Proyecto Final de Máster en Software Libre

"Estado del arte en soluciones de virtualización. Sistemas gestores de Cloud: OpenNebula"

Anexo1: Comandos ejecutados junto con sus salidas correspondientes, para realizar la instalación y puesta en servicio de la solución en el entorno de pruebas.

Administración de redes y sistemas operativos
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Resumen del Anexo1:

En el presente documento se pretende recoger todos los comandos ejecutados junto con sus salidas correspondientes, acompañados de los comentarios necesarios, para seguir los pasos acometidos durante los procesos de instalación, pruebas, y puesta a punto de la maqueta de gestión del datacenter virtualizado basado en OpenNebula.

La instalación y pruebas realizadas sobre la maqueta nos ha permitido adquirir el conocimiento y las destrezas necesarias en materia de virtualización, y en especial, de la solución de virtualización de datacenters basada en OpenNebula. Ello nos ha dado la ocasión de conocer a fondo las posibilidades y limitaciones ofrecidas por la plataforma, para poder aplicarlas con confianza y experiencia sobre el entorno de producción, sin llevarnos sorpresas. La solución desplegada sobre la maqueta pretende reflejar la misma configuración que se ha adoptado sobre el entorno de producción, con el fin de que las condiciones de trabajo sean lo más parecidas posible en ambos entornos, y podamos probar cualquier configuración sobre el entorno de pruebas, sin asumir riesgos innecesarios sobre el entorno de producción.

Se ha intentado ser lo más riguroso posible (incluyendo los problemas encontrados y las soluciones adoptadas), de tal forma que pueda servir de guía a cualquiera que desee implantar la misma solución (o similar), y ahorrarle el trabajo de caer en los mismos errores, sin tener que tropezar con las mismas piedras durante el camino.

Los pasos recogidos en el presente documento siguen estrictamente el mismo orden que el abordado en la ejecución de los comandos realizados durante la instalación y exploración de la solución sobre la maqueta. Como el criterio de implantación y exploración de las opciones va en función de las necesidades a cubrir, las posibilidades a probar, y los problemas encontrados durante la fase de aprendizaje, no podemos establecer un guión similar al de un manual de aprendizaje formal de una materia, donde los capítulos siguen una estructura que permita al que lo lea seguir una linea de progresión bien delimitada, sino más bien a las anotaciones de un *diario de abordo* o *cuaderno de bitácora*, con el fin de recoger fielmente todo lo que se ha hecho para conseguir probar, explorar, y conocer a fondo, las funcionalidades y opciones que ofrece la solución.

Es por ello por lo que definir un índice para este documento no tiene mucho sentido (al contrario de lo que ocurre con la memoria principal), y por eso no lo hemos incluido.

Este anexo (junto con el anexo 2, correspondiente a la instalación de la plataforma de producción) forma parte de los materiales entregables del Trabajo de Fin de Máster presentado por el alumno.

Comandos y salidas ejecutados y comentados, realizados en en entorno de pruebas

Partimos de la instalación del sistema operativo CentOS 6.4. basada en formato DVD (DVDs 1 y 2, aunque este último no lo necesitamos). Los pasos seguidos en la instalación del sistema operativo de la máquina física de la maqueta de pruebas serán los mismos que se realizarán en las posteriores instalaciones sobre todos los servidores (tanto de pruebas como de producción) que componen la solución. La instalación de la máquina física seguirá la instalación típica de **basic server** de CentOS para esa versión, configurando de antemano los parámetros de red, y dejando el resto de parámetros de la instalación por defecto.

Una vez realizado el primer arranque de la máquina recién instalada, hacemos un: **yum update**

A continuación, tenemos que confirmar la ultima versión de kernel instalada, y hacer:

```
yum reinstall kernel-2.6.32-358.18.1.el6.x86_64
```

Una vez reiniciada la máquina tenemos que hacer una limpieza de las transacciones pendientes:

```
yum-complete-transaction
```

Para poder acceder de forma remota por ssh y ejecutar aplicaciones X11 hay que instalar el siguiente paquete en el servidor:

```
yum install xorg-x11-xauth
```

Además tendremos que instalar los paquetes de virtualización:

```
yum install libvirt-client libvirt libvirt-snmp
yum install qemu-kvm qemu-kvm-tools qemu-img
yum install virt-manager virt-top virt-viewer python-virtinst
```

Una vez instalado todo, tenemos que asegurarnos que el libvirtd está arrancado y que quedará arrancado cada vez que se reinicie la máquina física:

```
[root@Testit ~]# chkconfig --list libvirtd
libvirtd        0:off   1:off   2:off   3:on    4:on    5:on    6:off


[root@Testit ~]# service libvirtd start
Starting libvirtd daemon: 2013-10-04 12:37:25.345+0000: 26650: info : libvirt version: 0.10.2,
package: 18.el6_4.14 (CentOS BuildSystem <http://bugs.centos.org>, 2013-09-19-19:15:27,
c6b8.bsys.dev.centos.org)
2013-10-04 12:37:25.345+0000: 26650: warning : virGetHostname:2266 : getaddrinfo failed for 'Testit':
Name or service not known
                                                           [  OK  ]
```

Además tenemos que editar el /etc/hosts y añadir el nombre de la máquina (??) en la IP de loopback, para que no se queje el proceso libvirtd al reiniciarse:

```
[root@Testit ~]# head -1 /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4 Testit
```

Consultamos y comprobamos que se ha creado el interfaz virbr0:

```
virbr0    Link encap:Ethernet  HWaddr 52:54:00:7E:A9:0C
          inet addr:192.168.122.1  Bcast:192.168.122.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
```

```
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)
```

Creamos un directorio especial donde almacenar las imágenes instaladas en la máquina física.

```
[root@Testit ~]# df -h
Filesystem            Size  Used Avail Use% Mounted on
/dev/mapper/vg_Testit-lv_root
                       50G  2.3G   45G   5% /
tmpfs                 1.9G     0  1.9G   0% /dev/shm
/dev/sda1             485M   64M  397M  14% /boot
/dev/mapper/vg_Testit-lv_home
                      405G  199M  385G   1% /home
```

Donde hay más espacio es el /home, así que tendremos que crear un directorio dentro de /home y en caso necesario, utilizar un softlink:

```
[root@Testit home]# mkdir libvirtimages
```

Ahora podemos instalar la imagen de Centos 6.4 virtualizada.

```
[root@Testit home]# virt-install --prompt
What is the name of your virtual machine?
centos64_x86_64
How much RAM should be allocated (in megabytes)?
1024
What would you like to use as the disk (file path)?
/home/libvirtimages/centos64_x86_64.qcow2
How large would you like the disk (/home/libvirtimages/centos64_x86_64.qcow2) to be (in gigabytes)?
40
What is the install CD-ROM/ISO or URL?
/dev/sr0

Starting install...
Creating storage file centos64_x86_64.qcow2
|  40 GB     00:00
Creating domain...
|    0 B     00:02

** (virt-viewer:26883): CRITICAL **: virt_viewer_display_get_monitor: assertion
`VIRT_VIEWER_IS_DISPLAY(self)' failed
```

Repetimos la instalación estándar de Centos 6.4, para que queden reflejados los pasos de instalación del sistema operativo, que utilizaremos en todos los servidores que instalemos para la solución:

1) Escogemos la instalación nueva con vídeo básico.

2) nos saltamos el testing media (skip).

3) Una vez arrancado el modo gráfico, hacemos lo siguiente (presionamos control+alt para liberar el cursor del ratón):

4) Seleccionamos el idioma de la instalación en inglés, y el idioma del teclado spanish.

5) Seleccionamos una instalación con Basic Storage Devices (lo que viene por defecto).

6) Nos aparece un mensaje de warning diciendo que no detecta el tipo de unidad. Le confirmamos que queremos descartaros datos del disco.

7) una vez detectado el disco, nos pide meter el hostname. Lo dejamos tal y como está por defecto (localhost.localdomain).

8) También nos saltamos la configuración de la red, pues vamos a utilizar DHCP por defecto.

9) Escogemos el timezone a Madrid, y dejamos por defecto el UTC pinchado. Además metemos la password de root.

10) Aquí tenemos el tema de escoger cómo particionamos la imagen. Le decimos que queremos hacer el layout nosotros.

Para ello probamos a marcar al mismo tiempo: Use all Space, y abajo del todo: "Review and modify partitioning layout".

Probamos a montar una partición física sda1 con / ext4 y todo el espacio posible, y otra sda2 con 4096M para swap.

Nos advierte que será todo formateado, y le decimos que adelante.

Una vez formateada la imagen, nos pregunta donde instalar el boot loader, y le indicamos por defecto que en /dev/sda.

A continuación nos pregunta por el tipo de instalación, y le decimos que queremos una instalación básica de servidor.

Nota importante: en el servidor Dell hay que activar la virtualización hardware en la BIOS.

Nota: como no hemos configurado el networking, la imagen levantaba sin el interfaz eth0. He tenido que crear a mano el fichero ifcfg-eth0 para que levantase el interfaz con una IP por DHCP.

Nota: la imagen anterior, es de tipo raw, así que tenemos que pasarla a modo qcow2 para poder hacer snapshots:

```
[root@Testit libvirtimages]# mv centos64_x86_64.qcow2 centos64_x86_64.img
[root@Testit libvirtimages]# qemu-img convert -p -O qcow2 centos64_x86_64.img centos64_x86_64.qcow2
    (100.00/100%)
[root@Testit libvirtimages]# ll
total 6390312
-rwxr-xr-x. 1 root root 42949672960 Oct  5 04:27 centos64_x86_64.img
-rw-r--r--. 1 qemu qemu  2967339008 Oct  5 04:50 centos64_x86_64.qcow2
```

Ahora clonamos la imagen original para sacar las 3 máquinas virtuales que nos servirán para montar la maqueta:

```
[root@Testit libvirtimages]# virt-clone --prompt
What is the name of the original virtual machine?
centos64_x86_64
What is the name for the cloned virtual machine?
opennebula_frontend
What would you like to use as the cloned disk (file path) for
'/home/libvirtimages/centos64_x86_64.qcow2'?
/home/libvirtimages/opennebula_frontend.qcow2
Cloning centos64_x86_64.qcow2
| 2.8 GB     00:50

Clone 'opennebula_frontend' created successfully.
[root@Testit libvirtimages]# ll
total 9273340
-rwxr-xr-x. 1 root root 42949672960 Oct  5 04:27 centos64_x86_64.img
-rw-r--r--. 1 root root  2967339008 Oct  5 04:54 centos64_x86_64.qcow2
-rwxr-xr-x. 1 root root  2967339008 Oct  5 04:58 opennebula_frontend.qcow2
[root@Testit libvirtimages]# virsh list --all
 Id    Name                           State
----------------------------------------------------
 -     centos64_x86_64                shut off
 -     opennebula_frontend            shut off

[root@Testit libvirtimages]# virt-clone --prompt
What is the name of the original virtual machine?
centos64_x86_64
What is the name for the cloned virtual machine?
opennebula_node1
What would you like to use as the cloned disk (file path) for
'/home/libvirtimages/centos64_x86_64.qcow2'?
/home/libvirtimages/opennebula_node1.qcow2
Cloning centos64_x86_64.qcow2
| 2.8 GB     00:51

Clone 'opennebula_node1' created successfully.
[root@Testit libvirtimages]# virt-clone --prompt
What is the name of the original virtual machine?
centos64_x86_64
What is the name for the cloned virtual machine?
opennebula_node2
What would you like to use as the cloned disk (file path) for
'/home/libvirtimages/centos64_x86_64.qcow2'?
/home/libvirtimages/opennebula_node2.qcow2
Cloning centos64_x86_64.qcow2
| 2.8 GB     00:51
```

```
Clone 'opennebula_node2' created successfully.
[root@Testit libvirtimages]# ll
total 15039396
-rwxr-xr-x. 1 root root 42949672960 Oct  5 04:27 centos64_x86_64.img
-rw-r--r--. 1 root root  2967339008 Oct  5 04:54 centos64_x86_64.qcow2
-rwxr-xr-x. 1 root root  2967339008 Oct  5 04:58 opennebula_frontend.qcow2
-rwxr-xr-x. 1 root root  2967339008 Oct  5 05:00 opennebula_node1.qcow2
-rwxr-xr-x. 1 root root  2967339008 Oct  5 05:01 opennebula_node2.qcow2
[root@Testit libvirtimages]#
```

Seguimos configurando cosas. Tenemos que configurar el ntp:

```
[root@Testit ~]# service ntpd start
Starting ntpd:                                             [  OK  ]
[root@Testit ~]# ntpstat
unsynchronised
   polling server every 16 s
```

Ya tenemos el equipo con la hora OK. Tenemos que hacer que el servicio quede activado con cada arranque.

```
[root@Testit ~]# chkconfig --list ntpd
ntpd            0:off   1:off   2:off   3:off   4:off   5:off   6:off
[root@Testit ~]# chkconfig  ntpd on
[root@Testit ~]# chkconfig --list ntpd
ntpd            0:off   1:off   2:on    3:on    4:on    5:on    6:off
```

Lo mismo tenemos que hacer con el resto de máquinas. Ahora pasamos a configurar una a una las tres máquinas virtuales.

```
[root@Testit ~]# virsh list --all
 Id    Name                           State
----------------------------------------------------
 -     centos64_x86_64                shut off
 -     opennebula_frontend            shut off
 -     opennebula_node1               shut off
 -     opennebula_node2               shut off
```

La máquina llamada frontend llevará todo el sistema de gestión de la nube. Las máquinas llamadas node1 y node2 correrán a través de KVM las instancias virtualizadas.

La máquina física será la encargada de hacer de servidor NFS para gestionar las imágenes y las instancias de estas de forma compartida para los dos nodos y el frontend.

Hemos decidido sacar el servidor NFS del frontend, por no instalar las imágenes dentro de una imagen virtual (en la maqueta), y porque tenemos la posibilidad de contar un un cuarto equipo, que en este caso es el equipo físico donde reside la maqueta. Esto nos ayudará también a mover las imágenes preparadas al entorno de producción, y aumentará los ratios de rendimiento al crear las instancias en la nube.

Respecto al diseño de la red, hemos decidido crear 3 segmentos de red, que corresponderán a tres interfaces en cada uno de los equipos que componen la nube:

- Interfaz eth0 (en los tres equipos): será el interfaz de salida a internet, y de gestión de los equipos.
- Interfaz eth1 (en los tres equipos): será el interfaz utilizado para la red NFS. Como las imágenes instanciadas se encontrarán en el servidor NFS, esta red debe de ser dedicada y se empleará para ello un interfaz de red.
- Interfaz eth2: (sólo en los dos nodos): Será utilizada para establecer las VLANs que interconectarán las instancias repartidas entre los dos nodos, para que las máquinas virtuales puedan conectarse entre sí, aunque se encuentren en nodos diferentes.

Vamos a ir entrando en cada una de las máquinas que formarán la nube, y vamos a personalizar la configuración de acuerdo al roll que deberá desempeñar cada una de ellas.

Empezamos con el frontend:

Cambiamos el hostname de localhost a "one-admin":

```
hostname one-admin
```

Y editamos el fichero /etc/sysconfig/network

```
HOSTNAME=one-admin
```

En /etc/sysconfig/network-scripts configuramos el interfaz eth0 para poder administrarse por ssh:

```
::::::::::::::
ifcfg-eth0
::::::::::::::
DEVICE=eth0
TYPE=Ethernet
ONBOOT=yes
BOOTPROTO=none
IPADDR=192.168.122.2
PREFIX=8
GATEWAY=192.168.122.1
DNS1=192.168.122.1
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
```

Al intentar levantar la máquina virtual del frontend tenemos problemas con las persistent-net-rules:

```
http://opennebula.org/documentation:archives:rel4.0:vm4market
```

Lo que vemos es que efectivamente, se ha creado un fichero /etc/udev/rules.d/70-persistent-net.rules con una línea para el interfaz eth0 que hace que se fuerce una entrada en el directorio udev con la MAC de la primera máquina creada:

```
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ATTR{address}=="52:54:00:3e:93:ae", ATTR{type}=="1",
KERNEL=="eth*", NAME="eth0"
```

La forma de solucionarlo es:

```
 >/etc/udev/rules.d/70-persistent-net.rules
```

Y en /lib/udev/rules.d/75-persistent-net-generator.rules comentar la linea:

```
DRIVERS=="?*", IMPORT{program}="write_net_rules"
```

Con esto reiniciamos la máquina y vemos si surte efecto. Pues si, ha surgido su efecto, y ya podemos acceder a al interfaz de red.

Ahora vamos a configurar el repositorio para instalar todos los paquetes del OpenNebula en los tres hosts. Creamos un archivo opennebula.repo con lo siguiente dentro de /etc/yum.repos.d/

```
[root@one-admin yum.repos.d]# more opennebula.repo
[opennebula]
name=opennebula
baseurl=http://opennebula.org/repo/CentOS/6/stable/x86_64
enabled=1
gpgcheck=0
```

Una vez salvado podemos probar que efectivamente el repositorio funciona:

```
[root@one-admin yum.repos.d]# yum search opennebula
Loaded plugins: fastestmirror, security
Loading mirror speeds from cached hostfile
 * base: centos.mirror.privado1.es
 * extras: centos.mirror.privado1.es
 * updates: centos.mirror.privado1.es
base                                                                      | 3.7
kB     00:00
extras                                                                    | 3.4
kB     00:00
opennebula                                                                | 2.9
kB     00:00
opennebula/primary_db                                                     |  16
kB     00:00
updates                                                                   | 3.4
kB     00:00
============================================= N/S Matched: opennebula
==============================================
opennebula-common.x86_64 : Provides the OpenNebula user
opennebula-context.x86_64 : Configures a Virtual Machine for OpenNebula
opennebula-flow.x86_64 : Manage OpenNebula Services
opennebula-gate.x86_64 : Transfer information from Virtual Machines to OpenNebula
opennebula-java.x86_64 : Java interface to OpenNebula Cloud API
opennebula-node-kvm.x86_64 : Configures an OpenNebula node providing kvm
opennebula-ruby.x86_64 : Provides the OpenNebula Ruby libraries
opennebula-server.x86_64 : Provides the OpenNebula servers
opennebula.x86_64 : Cloud computing solution for Data Center Virtualization
opennebula-ozones.x86_64 : Tool for administering
opennebula-sunstone.x86_64 : Browser based UI and public cloud interfaces.

  Name and summary matches only, use "search all" for everything.
```

```
[root@one-admin yum.repos.d]# yum info opennebula-common
Loaded plugins: fastestmirror, security
Loading mirror speeds from cached hostfile
 * base: centos.mirror.privado1.es
 * extras: centos.mirror.privado1.es
 * updates: centos.mirror.privado1.es
Available Packages
Name        : opennebula-common
Arch        : x86_64
Version     : 4.2.0
Release     : 1
Size        : 5.4 k
Repo        : opennebula
Summary     : Provides the OpenNebula user
URL         : http://opennebula.org
License     : Apache
Description : This package creates the oneadmin user and group, with id/gid 9869.
```

Comprobado que funciona, vamos a centrarnos en replicar la información al resto de máquinas. Antes de replicar las máquinas, vamos a automatizar el ssh desde el host hacia las máquinas. Desde Testit creamos una clave para root, que podremos exportar en las maquinas del cluster.

```
[root@Testit ~]# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa.
Your public key has been saved in /root/.ssh/id_rsa.pub.
The key fingerprint is:
6e:7a:be:89:b1:8a:3f:bf:b6:f0:a3:82:d2:89:f0:8d root@Testit
The key's randomart image is:
+--[ RSA 2048]----+
|                 |
|                 |
|                 |
|                 |
|        S        |
|.      .         |
|.= +. . o        |
|+ E.ooo*..       |
|. .o+*O*+.       |
+-----------------+
```

Ya está. Ahora tenemos que exportar esa clave pública al frontend:

```
[root@Testit .ssh]# ll
total 20
```

```
-rw-------. 1 root root  449 Oct  3 21:20 authorized_keys
-rw-------. 1 root root 1675 Oct  6 01:11 id_rsa
-rw-r--r--. 1 root root  393 Oct  6 01:11 id_rsa.pub
-rw-r--r--. 1 root root  796 Oct  5 21:19 known_hosts
-rw-r--r--. 1 root root  225 Oct  3 21:01 Tesla
```

Copiamos el fichero id_rsa.pub del host como authorized_keys en el frontend:

```
[root@Testit ~]# ssh-copy-id -i .ssh/id_rsa.pub root@one-admin
```

Generamos también una clave para el usuario del servidor, con la idea que desde root también se pueda saltar entre las tres máquinas:

```
[root@one-admin .ssh]# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa.
Your public key has been saved in /root/.ssh/id_rsa.pub.
The key fingerprint is:
df:1d:b3:0a:0d:f4:c0:57:a2:b1:74:7e:af:b8:78:3b root@one-admin
The key's randomart image is:
+--[ RSA 2048]----+
|          o o .  |
|         o * o   |
|          * o .  |
|         . + . . |
|        S . . o .|
|         . + o = |
|          o + +  |
|           oEo   |
|          ..+o   |
+-----------------+
[root@one-admin .ssh]#
```

Añadimos la clave pública a la lista de host autorizados.

```
[root@one-admin .ssh]# cat id_rsa.pub >> authorized_keys
[root@one-admin .ssh]# ll
total 12
-rw-------. 1 root root  789 Oct  6 01:24 authorized_keys
-rw-------. 1 root root 1675 Oct  6 01:23 id_rsa
-rw-r--r--. 1 root root  396 Oct  6 01:23 id_rsa.pub
```

Editamos el fichero /etc/hosts y añadimos las IPs de las tres máquinas del cluster:

```
[root@one-admin .ssh]# more /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.168.122.2   one-admin
192.168.122.3   one-node1
```

```
192.168.122.4   one-node2
```

Modificamos el fichero /etc/ssh/sshd_config:

```
[root@one-admin ssh]# diff sshd_config sshd_config.org
122c122
< UseDNS no
---
> #UseDNS yes
```

Y el fichero ssh_config en el host para permitir el X11 Forwarding:

```
[root@Testit ssh]# diff ssh_config ssh_config.org
22c22
<     ForwardX11 yes
---
> #   ForwardX11 no
```

Ya lo tenemos todo. Reiniciamos y hacemos la prueba.

```
[root@Testit ssh]# ssh root@one-admin
Last login: Sun Oct  6 02:08:06 2013 from ::1
[root@one-admin ~]# ssh localhost
Last login: Sun Oct  6 02:11:38 2013 from 192.168.122.1
[root@one-admin ~]#
```

Perfecto. Ahora si que tenemos todo preparado para replicar las otras imágenes, y comenzar a instalar el cluster. Clonamos de nuevo los discos, incluso sacamos una imagen de seguridad para el frontend:

```
[root@Testit libvirtimages]# virt-clone --prompt
What is the name of the original virtual machine?
opennebula_frontend
What is the name for the cloned virtual machine?
one-admin
What would you like to use as the cloned disk (file path) for
'/home/libvirtimages/opennebula_frontend.qcow2'?
/home/libvirtimages/one-admin.qcow2
Cloning opennebula_frontend.qcow2
| 2.8 GB     00:51


Clone 'one-admin' created successfully.
[root@Testit libvirtimages]# virt-clone --prompt
What is the name of the original virtual machine?
opennebula_frontend
What is the name for the cloned virtual machine?
one-node1
What would you like to use as the cloned disk (file path) for
'/home/libvirtimages/opennebula_frontend.qcow2'?
/home/libvirtimages/one-node1.qcow2
Cloning opennebula_frontend.qcow2
| 2.8 GB     00:51


Clone 'one-node1' created successfully.
```

```
[root@Testit libvirtimages]# virt-clone --prompt
What is the name of the original virtual machine?
opennebula_frontend
What is the name for the cloned virtual machine?
one-node2
What would you like to use as the cloned disk (file path) for
'/home/libvirtimages/opennebula_frontend.qcow2'?
/home/libvirtimages/one-node2.qcow2
Cloning opennebula_frontend.qcow2
| 2.8 GB     00:52

Clone 'one-node2' created successfully.
[root@Testit libvirtimages]# virsh list --all
 Id    Name                           State
----------------------------------------------------
 -     centos64_x86_64                shut off
 -     one-admin                      shut off
 -     one-node1                      shut off
 -     one-node2                      shut off
 -     opennebula_frontend            shut off

[root@Testit libvirtimages]# ll
total 17923676
-rwxr-xr-x. 1 root root 42949672960 Oct  5 04:27 centos64_x86_64.img
-rw-r--r--. 1 root root  2967339008 Oct  5 04:54 centos64_x86_64.qcow2
-rwxr-xr-x. 1 root root  2967732224 Oct  6 02:19 one-admin.qcow2
-rwxr-xr-x. 1 root root  2967732224 Oct  6 02:22 one-node1.qcow2
-rwxr-xr-x. 1 root root  2967732224 Oct  6 02:23 one-node2.qcow2
-rwxr-xr-x. 1 root root  2967732224 Oct  6 02:14 opennebula_frontend.qcow2
[root@Testit libvirtimages]#
```

Ahora vamos arrancando las imágenes una por una, para cambiarles la IP fija al interfaz eth0. Ya lo tenemos todo. Sólo nos queda el tema de la red. Pero ahora mismo de momento vamos a instalar los paquetes, y mañana empezamos con la configuración. Arrancamos los tres equipos del cluster:

```
[root@Testit libvirtimages]# virsh list --all
 Id    Name                           State
----------------------------------------------------
 9     one-node2                      running
 10    one-node1                      running
 11    one-admin                      running
 -     centos64_x86_64                shut off
 -     opennebula_frontend            shut off
```

Entramos en el one-admin, que es el que tiene mas miga para instalar:

```
[root@Testit ssh]# ssh root@one-admin
Last login: Sun Oct  6 02:26:41 2013 from 192.168.122.1
[root@one-admin ~]# yum install opennebula-server opennebula-sunstone
```

Y vemos que efectivamente, para el Sunstone necesitamos algunos paquetes de ruby del EPEL, con lo que tenemos que activarlo si queremos tener el Sunstone. Vamos a instalar los paquetes necesarios en los nodos:

```
[root@Testit ssh]# ssh root@one-node1
Last login: Sun Oct  6 02:30:59 2013 from 192.168.122.1
[root@one-node1 ~]# yum install opennebula-node-kvm
Dependencies Resolved


================================================================================
 Package                 Arch              Version
Repository            Size
================================================================================
Installing:
 opennebula-node-kvm     x86_64            4.2.0-1
opennebula            6.5 k
Installing for dependencies:
 augeas-libs             x86_64            0.9.0-4.el6
base                  317 k
 celt051                 x86_64            0.5.1.3-0.el6
base                   50 k
 compat-readline5        x86_64            5.2-17.1.el6
base                  130 k
 cyrus-sasl-md5          x86_64            2.1.23-13.el6_3.1
base                   47 k
 dnsmasq                 x86_64            2.48-13.el6
base                  149 k
 ebtables                x86_64            2.0.9-6.el6
base                   95 k
 gnutls-utils            x86_64            2.8.5-10.el6_4.2
updates               100 k
 gpxe-roms-qemu          noarch            0.9.7-6.9.el6
base                  219 k
 iscsi-initiator-utils   x86_64            6.2.0.873-2.el6
base                  655 k
 libvirt                 x86_64            0.10.2-18.el6_4.14
updates               2.3 M
 libvirt-client          x86_64            0.10.2-18.el6_4.14
updates               4.0 M
 lzo                     x86_64            2.03-3.1.el6
base                   55 k
 lzop                    x86_64            1.02-0.9.rc1.el6
base                   50 k
 nc                      x86_64            1.84-22.el6
base                   57 k
 netcf-libs              x86_64            0.1.9-3.el6
base                   51 k
 opennebula-common       x86_64            4.2.0-1
opennebula            5.4 k
```

```
 qemu-img                                  x86_64                    2:0.12.1.2-
2.355.0.1.el6_4.9                        updates                     475 k
 qemu-kvm                                  x86_64                    2:0.12.1.2-
2.355.0.1.el6_4.9                        updates                     1.3 M
 radvd                                     x86_64                    1.6-1.el6
base                                75 k
 ruby                                      x86_64                    1.8.7.352-12.el6_4
updates                             534 k
 ruby-libs                                 x86_64                    1.8.7.352-12.el6_4
updates                             1.6 M
 seabios                                   x86_64                    0.6.1.2-26.el6
base                                91 k
 sgabios-bin                               noarch                    0-0.3.20110621svn.el6
base                                6.6 k
 spice-server                              x86_64                    0.12.0-12.el6_4.3
updates                             326 k
 usbredir                                  x86_64                    0.5.1-1.el6
base                                40 k
 vgabios                                   noarch                    0.6b-3.7.el6
base                                42 k
 yajl                                      x86_64                    1.0.7-3.el6
base                                27 k

Transaction Summary
================================================================================
================================================================================
Install      28 Package(s)

Total download size: 13 M
Installed size: 40 M
Is this ok [y/N]:y
```

Después de instalarlo vemos que ha creado correctamente los usuarios qemu y oneadmin en /etc/passwd:

```
oneadmin:x:9869:9869::/var/lib/one:/bin/bash
qemu:x:107:107:qemu user:/:/sbin/nologin
```

Vamos a por el otro nodo. Es exactamente igual:

```
[root@Testit ssh]# ssh root@one-node2
Last login: Sun Oct  6 02:34:01 2013 from 192.168.122.1
[root@one-node2 ~]# yum install opennebula-node-kvm
```

Ya está. Ahora vamos a pelearnos con el EPEL.

```
[root@Testit ssh]# ssh root@one-admin
Last login: Sun Oct  6 02:40:01 2013 from 192.168.122.1
[root@one-admin ~]# wget http://dl.fedoraproject.org/pub/epel/6/i386/epel-release-6-8.noarch.rpm
--2013-10-06 02:55:25--  http://dl.fedoraproject.org/pub/epel/6/i386/epel-release-6-8.noarch.rpm
Resolving dl.fedoraproject.org... 209.132.181.27, 209.132.181.23, 209.132.181.24, ...
Connecting to dl.fedoraproject.org|209.132.181.27|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 14540 (14K) [application/x-rpm]
```

```
Saving to: “epel-release-6-8.noarch.rpm”

100% [==========================================================================================================
============================>] 14,540      84.0K/s   in 0.2s

2013-10-06 02:55:26 (84.0 KB/s) - “epel-release-6-8.noarch.rpm” saved [14540/14540]

[root@one-admin ~]#  ll
total 60
-rw-------. 1 root root  1194 Oct  4 16:32 anaconda-ks.cfg
-rw-r--r--. 1 root root 14540 Nov  5  2012 epel-release-6-8.noarch.rpm
-rw-r--r--. 1 root root 26505 Oct  4 16:32 install.log
-rw-r--r--. 1 root root  7572 Oct  4 16:18 install.log.syslog
[root@one-admin ~]# yum localinstall epel-release-6-8.noarch.rpm
Loaded plugins: fastestmirror, security
Setting up Local Package Process
Examining epel-release-6-8.noarch.rpm: epel-release-6-8.noarch
Marking epel-release-6-8.noarch.rpm to be installed
Loading mirror speeds from cached hostfile
 * base: centos.mirror.privado1.es
 * extras: centos.mirror.privado1.es
 * updates: centos.mirror.privado1.es
Resolving Dependencies
--> Running transaction check
---> Package epel-release.noarch 0:6-8 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================================================
================================================================
 Package                                 Arch                                 Version
Repository                                          Size
================================================================================================================
================================================================
Installing:
 epel-release                            noarch                               6-8
/epel-release-6-8.noarch                            22 k

Transaction Summary
================================================================================================================
================================================================
Install       1 Package(s)

Total size: 22 k
Installed size: 22 k
```

```
Is this ok [y/N]: y
Downloading Packages:
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : epel-release-6-8.noarch
1/1
  Verifying  : epel-release-6-8.noarch
1/1

Installed:
  epel-release.noarch 0:6-8

Complete!
[root@one-admin ~]# yum repolist
Loaded plugins: fastestmirror, security
Loading mirror speeds from cached hostfile
epel/metalink
|  24 kB     00:00
 * base: centos.mirror.privado1.es
 * epel: ftp.rediris.es
 * extras: centos.mirror.privado1.es
 * updates: centos.mirror.privado1.es
epel
| 4.2 kB     00:00
epel/primary_db
| 5.6 MB     00:07
repo id                                                 repo name
status
base                                                    CentOS-6 - Base
6,381
epel                                                    Extra Packages for Enterprise Linux 6
- x86_64                                               9,758
extras                                                  CentOS-6 - Extras
13
opennebula                                              opennebula
21
updates                                                 CentOS-6 - Updates
1,326
repolist: 17,499
[root@one-admin ~]#
```

Perfecto. Ahora volvemos a probar con la instalación del OpenNebula en el one-admin:

```
[root@one-admin ~]# yum install opennebula-server opennebula-sunstone
Dependencies Resolved

================================================================================
================================================================
```

```
 Package                                 Arch                          Version
Repository                            Size
================================================================================================================
================================================================================

Installing:
 opennebula-server                       x86_64                        4.2.0-1
opennebula                           864 k
 opennebula-sunstone                     x86_64                        4.2.0-1
opennebula                           1.1 M
Installing for dependencies:
 compat-readline5                        x86_64                        5.2-17.1.el6
base                                 130 k
 genisoimage                             x86_64                        1.1.9-12.el6
base                                 348 k
 log4cpp                                 x86_64                        1.0-13.el6
base                                 537 k
 opennebula                              x86_64                        4.2.0-1
opennebula                            58 k
 opennebula-common                       x86_64                        4.2.0-1
opennebula                           5.4 k
 opennebula-ruby                         x86_64                        4.2.0-1
opennebula                            53 k
 qemu-img                                x86_64                        2:0.12.1.2-
2.355.0.1.el6_4.9                      updates                       475 k
 ruby                                    x86_64                        1.8.7.352-12.el6_4
updates                              534 k
 ruby-irb                                x86_64                        1.8.7.352-12.el6_4
updates                              313 k
 ruby-libs                               x86_64                        1.8.7.352-12.el6_4
updates                              1.6 M
 ruby-rdoc                               x86_64                        1.8.7.352-12.el6_4
updates                              376 k
 rubygem-daemons                         noarch                        1.0.10-2.el6
epel                                 122 k
 rubygem-eventmachine                    x86_64                        0.12.10-4.el6
epel                                 355 k
 rubygem-json                            x86_64                        1.4.6-1.el6
epel                                 457 k
 rubygem-nokogiri                        x86_64                        1.4.3.1-1.el6
epel                                 308 k
 rubygem-rack                            noarch                        1:1.1.0-2.el6
epel                                 446 k
 rubygem-rack-test                       noarch                        0.5.4-1.el6
epel                                  62 k
 rubygem-sequel                          noarch                        4.1.1-1.el6
epel                                 2.2 M
 rubygem-sinatra                         noarch                        1:1.0-2.el6
epel                                 306 k
 rubygem-sqlite3-ruby                    x86_64                        1.2.4-5.el6
epel                                 221 k
 rubygem-thin                            x86_64                        1.2.8-4.el6
epel                                 187 k
```

```
 rubygem-uuidtools                       noarch                  2.1.1-1.el6
epel                             30 k
 rubygems                                noarch                  1.3.7-1.el6
base                            206 k
 usbredir                                x86_64                  0.5.1-1.el6
base                             40 k
 xmlrpc-c-c++                            x86_64                  1.16.24-1209.1840.el6
base                             66 k
 xmlrpc-c-client++                       x86_64                  1.16.24-1209.1840.el6
base                             36 k

Transaction Summary
================================================================================
================================================================

Install      28 Package(s)

Total download size: 11 M
Installed size: 39 M
Is this ok [y/N]: y
```

Esto nos lo saca por instalarla primera vez del repositorio del EPEL:

```
warning: rpmts_HdrFromFdno: Header V3 RSA/SHA256 Signature, key ID 0608b895: NOKEY
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-6
Importing GPG key 0x0608B895:
 Userid : EPEL (6) <epel@fedoraproject.org>
 Package: epel-release-6-8.noarch (@/epel-release-6-8.noarch)
 From   : /etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-6
Is this ok [y/N]: y
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
```

Todo lo demás sigue su curso, y nos genera un par de claves para el usuario de administración:

```
Generating public/private dsa key pair.
Created directory '/var/lib/one/.ssh'.
Your identification has been saved in /var/lib/one/.ssh/id_dsa.
Your public key has been saved in /var/lib/one/.ssh/id_dsa.pub.
The key fingerprint is:
00:64:e4:6d:92:4a:de:96:93:86:75:de:14:dd:d2:65 oneadmin@one-admin
```

Con esto ya tenemos la instalación de los paquetes. Queda configurar los interfaces de red en las máquinas para montar el NFS y las redes entre los nodos.

Desde el virt-manager creamos una red virtual llamada NFS_LAN sin NAT, con la IP 192.168.123.1/24, y sin DHCP, y otra igual llamada inter_nodes_vlans con la 192.168.124.1./24

Ahora tenemos que levantar las máquinas de nuevo, añadiéndole los interfaces de red a cada una de ellas. Ya está creado todo. Ahora arrancamos de nuevo las máquinas y asignamos los interfaces recién creados a cada una de ellas:

En one-admin tenemos que añadir esta línea al fichero ifcfg-eth0:

```
HWADDR=52:54:00:BE:75:EC
```

Ahora copiamos ese fichero y lo utilizamos para crear el eth1:

```
[root@one-admin network-scripts]# more ifcfg-eth1
DEVICE=eth1
TYPE=Ethernet
ONBOOT=yes
BOOTPROTO=none
HWADDR=52:54:00:D8:9E:2D
IPADDR=192.168.123.2
PREFIX=24
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
```

Probamos a levantar el interfaz:

```
[root@one-admin network-scripts]# ifup eth1
[root@one-admin network-scripts]# ifconfig
eth0      Link encap:Ethernet  HWaddr 52:54:00:BE:75:EC
          inet addr:192.168.122.2  Bcast:192.255.255.255  Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:febe:75ec/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:865 errors:0 dropped:0 overruns:0 frame:0
          TX packets:352 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:69771 (68.1 KiB)  TX bytes:50997 (49.8 KiB)

eth1      Link encap:Ethernet  HWaddr 52:54:00:D8:9E:2D
          inet addr:192.168.123.2  Bcast:192.255.255.255  Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:fed8:9e2d/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:329 errors:0 dropped:0 overruns:0 frame:0
          TX packets:8 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:17432 (17.0 KiB)  TX bytes:496 (496.0 b)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:472 errors:0 dropped:0 overruns:0 frame:0
          TX packets:472 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:62307 (60.8 KiB)  TX bytes:62307 (60.8 KiB)

[root@one-admin network-scripts]# ping 192.168.123.1
PING 192.168.123.1 (192.168.123.1) 56(84) bytes of data.
```

```
64 bytes from 192.168.123.1: icmp_seq=1 ttl=64 time=0.572 ms
64 bytes from 192.168.123.1: icmp_seq=2 ttl=64 time=0.144 ms
^C
--- 192.168.123.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1695ms
rtt min/avg/max/mdev = 0.144/0.358/0.572/0.214 ms
[root@one-admin network-scripts]#
```

Ahora nos toca hacer lo mismo con las otras dos máquinas.

Comenzamos con el nodo1, aprovechando el fichero ya creado para usarlo como plantilla.

Nota: nos hemos encontrado con el problema de que los nodos 1 y 2 utilizan también la red 192.168.122 para sus interfaces virbr0, con lo que entra en conflicto con el del host.

Esto se encuentra en este fichero:

```
/etc/libvirt/qemu/networks/default.xml:  <ip address="192.168.122.1" netmask="255.255.255.0">
/etc/libvirt/qemu/networks/default.xml:      <range start="192.168.122.2" end="192.168.122.254" />
```

Con lo que hay que cambiarlo en los nodos 1 y 2, y volver a reiniciarlos para recuperar el control. Hemos visto que no vale solo con eso, sino que también hay que modificarlos en el directorio

```
/var/lib/libvirt/network/default.xml:  <ip address='192.168.122.1' netmask='255.255.255.0'>
/var/lib/libvirt/network/default.xml:      <range start='192.168.122.2' end='192.168.122.254' />
::::::::::::::
default.xml
::::::::::::::
<!--
WARNING: THIS IS AN AUTO-GENERATED FILE. CHANGES TO IT ARE LIKELY TO BE
OVERWRITTEN AND LOST. Changes to this xml configuration should be made using:
  virsh net-edit default
or other application using the libvirt API.
-->

<network>
  <name>default</name>
  <uuid>cb2545e4-0200-473f-9c64-6160e06030b7</uuid>
  <forward mode='nat'/>
  <bridge name='virbr0' stp='on' delay='0' />
  <mac address='52:54:00:7E:A9:0C'/>
  <ip address='192.168.122.1' netmask='255.255.255.0'>
    <dhcp>
      <range start='192.168.122.2' end='192.168.122.254' />
    </dhcp>
  </ip>
</network>
```

Ahí está el meollo de la cuestión: hay que utilizar el comando para poder editarlo. No nos queda otra que editar el interfaz. Hacemos caso del comando, y la IP es la correcta (la red es la 192.168.125.1), pero la que sigue apareciendo en el interfaz es la 122.1

Pero también tenemos el problema de las iptables, y probablemente del servicio dnsmasq. editamos el fichero del eth1 a mano

Nota: después de haber dado un montón de vueltas con el tema de los puertos, por fin descubrimos que lo que configura el interfaz virbr0 es el contenido:

```
/var/lib/libvirt/network/default.xml
```

A pesar de lo que diga la documentación, e incluso configurando la red con el comando:

```
virsh net-edit default
```

Parece ser que ese comando es responsable de editar las iptables para actualizar el NAT, y permitir el tráfico entre los interfaces virbr.

Una vez constituidos los interfaces tipo bridge, tenemos que asociar el interfaz/red a la MAC correspondiente en cada máquina virtualizada. Así es como queda en el servidor one-admin:

```
[root@one-admin network-scripts]# more ifcfg-eth*
::::::::::::::
ifcfg-eth0
::::::::::::::
DEVICE=eth0
TYPE=Ethernet
ONBOOT=yes
BOOTPROTO=none
HWADDR=52:54:00:BE:75:EC
IPADDR=192.168.122.2
PREFIX=24
GATEWAY=192.168.122.1
DNS1=192.168.122.1
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
::::::::::::::
ifcfg-eth1
::::::::::::::
DEVICE=eth1
TYPE=Ethernet
ONBOOT=yes
BOOTPROTO=none
HWADDR=52:54:00:D8:9E:2D
IPADDR=192.168.123.2
PREFIX=24
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
```

Los interfaces una vez configurados quedan así:

```
[root@one-admin network-scripts]# ifconfig
eth0      Link encap:Ethernet  HWaddr 52:54:00:BE:75:EC
          inet addr:192.168.122.2  Bcast:192.168.122.255  Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:febe:75ec/64 Scope:Link
```

```
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:58802 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2405 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3862405 (3.6 MiB)  TX bytes:361485 (353.0 KiB)

eth1      Link encap:Ethernet  HWaddr 52:54:00:D8:9E:2D
          inet addr:192.168.123.2  Bcast:192.168.123.255  Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:fed8:9e2d/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:55913 errors:0 dropped:0 overruns:0 frame:0
          TX packets:31 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2931884 (2.7 MiB)  TX bytes:2194 (2.1 KiB)
```

En el servidor one-node1 queda así:

```
[root@one-node1 network-scripts]# more ifcfg-eth*
::::::::::::::
ifcfg-eth0
::::::::::::::
DEVICE=eth0
TYPE=Ethernet
ONBOOT=yes
BOOTPROTO=none
HWADDR=52:54:00:39:19:59
IPADDR=192.168.122.3
PREFIX=24
GATEWAY=192.168.122.1
DNS1=192.168.122.1
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
::::::::::::::
ifcfg-eth1
::::::::::::::
DEVICE=eth1
TYPE=Ethernet
ONBOOT=yes
BOOTPROTO=none
HWADDR=52:54:00:08:48:BE
IPADDR=192.168.123.3
PREFIX=24
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
::::::::::::::
```

```
ifcfg-eth2
:::::::::::::
DEVICE=eth2
TYPE=Ethernet
ONBOOT=yes
BOOTPROTO=none
HWADDR=52:54:00:73:4D:BE
IPADDR=192.168.124.3
PREFIX=24
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
```

Y una vez configurados aparecen así:

```
[root@one-node1 network-scripts]# ifconfig
eth0      Link encap:Ethernet  HWaddr 52:54:00:39:19:59
          inet addr:192.168.122.3  Bcast:192.168.122.255  Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:fe39:1959/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:57640 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1349 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3099959 (2.9 MiB)  TX bytes:197201 (192.5 KiB)

eth1      Link encap:Ethernet  HWaddr 52:54:00:08:48:BE
          inet addr:192.168.123.3  Bcast:192.168.123.255  Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:fe08:48be/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:55745 errors:0 dropped:0 overruns:0 frame:0
          TX packets:34 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2923116 (2.7 MiB)  TX bytes:2348 (2.2 KiB)

eth2      Link encap:Ethernet  HWaddr 52:54:00:73:4D:BE
          inet addr:192.168.124.3  Bcast:192.168.124.255  Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:fe73:4dbe/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:55716 errors:0 dropped:0 overruns:0 frame:0
          TX packets:34 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2921926 (2.7 MiB)  TX bytes:2348 (2.2 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
```

```
          RX packets:38 errors:0 dropped:0 overruns:0 frame:0
          TX packets:38 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:3192 (3.1 KiB)  TX bytes:3192 (3.1 KiB)

virbr0    Link encap:Ethernet  HWaddr 52:54:00:60:CF:CF
          inet addr:192.168.125.1  Bcast:192.168.125.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)
```

Y en el servidor one-node2:

```
[root@one-node2 network-scripts]# more ifcfg-eth*
::::::::::::::
ifcfg-eth0
::::::::::::::
DEVICE=eth0
TYPE=Ethernet
ONBOOT=yes
BOOTPROTO=none
HWADDR=52:54:00:F8:19:32
IPADDR=192.168.122.4
PREFIX=24
GATEWAY=192.168.122.1
DNS1=192.168.122.1
DEFROUTE=yes
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
::::::::::::::
ifcfg-eth1
::::::::::::::
DEVICE=eth1
TYPE=Ethernet
ONBOOT=yes
BOOTPROTO=none
HWADDR=52:54:00:39:74:28
IPADDR=192.168.123.4
PREFIX=24
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
::::::::::::::
ifcfg-eth2
::::::::::::::
DEVICE=eth2
```

```
TYPE=Ethernet
ONBOOT=yes
BOOTPROTO=none
HWADDR=52:54:00:15:e8:a4
IPADDR=192.168.124.4
PREFIX=24
IPV4_FAILURE_FATAL=yes
IPV6INIT=no
```

Quedando así:

```
[root@one-node2 network-scripts]# ifconfig
eth0      Link encap:Ethernet  HWaddr 52:54:00:F8:19:32
          inet addr:192.168.122.4  Bcast:192.168.122.255  Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:fef8:1932/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:56970 errors:0 dropped:0 overruns:0 frame:0
          TX packets:797 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3033489 (2.8 MiB)  TX bytes:110649 (108.0 KiB)

eth1      Link encap:Ethernet  HWaddr 52:54:00:39:74:28
          inet addr:192.168.123.4  Bcast:192.168.123.255  Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:fe39:7428/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:55913 errors:0 dropped:0 overruns:0 frame:0
          TX packets:37 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2932090 (2.7 MiB)  TX bytes:2670 (2.6 KiB)

eth2      Link encap:Ethernet  HWaddr 52:54:00:15:E8:A4
          inet addr:192.168.124.4  Bcast:192.168.124.255  Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:fe15:e8a4/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:55887 errors:0 dropped:0 overruns:0 frame:0
          TX packets:39 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2930960 (2.7 MiB)  TX bytes:2782 (2.7 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:32 errors:0 dropped:0 overruns:0 frame:0
          TX packets:32 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:2688 (2.6 KiB)  TX bytes:2688 (2.6 KiB)
```

```
virbr0    Link encap:Ethernet  HWaddr 52:54:00:15:2B:DB
          inet addr:192.168.125.1  Bcast:192.168.125.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)
```

Si hacemos pruebas de conectividad entre las máquinas podremos ver que hay conectividad a través de las tres redes:

```
[root@one-node2 network-scripts]# ip route
192.168.124.0/24 dev eth2  proto kernel  scope link  src 192.168.124.4
192.168.125.0/24 dev virbr0  proto kernel  scope link  src 192.168.125.2
192.168.122.0/24 dev eth0  proto kernel  scope link  src 192.168.122.4
192.168.123.0/24 dev eth1  proto kernel  scope link  src 192.168.123.4
169.254.0.0/16 dev eth0  scope link  metric 1002
169.254.0.0/16 dev eth1  scope link  metric 1003
169.254.0.0/16 dev eth2  scope link  metric 1004
default via 192.168.122.1 dev eth0
[root@one-node2 network-scripts]#
[root@one-node2 network-scripts]# ping  192.168.122.1
PING 192.168.122.1 (192.168.122.1) 56(84) bytes of data.
64 bytes from 192.168.122.1: icmp_seq=1 ttl=64 time=0.136 ms
64 bytes from 192.168.122.1: icmp_seq=2 ttl=64 time=0.090 ms
^C
--- 192.168.122.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1024ms
rtt min/avg/max/mdev = 0.090/0.113/0.136/0.023 ms
[root@one-node2 network-scripts]# ping  192.168.122.2
PING 192.168.122.2 (192.168.122.2) 56(84) bytes of data.
64 bytes from 192.168.122.2: icmp_seq=1 ttl=64 time=0.910 ms
64 bytes from 192.168.122.2: icmp_seq=2 ttl=64 time=0.341 ms
^C
--- 192.168.122.2 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1694ms
rtt min/avg/max/mdev = 0.341/0.625/0.910/0.285 ms
[root@one-node2 network-scripts]# ping  192.168.122.3
PING 192.168.122.3 (192.168.122.3) 56(84) bytes of data.
64 bytes from 192.168.122.3: icmp_seq=1 ttl=64 time=1.17 ms
64 bytes from 192.168.122.3: icmp_seq=2 ttl=64 time=0.261 ms
^C
--- 192.168.122.3 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1654ms
rtt min/avg/max/mdev = 0.261/0.715/1.170/0.455 ms
[root@one-node2 network-scripts]# ping  192.168.122.4
```

```
PING 192.168.122.4 (192.168.122.4) 56(84) bytes of data.
64 bytes from 192.168.122.4: icmp_seq=1 ttl=64 time=0.020 ms
^C
--- 192.168.122.4 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 998ms
rtt min/avg/max/mdev = 0.020/0.020/0.020/0.000 ms
[root@one-node2 network-scripts]# ping  192.168.123.1
PING 192.168.123.1 (192.168.123.1) 56(84) bytes of data.
64 bytes from 192.168.123.1: icmp_seq=1 ttl=64 time=0.706 ms
^C
--- 192.168.123.1 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 950ms
rtt min/avg/max/mdev = 0.706/0.706/0.706/0.000 ms
[root@one-node2 network-scripts]# ping  192.168.123.2
PING 192.168.123.2 (192.168.123.2) 56(84) bytes of data.
64 bytes from 192.168.123.2: icmp_seq=1 ttl=64 time=1.04 ms
64 bytes from 192.168.123.2: icmp_seq=2 ttl=64 time=0.193 ms
^C
--- 192.168.123.2 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1174ms
rtt min/avg/max/mdev = 0.193/0.619/1.045/0.426 ms
[root@one-node2 network-scripts]# ping  192.168.123.3
PING 192.168.123.3 (192.168.123.3) 56(84) bytes of data.
64 bytes from 192.168.123.3: icmp_seq=1 ttl=64 time=1.16 ms
64 bytes from 192.168.123.3: icmp_seq=2 ttl=64 time=0.223 ms
^C
--- 192.168.123.3 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1438ms
rtt min/avg/max/mdev = 0.223/0.692/1.161/0.469 ms
[root@one-node2 network-scripts]# ping  192.168.123.4
PING 192.168.123.4 (192.168.123.4) 56(84) bytes of data.
64 bytes from 192.168.123.4: icmp_seq=1 ttl=64 time=0.018 ms
64 bytes from 192.168.123.4: icmp_seq=2 ttl=64 time=0.018 ms
^C
--- 192.168.123.4 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1606ms
rtt min/avg/max/mdev = 0.018/0.018/0.018/0.000 ms
[root@one-node2 network-scripts]# ping  192.168.124.1
PING 192.168.124.1 (192.168.124.1) 56(84) bytes of data.
64 bytes from 192.168.124.1: icmp_seq=1 ttl=64 time=0.888 ms
64 bytes from 192.168.124.1: icmp_seq=2 ttl=64 time=0.086 ms
^C
--- 192.168.124.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1366ms
rtt min/avg/max/mdev = 0.086/0.487/0.888/0.401 ms
```

```
[root@one-node2 network-scripts]# ping  192.168.124.3
PING 192.168.124.3 (192.168.124.3) 56(84) bytes of data.
64 bytes from 192.168.124.3: icmp_seq=1 ttl=64 time=1.05 ms
64 bytes from 192.168.124.3: icmp_seq=2 ttl=64 time=0.251 ms
^C
--- 192.168.124.3 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1270ms
rtt min/avg/max/mdev = 0.251/0.650/1.050/0.400 ms
[root@one-node2 network-scripts]# ping  192.168.124.4
PING 192.168.124.4 (192.168.124.4) 56(84) bytes of data.
64 bytes from 192.168.124.4: icmp_seq=1 ttl=64 time=0.022 ms
64 bytes from 192.168.124.4: icmp_seq=2 ttl=64 time=0.017 ms
^C
--- 192.168.124.4 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1070ms
rtt min/avg/max/mdev = 0.017/0.019/0.022/0.005 ms
```

La tabla de MACs resuelve el ARP por los interfaces correctos:

```
[root@one-node2 network-scripts]# arp -e
Address                  HWtype  HWaddress           Flags Mask            Iface
192.168.124.1            ether   52:54:00:3a:6f:75   C                     eth2
192.168.123.2            ether   52:54:00:d8:9e:2d   C                     eth1
one-node1                ether   52:54:00:39:19:59   C                     eth0
192.168.124.3            ether   52:54:00:73:4d:be   C                     eth2
192.168.123.3            ether   52:54:00:08:48:be   C                     eth1
192.168.122.1            ether   52:54:00:7e:a9:0c   C                     eth0
one-admin                ether   52:54:00:be:75:ec   C                     eth0
192.168.123.1            ether   52:54:00:7d:68:1e   C                     eth1
```

Mientras que en el host podemos ver que ocurre lo mismo, después de hacer ping a todos los interfaces de los equipos virtualizados:

```
[root@Testit ~]# arp -e
Address                  HWtype  HWaddress           Flags Mask            Iface
192.168.123.2            ether   52:54:00:d8:9e:2d   C                     virbr1
one-node2                ether   52:54:00:f8:19:32   C                     virbr0
one-admin                ether   52:54:00:be:75:ec   C                     virbr0
192.168.123.3            ether   52:54:00:08:48:be   C                     virbr1
one-node1                ether   52:54:00:39:19:59   C                     virbr0
192.168.124.4            ether   52:54:00:15:e8:a4   C                     virbr2
192.168.124.3            ether   52:54:00:73:4d:be   C                     virbr2
192.168.123.4            ether   52:54:00:39:74:28   C                     virbr1
```

Y podemos ver los interfaces virtuales asociados a cada bridge:

```
[root@Testit ~]# brctl show
bridge name     bridge id               STP enabled     interfaces
virbr0          8000.5254007ea90c       yes             virbr0-nic
                                                        vnet0
                                                        vnet2
```

```
                                                vnet5
virbr1          8000.5254007d681e       yes             virbr1-nic
                                                vnet1
                                                vnet3
                                                vnet6
virbr2          8000.5254003a6f75       yes             virbr2-nic
                                                vnet4
                                                vnet7
[root@Testit ~]#
```

Con esto ya tenemos la maqueta preparada para la configuración del OpenNebula.

Ahora paramos las máquinas virtuales, y sacamos los snapshots para iniciar la configuración de base.

```
[root@Testit ~]# virsh snapshot-create-as one-admin one-admin_base "one-admin before ON config"
Domain snapshot one-admin_base created
[root@Testit ~]# virsh snapshot-list --parent one-admin
 Name                 Creation Time             State           Parent
------------------------------------------------------------
 one-admin_base       2013-10-07 13:02:26 +0200 shutoff
```

Hacemos lo mismo con las otras dos máquinas:

```
[root@Testit ~]# virsh snapshot-create-as one-node1 one-node1_base "one-node1 before ON config"
Domain snapshot one-node1_base created
[root@Testit ~]# virsh snapshot-create-as one-node2 one-node2_base "one-node2 before ON config"
Domain snapshot one-node2_base created
[root@Testit ~]# virsh snapshot-list one-node1
 Name                 Creation Time             State
------------------------------------------------------------
 one-node1_base       2013-10-07 13:10:48 +0200 shutoff

[root@Testit ~]# virsh snapshot-list one-node2
 Name                 Creation Time             State
------------------------------------------------------------
 one-node2_base       2013-10-07 13:11:12 +0200 shutoff
```

Ya tenemos todo preparado. A partir de aquí toda la configuración será sobre el entorno OpenNebula. Primero configuramos las claves para el usuario oneadmin, de tal forma que se pueda acceder de forma automática desde el frontend al resto de nodos, y viceversa. Trabajamos en el servidor one-admin con el usuario oneadmin. Primero, fijamos una password para el usuario oneadmin en los tres nodos:

```
[root@one-admin ~]# passwd oneadmin
Changing password for user oneadmin.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[root@one-admin ~]#

[root@one-node1 ~]# passwd oneadmin
```

```
Changing password for user oneadmin.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[root@one-node1 ~]#

[root@one-node2 ~]# passwd oneadmin
Changing password for user oneadmin.
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[root@one-node2 ~]#
```

Ahora entramos en el frontend con el usuario oneadmin, y preparamos el entorno passwordless para automatizar el acceso. Vemos que los paquetes de instalación de OpenNebula ya han creado el directorio .ssh y generado las claves, en el frontend:

```
[oneadmin@one-admin ~]$ cd .ssh
[oneadmin@one-admin .ssh]$ ll
total 12
-rw-------. 1 oneadmin oneadmin 608 Oct  6 03:00 authorized_keys
-rw-------. 1 oneadmin oneadmin 668 Oct  6 03:00 id_dsa
-rw-r--r--. 1 oneadmin oneadmin 608 Oct  6 03:00 id_dsa.pub
```

Vamos a crear el fichero ssh_config y a replicar el directorio .ssh en los dos nodos.

```
[root@one-admin ~]# cp /etc/ssh/ssh_config /var/lib/one/.ssh/
[root@one-admin ~]# cd /var/lib/one/.ssh/
[root@one-admin .ssh]# chown oneadmin:oneadmin ssh_config
```

Y añadimos lo siguiente al fichero:

```
[oneadmin@one-admin .ssh]$ more ssh_config
Host *
        StrictHostKeyChecking no
        UserKnownHostsFile /dev/null
```

Bien, ahora ya podemos copiarlo al resto de nodos. Para asegurarnos que lo hacemos correctamente, y evitar problemas de selinux, vamos a usar el comando ssh-copy-id:

```
[oneadmin@one-admin ~]$ ssh-copy-id -i .ssh/id_dsa.pub oneadmin@one-node1
oneadmin@one-node1's password:
Warning: No xauth data; using fake authentication data for X11 forwarding.
Now try logging into the machine, with "ssh 'oneadmin@one-node1'", and check in:

  .ssh/authorized_keys

to make sure we haven't added extra keys that you weren't expecting.

[oneadmin@one-admin ~]$ ssh-copy-id -i .ssh/id_dsa.pub oneadmin@one-node2
oneadmin@one-node2's password:
Warning: No xauth data; using fake authentication data for X11 forwarding.
/usr/bin/xauth:  creating new authority file /var/lib/one/.Xauthority
```

```
Now try logging into the machine, with "ssh 'oneadmin@one-node2'", and check in:

  .ssh/authorized_keys

to make sure we haven't added extra keys that you weren't expecting.
```

Ahora copiamos el resto de ficheros:

```
[oneadmin@one-admin ~]$ cd .ssh
[oneadmin@one-admin .ssh]$ scp id_dsa id_dsa.pub ssh_config oneadmin@one-node1:.ssh/
oneadmin@one-node1's password:
id_dsa                                                100%  668     0.7KB/s   00:00
id_dsa.pub                                            100%  608     0.6KB/s   00:00
ssh_config                                            100% 2103     2.1KB/s   00:00
[oneadmin@one-admin .ssh]$ scp id_dsa id_dsa.pub ssh_config oneadmin@one-node2:.ssh/
oneadmin@one-node2's password:
id_dsa                                                100%  668     0.7KB/s   00:00
id_dsa.pub                                            100%  608     0.6KB/s   00:00
ssh_config                                            100% 2103     2.1KB/s   00:00
[oneadmin@one-admin .ssh]$
```

Ahora como root, debemos decirle al SELinux que nos permita conectarnos de forma automática por ssh usando el fichero authorized_keys en un directorio home fuera de lo habitual (vease link con la explicación aquí: http://n40lab.wordpress.com/2012/11/26/69/)

Como root tecleamos en cada servidor lo siguiente:

```
[root@one-admin ~]# chcon -v --type=ssh_home_t /var/lib/one/.ssh/authorized_keys
changing security context of `/var/lib/one/.ssh/authorized_keys'
[root@one-admin ~]# semanage fcontext -a -t ssh_home_t /var/lib/one/.ssh/authorized_keys
-bash: semanage: command not found
```

Como no encontramos el comando semanage, tenemos que buscar la solución para Centos 6.4:

```
http://marcofalchi.blogspot.com.es/2013/05/centos-64-semanage-selinux-command-not.html
```

```
[root@one-admin ~]# rpm -qa | grep semanag
libsemanage-2.0.43-4.2.el6.x86_64
[root@one-admin ~]# which semanage
/usr/bin/which: no semanage in (/usr/lib64/qt-
3.3/bin:/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin:/root/bin)
[root@one-admin ~]# yum provides /usr/sbin/semanage
policycoreutils-python-2.0.83-19.30.el6.x86_64 : SELinux policy core python utilities
Repo        : base
Matched from:
Filename    : /usr/sbin/semanage

[root@one-admin ~]# yum install policycoreutils-python
Dependencies Resolved
```

```
================================================================================================================
================================================
 Package                                    Arch                        Version
Repository                       Size
================================================================================================================
================================================
Installing:
 policycoreutils-python                     x86_64                      2.0.83-19.30.el6
base                             342 k
Installing for dependencies:
 audit-libs-python                          x86_64                      2.2-2.el6
base                              59 k
 libselinux-python                          x86_64                      2.0.94-5.3.el6_4.1
updates                          202 k
 libsemanage-python                         x86_64                      2.0.43-4.2.el6
base                              81 k
 setools-libs                               x86_64                      3.3.7-4.el6
base                             400 k
 setools-libs-python                        x86_64                      3.3.7-4.el6
base                             222 k

Transaction Summary
================================================================================================================
================================================
Install       6 Package(s)

Total download size: 1.3 M
Installed size: 4.8 M
```

Y volvemos a probar:

```
[root@one-admin ~]# semanage fcontext -a -t ssh_home_t /var/lib/one/.ssh/authorized_keys
[root@one-admin ~]#
```

Ahora sí. Vamos a hacer la prueba:

```
[root@one-admin ~]# su - oneadmin
[oneadmin@one-admin ~]$ ssh one-admin
The authenticity of host 'one-admin (192.168.122.2)' can't be established.
RSA key fingerprint is 3f:d6:b0:75:21:0a:3e:93:53:5a:ee:8e:b9:8a:9e:17.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'one-admin,192.168.122.2' (RSA) to the list of known hosts.
Last login: Wed Oct  9 13:23:00 2013 from 192.168.122.2
```

Vale, ahora ya nos permite hacer el login, pero el tema de que no pregunte no funciona. Podríamos hacerlo en el fichero general, pero sería un agujero de seguridad. Vamos a repetir los mismos pasos del SELinux para los dos nodos:

```
[root@one-node1 ~]# yum install -y policycoreutils-python
[root@one-node1 ~]# chcon -v --type=ssh_home_t /var/lib/one/.ssh/authorized_keys
changing security context of `/var/lib/one/.ssh/authorized_keys'
[root@one-node1 ~]# semanage fcontext -a -t ssh_home_t /var/lib/one/.ssh/authorized_keys
[root@one-node1 ~]#
```

```
[root@one-node2 ~]# yum install -y policycoreutils-python
[root@one-node2 ~]# chcon -v --type=ssh_home_t /var/lib/one/.ssh/authorized_keys
changing security context of `/var/lib/one/.ssh/authorized_keys'
[root@one-node2 ~]# semanage fcontext -a -t ssh_home_t /var/lib/one/.ssh/authorized_keys
[root@one-node2 ~]#
```

Ahora probamos todas las configuraciones entre las máquinas con el usuario oneadmin, para asegurarnos que podemos entrar de forma automática:

```
[root@one-admin ~]# su - oneadmin
[oneadmin@one-admin ~]$ ssh one-admin
Last login: Wed Oct  9 17:14:49 2013 from 192.168.122.2
[oneadmin@one-admin ~]$ ssh one-node1
Last login: Wed Oct  9 17:13:26 2013 from 192.168.122.3
[oneadmin@one-node1 ~]$ ssh one-node1
Last login: Wed Oct  9 17:16:41 2013 from 192.168.122.2
[oneadmin@one-node1 ~]$ ssh one-node2
Last login: Wed Oct  9 17:14:43 2013 from 192.168.122.2
[oneadmin@one-node2 ~]$ ssh one-node2
Last login: Wed Oct  9 17:16:57 2013 from 192.168.122.3
[oneadmin@one-node2 ~]$ ssh one-node1
Last login: Wed Oct  9 17:16:48 2013 from 192.168.122.3
[oneadmin@one-node1 ~]$ ssh one-admin
Last login: Wed Oct  9 17:16:27 2013 from 192.168.122.2
[oneadmin@one-admin ~]$ ssh one-node2
Last login: Wed Oct  9 17:17:02 2013 from 192.168.122.4
[oneadmin@one-node2 ~]$ ssh one-admin
Last login: Wed Oct  9 17:17:48 2013 from 192.168.122.3
[oneadmin@one-admin ~]$
```

Ahora vamos a montar el servicio de NFS. Primero tenemos que crear la cuenta one-admin en el host, para que no haya problemas con los permisos. Metemos la siguiente linea en el host:

```
[root@Testit ~]# echo 'oneadmin:x:9869:9869::/:/sbin/nologin' >>/etc/passwd
[root@Testit ~]# echo 'oneadmin:!!:15987::::::' >>/etc/shadow
[root@Testit ~]# echo 'oneadmin:x:9869:' >>/etc/group
[root@Testit ~]#
```

Creamos una carpeta datastore que servirá para el repositorio de las imágenes:

```
[root@Testit ~]# cd /home
[root@Testit home]# mkdir one
[root@Testit home]# cd one
[root@Testit one]# pwd
/home/one
[root@Testit one]# scp -Crp oneadmin@one-admin:datastores .
oneadmin@one-admin's password:
[root@Testit one]# ll
total 4
drwxr-x---. 5 root root 4096 Oct  6 03:26 datastores
```

```
[root@Testit one]# ll datastores/
total 12
drwxr-x---. 2 root root 4096 Jul 24 19:13 0
drwxr-x---. 2 root root 4096 Jul 24 19:13 1
drwxr-xr-x. 2 root root 4096 Oct  6 03:26 2
[root@Testit home]# chown -R oneadmin:oneadmin one
[root@Testit home]# ll
total 24
drwxr-xr-x. 2 root     root      4096 Oct  6 02:23 libvirtimages
drwx------. 2 root     root     16384 Oct  3 20:30 lost+found
drwxr-xr-x. 3 oneadmin oneadmin  4096 Oct  9 18:22 one
[root@Testit home]# ll one/
total 4
drwxr-x---. 5 oneadmin oneadmin 4096 Oct  6 03:26 datastores
[root@Testit home]# ll one/datastores/
total 12
drwxr-x---. 2 oneadmin oneadmin 4096 Jul 24 19:13 0
drwxr-x---. 2 oneadmin oneadmin 4096 Jul 24 19:13 1
drwxr-xr-x. 2 oneadmin oneadmin 4096 Oct  6 03:26 2
[root@Testit home]#
```

Actualizamos el fichero /etc/hosts con las IPs que usaremos para la red NFS:

```
[root@Testit ~]# more /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4 Testit
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.168.123.1   server-nfs
192.168.123.2   one-admin
192.168.123.3   one-node1
192.168.123.4   one-node2
[root@Testit ~]#
```

Hacemos lo mismo en los tres equipos del cluster, pero aprovechamos para forzar quese vean entre ellos a través de la red privada del NFS:

```
[root@one-admin ~]# more /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.168.123.1   server-nfs
192.168.123.2   one-admin
192.168.123.3   one-node1
192.168.123.4   one-node2
[root@one-admin ~]# scp /etc/hosts one-node1:/etc/hosts
The authenticity of host 'one-node1 (192.168.123.3)' can't be established.
RSA key fingerprint is 3f:d6:b0:75:21:0a:3e:93:53:5a:ee:8e:b9:8a:9e:17.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'one-node1,192.168.123.3' (RSA) to the list of known hosts.
hosts
100%  263     0.3KB/s   00:00
```

```
[root@one-admin ~]# scp /etc/hosts one-node2:/etc/hosts
Warning: Permanently added the RSA host key for IP address '192.168.123.4' to the list of known
hosts.
hosts
100%  263     0.3KB/s   00:00
[root@one-admin ~]#
```

Ahora sólo queda dar de alta en el fichero exports en el host:

```
[root@Testit ~]# more /etc/exports
/home/one/datastores 192.168.123.0/24(rw,sync,no_subtree_check,root_squash)
[root@Testit ~]# exportfs -a
[root@Testit ~]# exportfs -v
/home/one/datastores
                192.168.123.0/24(rw,wdelay,root_squash,no_subtree_check)
[root@Testit ~]#
```

Nos queda mover las carpetas datastores en los tres equipos, y montarlas por NFS para confirmar que se ven entre sí.

```
[root@one-admin ~]# service opennebula-sunstone stop
Stopping Sunstone Server daemon: sunstone-server stopped
                                                           [  OK  ]
[root@one-admin ~]# service opennebula stop
Stopping OpenNebula daemon: oned and scheduler stopped
                                                           [  OK  ]
[root@one-admin ~]# cd /var/lib/one/
[root@one-admin one]# ll
total 68
-rw-r--r--. 1 oneadmin oneadmin  1083 Oct  9 14:01 config
drwxr-x---. 5 oneadmin oneadmin  4096 Oct  6 03:26 datastores
-rw-r--r--. 1 oneadmin oneadmin 41984 Oct 11 16:53 one.db
drwx------. 2 oneadmin oneadmin  4096 Oct  9 13:58 one-node1
drwxr-x---. 9 oneadmin oneadmin  4096 Oct  9 14:01 remotes
drwxr-x---. 2 oneadmin oneadmin  4096 Jul 24 19:13 vms
[root@one-admin one]# ll
total 68
-rw-r--r--. 1 oneadmin oneadmin  1083 Oct  9 14:01 config
drwxr-x---. 5 oneadmin oneadmin  4096 Oct  6 03:26 datastores_org
-rw-r--r--. 1 oneadmin oneadmin 41984 Oct 11 16:53 one.db
drwx------. 2 oneadmin oneadmin  4096 Oct  9 13:58 one-node1
drwxr-x---. 9 oneadmin oneadmin  4096 Oct  9 14:01 remotes
drwxr-x---. 2 oneadmin oneadmin  4096 Jul 24 19:13 vms
[root@one-admin one]# mkdir datastores
[root@one-admin one]# chown oneadmin:oneadmin datastores
[root@one-admin one]# chmod 750 datastores
[root@one-admin one]# ll
total 72
-rw-r--r--. 1 oneadmin oneadmin  1083 Oct  9 14:01 config
```

```
drwxr-x---. 2 oneadmin oneadmin  4096 Oct 11 16:57 datastores
drwxr-x---. 5 oneadmin oneadmin  4096 Oct  6 03:26 datastores_org
-rw-r--r--. 1 oneadmin oneadmin 41984 Oct 11 16:53 one.db
drwx------. 2 oneadmin oneadmin  4096 Oct  9 13:58 one-node1
drwxr-x---. 9 oneadmin oneadmin  4096 Oct  9 14:01 remotes
drwxr-x---. 2 oneadmin oneadmin  4096 Jul 24 19:13 vms
[root@one-admin etc]# diff fstab fstab.org
15d14
< server-nfs:/home/one/datastores  /var/lib/one/datastores  nfs
soft,intr,rsize=8192,wsize=8192,noauto
```

Además tenemos que configurar las iptables para que no haya problemas de escucha en los puertos:

http://blog.zwiegnet.com/linux-server/setup-nfs-server-on-centos-6-4/

http://marcofalchi.blogspot.com.es/2013/05/centosredhat-64-configure-nfs-server.html

```
[root@Testit sysconfig]# service nfs start
Starting NFS services:                                     [  OK  ]
Starting NFS quotas:                                       [  OK  ]
Starting NFS mountd:                                       [  OK  ]
Stopping RPC idmapd:                                       [  OK  ]
Starting RPC idmapd:                                       [  OK  ]
Starting NFS daemon:                                       [  OK  ]
[root@Testit sysconfig]# rpcinfo -p
   program vers proto   port  service
    100000    4   tcp    111  portmapper
    100000    3   tcp    111  portmapper
    100000    2   tcp    111  portmapper
    100000    4   udp    111  portmapper
    100000    3   udp    111  portmapper
    100000    2   udp    111  portmapper
    100024    1   udp  48013  status
    100024    1   tcp  39003  status
    100011    1   udp    875  rquotad
    100011    2   udp    875  rquotad
    100011    1   tcp    875  rquotad
    100011    2   tcp    875  rquotad
    100005    1   udp  54096  mountd
    100005    1   tcp  54575  mountd
    100005    2   udp  44430  mountd
    100005    2   tcp  58727  mountd
    100005    3   udp  37750  mountd
    100005    3   tcp  54863  mountd
    100003    2   tcp   2049  nfs
    100003    3   tcp   2049  nfs
    100003    4   tcp   2049  nfs
```

```
    100227    2   tcp   2049  nfs_acl
    100227    3   tcp   2049  nfs_acl
    100003    2   udp   2049  nfs
    100003    3   udp   2049  nfs
    100003    4   udp   2049  nfs
    100227    2   udp   2049  nfs_acl
    100227    3   udp   2049  nfs_acl
    100021    1   udp  42467  nlockmgr
    100021    3   udp  42467  nlockmgr
    100021    4   udp  42467  nlockmgr
    100021    1   tcp  58145  nlockmgr
    100021    3   tcp  58145  nlockmgr
    100021    4   tcp  58145  nlockmgr
[root@Testit sysconfig]# fgrep PORT nfs
#RQUOTAD_PORT=875
#LOCKD_TCPPORT=32803
#LOCKD_UDPPORT=32769
#MOUNTD_PORT=892
#STATD_PORT=662
#STATD_OUTGOING_PORT=2020
#RDMA_PORT=20049
[root@Testit sysconfig]# egrep " 58145| 42467| 2049| 54863| 37750| 58727| 44430| 54575| 54096| 875|
39003| 48013| 111/" /etc/services
sunrpc          111/tcp         portmapper rpcbind      # RPC 4.0 portmapper TCP
sunrpc          111/udp         portmapper rpcbind      # RPC 4.0 portmapper UDP
rquotad         875/tcp                         # rquota daemon
rquotad         875/udp                         # rquota daemon
nfs             2049/tcp        nfsd shilp      # Network File System
nfs             2049/udp        nfsd shilp      # Network File System
nfs             2049/sctp       nfsd shilp      # Network File System
[root@Testit sysconfig]# nmap -sT server-nfs

Starting Nmap 5.51 ( http://nmap.org ) at 2013-10-11 17:34 CEST
Nmap scan report for server-nfs (192.168.123.1)
Host is up (0.00042s latency).
Not shown: 997 closed ports
PORT     STATE SERVICE
22/tcp   open  ssh
111/tcp  open  rpcbind
2049/tcp open  nfs

Nmap done: 1 IP address (1 host up) scanned in 0.06 seconds
[root@Testit sysconfig]# service nfslockd status
nfslockd: unrecognized service
[root@Testit sysconfig]# service nfslock status
```

```
rpc.statd (pid  1559) is running...
[root@Testit sysconfig]# nmap -sU server-nfs

Starting Nmap 5.51 ( http://nmap.org ) at 2013-10-11 17:35 CEST
Nmap scan report for server-nfs (192.168.123.1)
Host is up (0.0000060s latency).
Not shown: 996 closed ports
PORT     STATE         SERVICE
111/udp  open          rpcbind
123/udp  open          ntp
631/udp  open|filtered ipp
2049/udp open          nfs

Nmap done: 1 IP address (1 host up) scanned in 1.28 seconds
[root@Testit sysconfig]#
```

Salvamos el estado de las iptables en fichero, porque tenemos que permitir el servicio NFS en la red privada. De momento ponemos el servicio con un lan privada, así que podemos abrir las iptables en ese interfaz. Salvamos las iptables:

```
[root@Testit sysconfig]# iptables-save >iptables
[root@Testit sysconfig]# diff iptables iptables.org
30d29
< -A INPUT -i virbr1 -s 192.168.123.0/24 -j ACCEPT
[root@Testit sysconfig]# service iptables stop
iptables: Flushing firewall rules:                         [  OK  ]
iptables: Setting chains to policy ACCEPT: nat mangle filte[  OK  ]
iptables: Unloading modules:                               [  OK  ]
[root@Testit sysconfig]#
[root@Testit sysconfig]#
[root@Testit sysconfig]# diff iptables iptables.org
30d29
< -A INPUT -i virbr1 -s 192.168.123.0/24 -j ACCEPT
[root@Testit sysconfig]# service iptables start
iptables: Applying firewall rules:                         [  OK  ]
[root@Testit sysconfig]#
```

Ahora comprobamos que funciona desde el servidor one-admin:

```
[root@one-admin etc]# nmap -sT server-nfs

Starting Nmap 5.51 ( http://nmap.org ) at 2013-10-11 17:53 CEST
Nmap scan report for server-nfs (192.168.123.1)
Host is up (0.00071s latency).
Not shown: 996 closed ports
PORT     STATE SERVICE
22/tcp   open  ssh
53/tcp   open  domain
111/tcp  open  rpcbind
```

```
2049/tcp open  nfs
MAC Address: 52:54:00:7D:68:1E (QEMU Virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 0.07 seconds
[root@one-admin etc]# mount /var/lib/one/datastores
[root@one-admin etc]# mount
/dev/vda1 on / type ext4 (rw)
proc on /proc type proc (rw)
sysfs on /sys type sysfs (rw)
devpts on /dev/pts type devpts (rw,gid=5,mode=620)
tmpfs on /dev/shm type tmpfs (rw,rootcontext="system_u:object_r:tmpfs_t:s0")
none on /proc/sys/fs/binfmt_misc type binfmt_misc (rw)
sunrpc on /var/lib/nfs/rpc_pipefs type rpc_pipefs (rw)
server-nfs:/home/one/datastores on /var/lib/one/datastores type nfs
(rw,soft,intr,rsize=8192,wsize=8192,vers=4,addr=192.168.123.1,clientaddr=192.168.123.2)
[root@one-admin etc]#
[root@one-admin etc]# su - oneadmin
[oneadmin@one-admin ~]$ ll
total 72
-rw-r--r--. 1 oneadmin oneadmin  1083 Oct  9 14:01 config
drwxr-x---. 5 oneadmin oneadmin  4096 Oct  6 03:26 datastores
drwxr-x---. 5 oneadmin oneadmin  4096 Oct  6 03:26 datastores_org
-rw-r--r--. 1 oneadmin oneadmin 41984 Oct 11 16:53 one.db
drwx------. 2 oneadmin oneadmin  4096 Oct  9 13:58 one-node1
drwxr-x---. 9 oneadmin oneadmin  4096 Oct  9 14:01 remotes
drwxr-x---. 2 oneadmin oneadmin  4096 Jul 24 19:13 vms
[oneadmin@one-admin ~]$ cd datastores
[oneadmin@one-admin datastores]$ ll
total 12
drwxr-x---. 2 oneadmin oneadmin 4096 Jul 24 19:13 0
drwxr-x---. 2 oneadmin oneadmin 4096 Jul 24 19:13 1
drwxr-xr-x. 2 oneadmin oneadmin 4096 Oct  6 03:26 2
[oneadmin@one-admin datastores]$
```

Bien, tenemos que dejar el servicio NFS corriendo en el servidor:

```
[root@Testit sysconfig]# chkconfig nfs on
[root@Testit sysconfig]# chkconfig nfs --list
nfs             0:off   1:off   2:on    3:on    4:on    5:on    6:off
```

Hacemos una prueba de crear un fichero en el servidor one-admin para confirmar que se puede trabajar con el NFS sin problemas:

```
[oneadmin@one-admin datastores]$ echo "Esto es una prueba" >fichero_test.txt
[oneadmin@one-admin datastores]$ ll
total 16
drwxr-x---. 2 oneadmin oneadmin 4096 Jul 24 19:13 0
drwxr-x---. 2 oneadmin oneadmin 4096 Jul 24 19:13 1
drwxr-xr-x. 2 oneadmin oneadmin 4096 Oct  6 03:26 2
```

```
-rw-rw-r--. 1 oneadmin oneadmin   19 Oct 11 18:00 fichero_test.txt
[oneadmin@one-admin datastores]$
```

Comprobamos que en el servidor también es visible y se respetan los permisos:

```
[root@Testit sysconfig]# ll /home/one/datastores/
total 16
drwxr-x---. 2 oneadmin oneadmin 4096 Jul 24 19:13 0
drwxr-x---. 2 oneadmin oneadmin 4096 Jul 24 19:13 1
drwxr-xr-x. 2 oneadmin oneadmin 4096 Oct  6 03:26 2
-rw-rw-r--. 1 oneadmin oneadmin   19 Oct 11 18:00 fichero_test.txt
[root@Testit sysconfig]#
```

Perfecto. Con esto de momento tenemos solucionado el tema del repositorio de imágenes en el servidor. La configuración del servidor de cara a los nodos está en el directorio /var/lib/one/remotes del servidor one-admin:

```
[oneadmin@one-admin remotes]$ ll
total 44
drwxr-x---.  9 oneadmin oneadmin  4096 Oct  6 03:00 auth
drwxr-x---.  9 oneadmin oneadmin  4096 Oct  6 03:00 datastore
drwxr-x---.  3 oneadmin oneadmin  4096 Oct  6 03:00 hooks
drwxr-x---.  7 oneadmin oneadmin  4096 Oct  6 03:00 im
-rw-r--r--.  1 oneadmin oneadmin  2827 Jul 24 19:13 scripts_common.rb
-rw-r--r--.  1 oneadmin oneadmin 11666 Jul 24 19:13 scripts_common.sh
drwxr-x---. 10 oneadmin oneadmin  4096 Oct  6 03:00 tm
drwxr-x---.  6 oneadmin oneadmin  4096 Oct  6 03:00 vmm
drwxr-x---.  9 oneadmin oneadmin  4096 Oct  6 03:00 vnm
[oneadmin@one-admin remotes]$
```

Es ahí donde tenemos que modificar los parámetros antes de lanzar los nodos. En los hosts tenemos que añadir el grupo wheel a usuario oneadmin para que tenga privilegios al trabajar con la red, etc...

```
[root@one-node1 ~]# gpasswd -a oneadmin wheel
Adding user oneadmin to group wheel
[root@one-node1 ~]#

[root@one-node2 ~]# gpasswd -a oneadmin wheel
Adding user oneadmin to group wheel
[root@one-node2 ~]#
```

También hacemos lo mismo en el frontend por si acaso:

```
[root@one-admin ~]# gpasswd -a oneadmin wheel
Adding user oneadmin to group wheel
[root@one-admin ~]#
```

En el frontend tenemos que preparar el Sunstone para poder acceder desde fuera. En /etc/one/sunstone-server.conf cambiamos lo siguiente:

```
[root@one-admin one]# diff sunstone-server.conf sunstone-server.conf.org
31c31
< :host: 0.0.0.0
---
```

```
> :host: 127.0.0.1
```

Y entrando con el usuario oneadmin en el frontend metemos la password para el Sunstone:

```
[oneadmin@one-admin ~]$ more .one/sunstone_auth
serveradmin:459b194629449b4e5401c8fce38c08edc93b150f
```

Tenemos que hacer un par de cosas en los hosts:

- Preparar el NFS para los datastores locales de los hosts.
- Preparar el transporte de VLANs entre los hosts a través de 802.1q

Vamos primero con el tema del NFS, y a continuación terminamos el tema del NFS. En el servidor NFS, debemos establecer un directorio para el datastore del frotend, y otro diferente para todos los hosts del mismo cluster. Esto es lo que tenemos ahora mismo en el servidor NFS:

```
[root@Testit ~]# exportfs -v
/home/one/datastores
                192.168.123.0/24(rw,wdelay,root_squash,no_subtree_check)
```

Creamos un directorio /home/one/host_datastores:

```
[root@Testit ~]# cd /home/one
[root@Testit one]# ll
total 4
drwxr-x---. 5 oneadmin oneadmin 4096 Oct 11 18:03 datastores
[root@Testit one]# mkdir host_datastores
[root@Testit one]# chown oneadmin:oneadmin host_datastores
[root@Testit one]# chmod 750 host_datastores
[root@Testit one]# ll
total 8
drwxr-x---. 5 oneadmin oneadmin 4096 Oct 11 18:03 datastores
drwxr-x---. 2 oneadmin oneadmin 4096 Oct 19 16:54 host_datastores
```

Y ahora editamos el fichero /etc/exports:

```
[root@Testit one]# more /etc/exports
/home/one/datastores 192.168.123.0/24(rw,sync,no_subtree_check,root_squash,anonuid=9869,anongid=9869)
/home/one/host_datastores
192.168.123.0/24(rw,sync,no_subtree_check,root_squash,anonuid=9869,anongid=9869)
[root@Testit one]# exportfs -a
[root@Testit one]# exportfs -v
/home/one/datastores
                192.168.123.0/24(rw,wdelay,root_squash,no_subtree_check,anonuid=9869,anongid=9869)
/home/one/host_datastores
                192.168.123.0/24(rw,wdelay,root_squash,no_subtree_check,anonuid=9869,anongid=9869)
[root@Testit one]#
```

Ahora tenemos que configurar los hosts:

```
[root@one-node1 ~]# su - oneadmin
[oneadmin@one-node1 ~]$ pwd
/var/lib/one
[oneadmin@one-node1 ~]$ mkdir datastores
[oneadmin@one-node1 ~]$ chmod 750 datastores
```

```
[oneadmin@one-node1 ~]$ ll
total 4
drwxr-x---. 2 oneadmin oneadmin 4096 Oct 19 17:09 datastores
[oneadmin@one-node1 ~]$ exit
logout
[root@one-node1 ~]# tail -1 /etc/fstab
server-nfs:/home/one/host_datastores  /var/lib/one/datastores  nfs
soft,intr,rsize=8192,wsize=8192,auto
[root@one-node1 ~]# mount -a
[root@one-node1 ~]# mount | tail -1
server-nfs:/home/one/host_datastores on /var/lib/one/datastores type nfs
(rw,soft,intr,rsize=8192,wsize=8192,vers=4,addr=192.168.123.1,clientaddr=192.168.123.3)
[root@one-node1 ~]#

[root@one-node2 ~]# su - oneadmin
[oneadmin@one-node2 ~]$ mkdir datastores
[oneadmin@one-node2 ~]$ chmod 750 datastores
[oneadmin@one-node2 ~]$ ll
total 4
drwxr-x---. 2 oneadmin oneadmin 4096 Oct 19 17:14 datastores
[oneadmin@one-node2 ~]$ exit
logout
[root@one-node2 ~]#  vi /etc/fstab
[root@one-node2 ~]# tail -1 /etc/fstab
server-nfs:/home/one/host_datastores  /var/lib/one/datastores  nfs
soft,intr,rsize=8192,wsize=8192,auto
[root@one-node2 ~]# mount -a
[root@one-node2 ~]# mount | tail -1
server-nfs:/home/one/host_datastores on /var/lib/one/datastores type nfs
(rw,soft,intr,rsize=8192,wsize=8192,vers=4,addr=192.168.123.1,clientaddr=192.168.123.4)
[root@one-node2 ~]#
```

Y por último configuramos la parte del 802.1q para establecer VLANs entre los dos hosts. Vamos a basarnos en la información contenida en este link:

http://www.thetechrepo.com/main-articles/534.html

Lo primero que tenemos que ver en el host, es que el STP en los interfaces virbr está activado, para permitir el paso de las BPDUs:

```
[root@Testit ~]# brctl show
bridge name     bridge id               STP enabled interfaces
virbr0          8000.5254007ea90c       yes virbr0-nic
vnet0
vnet2
vnet5
virbr1          8000.5254007d681e       yes virbr1-nic
vnet1
vnet3
vnet6
```

```
virbr2          8000.5254003a6f75       yes virbr2-nic
vnet4
vnet7
```

Además tenemos que asegurarnos que los interfaces de red de las máquinas virtuales son interfaces de tipo virtio, para que soporte el envío de tramas 802.1Q. Ahora desde las máquinas virtuales (one-node1 y one-node2) cargamos el módulo 8021q:

```
[root@one-node1 ~]# modprobe 8021q
[root@one-node1 ~]# lsmod | grep modprobe
[root@one-node1 ~]# lsmod | grep 802
8021q                  25317  0
garp                    7152  1 8021q

[root@one-node2 ~]# modprobe 8021q
[root@one-node2 ~]# lsmod | grep 802
8021q                  25317  0
garp                    7152  1 8021q
```

Ahora vamos a crear una VLAN de pruebas ente los dos nodos: la VLAN 6.

```
[root@one-node1 ~]# vconfig add eth2 6
Added VLAN with VID == 6 to IF -:eth2:-

[root@one-node2 ~]# vconfig add eth2 6
Added VLAN with VID == 6 to IF -:eth2:-
```

Ahora probamos a confirmar que seguimos enviando paquetes por la vlan nativa, que no va etiquetada:

```
[root@one-node1 ~]# ping 192.168.124.4
PING 192.168.124.4 (192.168.124.4) 56(84) bytes of data.
64 bytes from 192.168.124.4: icmp_seq=1 ttl=64 time=0.255 ms
64 bytes from 192.168.124.4: icmp_seq=2 ttl=64 time=0.263 ms
64 bytes from 192.168.124.4: icmp_seq=3 ttl=64 time=0.254 ms
64 bytes from 192.168.124.4: icmp_seq=4 ttl=64 time=0.249 ms
^C
--- 192.168.124.4 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3200ms
rtt min/avg/max/mdev = 0.249/0.255/0.263/0.012 ms
```

Ahora creamos un interfaz para la vlan con una red de pruebas:

```
[root@one-node1 ~]# ifconfig eth2.6 192.168.126.3 netmask 255.255.255.0 up

eth2      Link encap:Ethernet  HWaddr 52:54:00:73:4D:BE
          inet addr:192.168.124.3  Bcast:192.168.124.255 Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:fe73:4dbe/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500 Metric:1
          RX packets:425373 errors:0 dropped:0 overruns:0 frame:0
          TX packets:33 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:22304612 (21.2 MiB)  TX bytes:2550 (2.4 KiB)
```

```
eth2.6    Link encap:Ethernet  HWaddr 52:54:00:73:4D:BE
          inet addr:192.168.126.3  Bcast:192.168.126.255 Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:fe73:4dbe/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500 Metric:1
          RX packets:3 errors:0 dropped:0 overruns:0 frame:0
          TX packets:6 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:208 (208.0 b)  TX bytes:492 (492.0 b)
```

Y hacemos lo mismo en el nodo2:

```
[root@one-node2 ~]# ifconfig eth2.6 192.168.126.4 netmask 255.255.255.0 up
```

Ahora probamos a hacer pings por la VLAN 6:

```
[root@one-node1 ~]# ping 192.168.126.4
PING 192.168.126.4 (192.168.126.4) 56(84) bytes of data.
64 bytes from 192.168.126.4: icmp_seq=1 ttl=64 time=0.823 ms
64 bytes from 192.168.126.4: icmp_seq=2 ttl=64 time=0.280 ms
64 bytes from 192.168.126.4: icmp_seq=3 ttl=64 time=0.163 ms
64 bytes from 192.168.126.4: icmp_seq=4 ttl=64 time=0.159 ms
^C
--- 192.168.126.4 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3886ms
rtt min/avg/max/mdev = 0.159/0.356/0.823/0.274 ms
```

Estupendo. Ahora vemos como se ha creado el interfaz y los datos:

```
[root@one-node1 ~]# cd /proc/net/vlan/
[root@one-node1 vlan]# ll
total 0
-rw-------. 1 root root 0 Oct 19 03:02 config
-rw-------. 1 root root 0 Oct 19 03:02 eth2.6
[root@one-node1 vlan]# cat config
VLAN Dev name    | VLAN ID
Name-Type: VLAN_NAME_TYPE_RAW_PLUS_VID_NO_PAD
eth2.6         | 6  | eth2
[root@one-node1 vlan]# cat eth2.6
eth2.6  VID: 6   REORDER_HDR: 1  dev->priv_flags: 1
         total frames received           12
          total bytes received          824
      Broadcast/Multicast Rcvd            6

      total frames transmitted           12
       total bytes transmitted          992
            total headroom inc            0
           total encap on xmit           12
Device: eth2
INGRESS priority mappings: 0:0  1:0  2:0  3:0  4:0  5:0 6:0 7:0
 EGRESS priority mappings:
```

```
[root@one-node1 vlan]#
```

Ahora tenemos que hacer que el módulo 8021q se cargue automáticamente al arrancar el host. Seguimos la información del siguiente link:

https://access.redhat.com/site/documentation/en-US/Red_Hat_Enterprise_Linux/6/html/Deployment_Guide/sec-Persistent_Module_Loading.html

Con lo cual debemos de crear el siguiente fichero /etc/sysconfig/modules/8021q.modules:

```
[root@one-node1 modules]# more 8021q.modules
#!/bin/sh

modprobe -b 8021q >/dev/null 2>&1

exit 0
```

No tenemos que olvidarnos de poner el fichero ejecutable:

```
[root@one-node1 modules]# chmod 755 8021q.modules
[root@one-node1 modules]# ll
total 8
-rwxr-xr-x. 1 root root  53 Oct 19 03:42 8021q.modules
-rwxr-xr-x. 1 root root 245 Oct  2 14:54 kvm.modules
```

Esto mismo lo hacemos con el otro equipo, pero lo más elegante es copiar directamente el fichero:

```
[root@one-node1 modules]# scp -Cp 8021q.modules root@one-node2:/etc/sysconfig/modules/
8021q.modules                                 100%   53     0.1KB/s 00:00
[root@one-node1 modules]#
```

Y comprobamos en el nodo 2 que efectivamente está el fichero:

```
[root@one-node2 ~]# ll /etc/sysconfig/modules/
total 8
-rwxr-xr-x. 1 root root  53 Oct 19 03:42 8021q.modules
-rwxr-xr-x. 1 root root 245 Oct  2 14:54 kvm.modules
[root@one-node2 ~]#
```

Con esto damos por terminado los preparativos de las tres máquinas. Reiniciamos las tres máquinas para confirmar que efectivamente se han realizado los cambios y quedan como persistentes. Comprobamos que no podemos acceder al Sunstone, como consecuencia de que tenemos activadas las iptables en el frontend:

```
[root@one-admin ~]# iptables-save
# Generated by iptables-save v1.4.7 on Sat Oct 19 17:52:21 2013
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [3872:388355]
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -j REJECT --reject-with icmp-host-prohibited
-A FORWARD -j REJECT --reject-with icmp-host-prohibited
```

```
COMMIT
# Completed on Sat Oct 19 17:52:21 2013
```

Modificamos las iptables en el frontend para permitir el puerto 9869 del Sunstone:

```
[root@one-admin sysconfig]# vi iptables
[root@one-admin sysconfig]# service iptables restart
iptables: Flushing firewall rules:                         [  OK  ]
iptables: Setting chains to policy ACCEPT: filter          [  OK  ]
iptables: Unloading modules:                               [  OK  ]
iptables: Applying firewall rules:                         [  OK  ]
[root@one-admin sysconfig]# iptables-save
# Generated by iptables-save v1.4.7 on Sat Oct 19 18:00:22 2013
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [23:3812]
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 9869 -j ACCEPT
-A INPUT -j REJECT --reject-with icmp-host-prohibited
-A FORWARD -j REJECT --reject-with icmp-host-prohibited
COMMIT
# Completed on Sat Oct 19 18:00:22 2013
[root@one-admin sysconfig]#
```

Ahora levantamos un túnel ssh para poder acceder al Sunstone desde un equipo remoto:

```
[jamontes@Braiz ~]$ ssh -L 9869:192.168.123.2:9869 root@Testit
Last login: Sat Oct 19 16:50:53 2013 from 192.168.80.10
[root@Testit ~]#
```

Y accedemos al Sunstone abriendo un navegador con la URL:

```
http://localhost:9869
```

Con esto tenemos acceso desde el exterior sin problemas. Vamos a cambiar la password de serveradmin:

```
[oneadmin@one-admin ~]$ oneuser show serveradmin
USER 1 INFORMATION
ID              : 1
NAME            : serveradmin
GROUP           : oneadmin
PASSWORD        : f747548ef4f4c55b54a827c0061b1fae71dba0d7
AUTH_DRIVER     : server_cipher
ENABLED         : Yes

USER TEMPLATE
TOKEN_PASSWORD="59f3c002100567420636b55b2e85609df9e77d06"
```

```
RESOURCE USAGE & QUOTAS

       NUMBER OF VMS               MEMORY                   CPU
        0 /        0        0M /       0M      0.00 /     0.00
```

Y en el fichero el Sunstone /var/lib/one/.one/sunstone_auth

```
[oneadmin@one-admin ~]$ more .one/sunstone_auth
serveradmin:machaca
[oneadmin@one-admin ~]$
```

Ahora que tenemos el Sunstone parado, aprovechamos para cambiar la password:

```
[oneadmin@one-admin ~]$ oneuser show serveradmin
USER 1 INFORMATION
ID             : 1
NAME           : serveradmin
GROUP          : oneadmin
PASSWORD       : machaca
AUTH_DRIVER    : server_cipher
ENABLED        : Yes

USER TEMPLATE
TOKEN_PASSWORD="59f3c002100567420636b55b2e85609df9e77d06"

RESOURCE USAGE & QUOTAS

       NUMBER OF VMS               MEMORY                   CPU
        0 /        0        0M /       0M      0.00 /     0.00
```

Y ahora arrancamos de nuevo el Sunstone:

```
[root@one-admin ~]# service opennebula-sunstone start
Starting Sunstone Server daemon: VNC proxy started
sunstone-server started
                                                           [  OK  ]
```

Ahora comprobamos si nos deja entrar en el Sunstone. Y creo que algo nos hemos cargado.... se acabó, me sale el error de antes:

```
OpenNebula is not running or there was a server exception. Please check the server logs.
```

Hemos recuperado el backup que habíamos hecho previamente con estos comandos:

```
[oneadmin@one-admin ~]$ onedb fsck -s one.db
Sqlite database backup stored in /var/lib/one/one.db.bck
Use 'onedb restore' or copy the file back to restore the DB.



Total errors found: 0
[oneadmin@one-admin ~]$
```

Gracias a ello, parando todos los procesos, y copiando de vuelta el fichero de BBDD, además de recuperar el fichero sunstone_auth a partir del occi_auth, hemos conseguido entrar de nuevo en el Sunstone con el usuario oneadmin/oneadmin. Es la primera vez que lo conseguimos. Menos mal.

Vamos a crear los dos hosts con el comando onehost, a ver que tal se comporta. Hacemos el primero por línea de comando, y el segundo por el Sunstone:

```
[oneadmin@one-admin ~]$ onehost create one-node1 -i kvm -v kvm  -n 802.1Q
ID: 0
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   0 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
[oneadmin@one-admin ~]$ onehost show one-node1
HOST 0 INFORMATION
ID                    : 0
NAME                  : one-node1
CLUSTER               : -
STATE                 : MONITORED
IM_MAD                : kvm
VM_MAD                : kvm
VN_MAD                : 802.1Q
LAST MONITORING TIME  : 10/20 00:12:08

HOST SHARES
TOTAL MEM             : 996.7M
USED MEM (REAL)       : 113.7M
USED MEM (ALLOCATED)  : 0K
TOTAL CPU             : 100
USED CPU (REAL)       : 0
USED CPU (ALLOCATED)  : 0
RUNNING VMS           : 0

MONITORING INFORMATION
ARCH="x86_64"
CPUSPEED="3292"
FREECPU="99.7"
FREEMEMORY="904104"
HOSTNAME="one-node1"
HYPERVISOR="kvm"
MODELNAME="QEMU Virtual CPU version (cpu64-rhel6)"
NETRX="1489300"
NETTX="254836"
TOTALCPU="100"
TOTALMEMORY="1020576"
USEDCPU="0.299999999999997"
USEDMEMORY="116472"
```

```
VIRTUAL MACHINES

    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME

[oneadmin@one-admin ~]$
```

Los datos del comando onehost se pueden encontrar aquí:

```
http://opennebula.org/documentation:rel4.2:host_guide
```

Ahora hacemos lo mismo desde el Sunstone. El efecto y las opciones son las mismas que hemos empleado a través de la línea de comando. Si mostramos ahora la lista podremos ver lo que ha ocurrido:

```
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   0 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   1 one-node2       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
[oneadmin@one-admin ~]$
```

Bueno, estamos en condiciones de lanzar una máquina, supongo. Tenemos que seguir leyendo. Vamos a crear una plantilla para lanzar la máquina TTY de pruebas. Lo hacemos a través del Sunstone, para ver las opciones disponibles.

No nos funciona. Aunque ponemos en /etc/sudoers el grupo %wheel para que tenga los mismos privilegios que root, sistema se queja.

Borramos los dos host, y los damos de alta de nuevo con la opción dummy, para curarnos en salud. Vamos a dar unos pasos para atrás, para poder seguir hacia adelante. Eliminamos los hosts de nuevo. Paramos el Sunstone y el OpenNebula

```
[root@one-admin ~]# service opennebula-sunstone stop
Stopping Sunstone Server daemon: sunstone-server stopped
                                                           [  OK  ]
[root@one-admin ~]# service opennebula stop
Stopping OpenNebula daemon: oned and scheduler stopped
                                                           [  OK  ]
[root@one-admin ~]#
```

Ahora modificamos el fichero /etc/one/oned.conf para soportar los drivers qemu en lugar de kvm:

```
[root@one-admin ~]# cd /etc/one
[root@one-admin one]# cp oned.conf oned.conf.org
[root@one-admin one]# sed -i 's/"kvm" ]/"qemu" ]/' oned.conf
[root@one-admin one]# diff oned.conf oned.conf.org
250c250
<     type       = "qemu" ]
---
>     type       = "kvm" ]
[root@one-admin one]#
```

Ahora arrancamos de nuevo los servicios:

```
[root@one-admin one]# service opennebula start
Starting OpenNebula daemon:                                [  OK  ]
```

```
[root@one-admin one]# service opennebula-sunstone start
Starting Sunstone Server daemon: VNC proxy started
sunstone-server started
                                                           [  OK  ]
[root@one-admin one]#
```

Creamos el host a mano:

```
[oneadmin@one-admin ~]$ onehost create one-node1 -i kvm -v qemu -n dummy
ID: 4
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   4 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
[oneadmin@one-admin ~]$  onehost show 4
HOST 4 INFORMATION
ID                    : 4
NAME                  : one-node1
CLUSTER               : -
STATE                 : MONITORED
IM_MAD                : kvm
VM_MAD                : qemu
VN_MAD                : dummy
LAST MONITORING TIME  : 10/20 02:47:17

HOST SHARES
TOTAL MEM             : 996.7M
USED MEM (REAL)       : 124.4M
USED MEM (ALLOCATED)  : 0K
TOTAL CPU             : 100
USED CPU (REAL)       : 0
USED CPU (ALLOCATED)  : 0
RUNNING VMS           : 0

MONITORING INFORMATION
ARCH="x86_64"
CPUSPEED="3292"
FREECPU="99.3"
FREEMEMORY="893184"
HOSTNAME="one-node1"
HYPERVISOR="kvm"
MODELNAME="QEMU Virtual CPU version (cpu64-rhel6)"
NETRX="54554853"
NETTX="136703247"
TOTALCPU="100"
TOTALMEMORY="1020576"
USEDCPU="0.700000000000003"
USEDMEMORY="127392"
```

```
VIRTUAL MACHINES

    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME

[oneadmin@one-admin ~]$
```

Parece que le ha gustado. Desde el Sunstone no se admite esa opción. Hacemos lo mismo con el otro host:

```
[oneadmin@one-admin ~]$ onehost create one-node2 -i kvm -v qemu -n dummy
ID: 5
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   4 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   5 one-node2       -           0                  -                  - init
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   4 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   5 one-node2       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
[oneadmin@one-admin ~]$ onehost show 5
HOST 5 INFORMATION
ID                    : 5
NAME                  : one-node2
CLUSTER               : -
STATE                 : MONITORED
IM_MAD                : kvm
VM_MAD                : qemu
VN_MAD                : dummy
LAST MONITORING TIME  : 10/20 02:51:07

HOST SHARES
TOTAL MEM             : 996.7M
USED MEM (REAL)       : 111.4M
USED MEM (ALLOCATED)  : 0K
TOTAL CPU             : 100
USED CPU (REAL)       : 0
USED CPU (ALLOCATED)  : 0
RUNNING VMS           : 0

MONITORING INFORMATION
ARCH="x86_64"
CPUSPEED="3292"
FREECPU="99.7"
FREEMEMORY="906520"
HOSTNAME="one-node2"
HYPERVISOR="kvm"
```

```
MODELNAME="QEMU Virtual CPU version (cpu64-rhel6)"
NETRX="57540935"
NETTX="268664203"
TOTALCPU="100"
TOTALMEMORY="1020576"
USEDCPU="0.299999999999997"
USEDMEMORY="114056"

VIRTUAL MACHINES

    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME

[oneadmin@one-admin ~]$
```

Como la maqueta está virtualizada, instalamos los siguientes paquetes en ambos hosts:

```
[root@one-node1 ~]# yum install qemu-guest-agent qemu-kvm-tools
[root@one-node2 ~]# yum install qemu-guest-agent qemu-kvm-tools
```

Después de arrancarlo todo me sale el error de marras siguiente:

```
Sun Oct 20 03:15:54 2013 [VMM][E]: deploy_action, error getting driver qemu
```

Vamos a pararlo todo, eliminar la historia del qemu, y dejarlo como estaba:

```
[oneadmin@one-admin ~]$ onevm delete 18
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   4 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   5 one-node2       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   4 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   5 one-node2       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
[oneadmin@one-admin ~]$ onehost delete 4
[oneadmin@one-admin ~]$ onehost delete 5
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT

[oneadmin@one-admin ~]$
[oneadmin@one-admin ~]$ exit
logout
[root@one-admin one]# service opennebula-sunstone stop
Stopping Sunstone Server daemon: sunstone-server stopped
                                                           [  OK  ]
[root@one-admin one]# service opennebula stop
Stopping OpenNebula daemon: oned and scheduler stopped
                                                           [  OK  ]
[root@one-admin one]#
[root@one-admin one]# diff oned.conf oned.conf.org
246,252d245
```

```
<     name       = "qemu",
<     executable = "one_vmm_exec",
<     arguments  = "-t 15 -r 0 kvm",
<     default    = "vmm_exec/vmm_exec_kvm.conf",
<     type       = "qemu" ]
< #-------------------------------------------------------------------------------
< VM_MAD = [
[root@one-admin one]#
```

Vamos a probar de nuevo, a ver si cuela, y sino lo dejamos directamente como kvm:

```
[root@one-admin one]# su - oneadmin
[oneadmin@one-admin ~]$ onehost create one-node1 -i kvm -v qemu -n dummy
ID: 6
[oneadmin@one-admin ~]$ onehost create one-node2 -i kvm -v qemu -n dummy
ID: 7
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   6 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   7 one-node2       -           0                  -                  - init
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   6 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   7 one-node2       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
[oneadmin@one-admin ~]$
```

Después de lanzarlo me sale lo siguiente:

```
Sun Oct 20 03:52:13 2013 [DiM][I]: New VM state is ACTIVE.
Sun Oct 20 03:52:13 2013 [LCM][I]: New VM state is PROLOG.
Sun Oct 20 03:52:13 2013 [VM][I]: Virtual Machine has no context
Sun Oct 20 03:52:14 2013 [LCM][I]: New VM state is BOOT
Sun Oct 20 03:52:14 2013 [VMM][I]: Generating deployment file: /var/lib/one/vms/19/deployment.0
Sun Oct 20 03:52:14 2013 [VMM][I]: ExitCode: 0
Sun Oct 20 03:52:14 2013 [VMM][I]: Successfully execute network driver operation: pre.
Sun Oct 20 03:52:15 2013 [VMM][I]: Command execution fail: cat << EOT | /var/tmp/one/vmm/kvm/deploy
'/var/lib/one//datastores/0/19/deployment.0' 'one-node2' 19 one-node2
Sun Oct 20 03:52:15 2013 [VMM][I]: error: Failed to create domain from
/var/lib/one//datastores/0/19/deployment.0
Sun Oct 20 03:52:15 2013 [VMM][I]: error: internal error process exited while connecting to monitor:
qemu-kvm: -drive file=/var/lib/one//datastores/0/19/disk.0,if=none,id=drive-ide0-0-
0,format=raw,cache=none: could not open disk image /var/lib/one//datastores/0/19/disk.0: Permission
denied
Sun Oct 20 03:52:15 2013 [VMM][I]:
Sun Oct 20 03:52:15 2013 [VMM][E]: Could not create domain from
/var/lib/one//datastores/0/19/deployment.0
Sun Oct 20 03:52:15 2013 [VMM][I]: ExitCode: 255
Sun Oct 20 03:52:15 2013 [VMM][I]: Failed to execute virtualization driver operation: deploy.
Sun Oct 20 03:52:15 2013 [VMM][E]: Error deploying virtual machine: Could not create domain from
/var/lib/one//datastores/0/19/deployment.0
Sun Oct 20 03:52:15 2013 [DiM][I]: New VM state is FAILED
```

Ahora se queja por problemas de permisos en la imagen. Vamos a comprobarlo:

```
[root@one-node1 libvirt]# ll /var/lib/one/datastores/0/19/*
-rw-rw-r--. 1 oneadmin oneadmin      575 Oct 20 03:52 /var/lib/one/datastores/0/19/deployment.0
-rw-r--r--. 1 oneadmin oneadmin 41943040 Oct 20 03:52 /var/lib/one/datastores/0/19/disk.0
```

Pues en principio no veo problemas de permisos. Vamos a desactivar el selinux en ambos hosts. Vaya! Parece que era por eso: estaba dando problemas el SELinux. Ahora desactivado funciona todo perfectamente. En fin, habrá que tenerlo en cuenta en el entorno en producción.

Otro fallo que ha salido:

```
"Server disconnected(1006)"
```

En la maquina sand-box lo solucionamos así:

```
[jamontes@Braiz ~]$ ssh -L 9869:192.168.123.2:9869 root@Testit
Last login: Sun Oct 20 04:38:57 2013 from 192.168.80.10
[root@Testit ~]#
[jamontes@Braiz ~]$ ssh -L 29876:192.168.123.2:29876 root@Testit
Last login: Sun Oct 20 01:29:00 2013 from 192.168.80.10
[root@Testit ~]#
```

Pero en esta no se deja, no sé si porque los hosts corren en máquinas diferentes, y no tengo abierto esos puertos del VNC.

```
[oneadmin@one-admin ~]$ onevm  top
    ID USER     GROUP    NAME             STAT UCPU    UMEM HOST             TIME
    20 oneadmin oneadmin test_ttylinux0  runn    8     64M one-node2    0d 00h50
    21 oneadmin oneadmin test_ttylinux0  runn    6     64M one-node1    0d 00h06
    22 oneadmin oneadmin test_ttylinux1  runn    7     64M one-node2    0d 00h06
    23 oneadmin oneadmin test_ttylinux2  runn    7     64M one-node1    0d 00h06
    24 oneadmin oneadmin test_ttylinux3  runn    8     64M one-node2    0d 00h06
    25 oneadmin oneadmin test_ttylinux4  runn    8     64M one-node1    0d 00h06
    26 oneadmin oneadmin test_ttylinux5  runn    7     64M one-node2    0d 00h06
    27 oneadmin oneadmin test_ttylinux6  runn    8     64M one-node1    0d 00h06
    28 oneadmin oneadmin test_ttylinux7  runn    7     64M one-node2    0d 00h06
    29 oneadmin oneadmin test_ttylinux8  runn    8     64M one-node1    0d 00h06
    30 oneadmin oneadmin test_ttylinux9  runn    8     64M one-node2    0d 00h06
    31 oneadmin oneadmin test_ttylinux10 runn    8     64M one-node1    0d 00h06
    32 oneadmin oneadmin test_ttylinux11 runn    7     64M one-node2    0d 00h06
    33 oneadmin oneadmin test_ttylinux12 runn    7     64M one-node1    0d 00h06
    34 oneadmin oneadmin test_ttylinux13 runn    7     64M one-node2    0d 00h06
    35 oneadmin oneadmin test_ttylinux14 runn    6     64M one-node1    0d 00h06
    36 oneadmin oneadmin test_ttylinux15 runn    8     64M one-node2    0d 00h06
    37 oneadmin oneadmin test_ttylinux16 runn    9     64M one-node1    0d 00h06
    38 oneadmin oneadmin test_ttylinux17 runn    9     64M one-node2    0d 00h06
^C
```

Hemos invocado 18 máquinas (19 en total), y ahí están corriendo, aunque sin VNC y sin red. Queda mucho por hacer, pero al menos ya tengo algo corriendo, que no es poco.

Vamos a trabajar en varios frentes que tenemos que solucionar. Para ello hacemos un snapshot del frontend, y además pararemos las máquinas para clonarlas. Tenemos que trabajar con un parque de máquinas preconfiguradas sobre las que podamos trabajar sin riesgo de estropear la maqueta montada. Eso nos permitirá trabajar mas deprisa y sin preocupaciones de dar pasos en falso.

Uno de los problemas que tenemos es el del acceso a las consolas remotas a través del Sunstone. Los dos hosts tienen abiertos los puertos de VNC a la escucha:

```
[root@one-node2 ~]# netstat -ale | grep ":59"
tcp        0      0 *:5930                      *:*                         LISTEN      oneadmin
35603
tcp        0      0 *:5932                      *:*                         LISTEN      oneadmin
36536
tcp        0      0 *:5934                      *:*                         LISTEN      oneadmin
38045
tcp        0      0 *:5936                      *:*                         LISTEN      oneadmin
39636
tcp        0      0 *:5938                      *:*                         LISTEN      oneadmin
41101
tcp        0      0 *:5920                      *:*                         LISTEN      oneadmin
28008
tcp        0      0 *:5922                      *:*                         LISTEN      oneadmin
31409
tcp        0      0 *:5924                      *:*                         LISTEN      oneadmin
32107
tcp        0      0 *:5926                      *:*                         LISTEN      oneadmin
33213
tcp        0      0 *:5928                      *:*                         LISTEN      oneadmin
34400
[root@one-node2 ~]#

[root@one-node1 ~]# netstat -ale | grep ":59"
tcp        0      0 *:5929                      *:*                         LISTEN      oneadmin
28509
tcp        0      0 *:5931                      *:*                         LISTEN      oneadmin
29430
tcp        0      0 *:5933                      *:*                         LISTEN      oneadmin
30328
tcp        0      0 *:5935                      *:*                         LISTEN      oneadmin
31827
tcp        0      0 *:5937                      *:*                         LISTEN      oneadmin
33436
tcp        0      0 *:5921                      *:*                         LISTEN      oneadmin
24778
tcp        0      0 *:5923                      *:*                         LISTEN      oneadmin
25551
tcp        0      0 *:5925                      *:*                         LISTEN      oneadmin
26209
tcp        0      0 *:5927                      *:*                         LISTEN      oneadmin
27305
[root@one-node1 ~]#
```

Actualmente tenemos 19 máquinas virtuales corriendo entre los dos hosts. Lo que vemos es que las iptables en los dos hosts impiden que se pueda establecer las peticiones de conexión desde el frontend hacia las consolas VNC, por lo que debemos modificar las iptables para permitir el acceso sin restricciones sólo para el interfaz de red dedicado entre las máquinas (el eth1). Modificamos las iptables actuales en los dos hosts. Esto es lo que tenemos en el host one-node1:

```
[root@one-node1 ~]# iptables -S
-P INPUT ACCEPT
-P FORWARD ACCEPT
-P OUTPUT ACCEPT
-A INPUT -i virbr0 -p udp -m udp --dport 53 -j ACCEPT
-A INPUT -i virbr0 -p tcp -m tcp --dport 53 -j ACCEPT
-A INPUT -i virbr0 -p udp -m udp --dport 67 -j ACCEPT
-A INPUT -i virbr0 -p tcp -m tcp --dport 67 -j ACCEPT
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -j REJECT --reject-with icmp-host-prohibited
-A FORWARD -d 192.168.125.0/24 -o virbr0 -m state --state RELATED,ESTABLISHED -j ACCEPT
-A FORWARD -s 192.168.125.0/24 -i virbr0 -j ACCEPT
-A FORWARD -i virbr0 -o virbr0 -j ACCEPT
-A FORWARD -o virbr0 -j REJECT --reject-with icmp-port-unreachable
-A FORWARD -i virbr0 -j REJECT --reject-with icmp-port-unreachable
-A FORWARD -j REJECT --reject-with icmp-host-prohibited
[root@one-node1 ~]#

[root@one-node1 ~]# cd /etc/sysconfig/
[root@one-node1 sysconfig]# iptables-save >iptables.old
[root@one-node1 sysconfig]# cp iptables.old iptables
[root@one-node1 sysconfig]# diff iptables.old iptables
29a30
> -A INPUT -i eth1 -j ACCEPT
[root@one-node1 sysconfig]# service iptables stop
iptables: Flushing firewall rules:                         [  OK  ]
iptables: Setting chains to policy ACCEPT: nat mangle filte[  OK  ]
iptables: Unloading modules:                               [  OK  ]
[root@one-node1 sysconfig]# service iptables start
iptables: Applying firewall rules:                         [  OK  ]
[root@one-node1 sysconfig]# iptables -S
-P INPUT ACCEPT
-P FORWARD ACCEPT
-P OUTPUT ACCEPT
-A INPUT -i virbr0 -p udp -m udp --dport 53 -j ACCEPT
-A INPUT -i virbr0 -p tcp -m tcp --dport 53 -j ACCEPT
```

```
-A INPUT -i virbr0 -p udp -m udp --dport 67 -j ACCEPT
-A INPUT -i virbr0 -p tcp -m tcp --dport 67 -j ACCEPT
-A INPUT -i eth1 -j ACCEPT
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -j REJECT --reject-with icmp-host-prohibited
-A FORWARD -d 192.168.125.0/24 -o virbr0 -m state --state RELATED,ESTABLISHED -j ACCEPT
-A FORWARD -s 192.168.125.0/24 -i virbr0 -j ACCEPT
-A FORWARD -i virbr0 -o virbr0 -j ACCEPT
-A FORWARD -o virbr0 -j REJECT --reject-with icmp-port-unreachable
-A FORWARD -i virbr0 -j REJECT --reject-with icmp-port-unreachable
-A FORWARD -j REJECT --reject-with icmp-host-prohibited
[root@one-node1 sysconfig]#
```

Hacemos lo mismo con el host2:

```
[root@one-node2 ~]# cd /etc/sysconfig/
[root@one-node2 sysconfig]# iptables-save >iptables.old
[root@one-node2 sysconfig]# cp iptables.old iptables
cp: overwrite `iptables'? y
[root@one-node2 sysconfig]# vi iptables
[root@one-node2 sysconfig]# diff iptables.old iptables
29a30
> -A INPUT -i eth1 -j ACCEPT
[root@one-node2 sysconfig]# service iptables stop
iptables: Flushing firewall rules:                         [  OK  ]
iptables: Setting chains to policy ACCEPT: nat mangle filte[  OK  ]
iptables: Unloading modules:                               [  OK  ]
[root@one-node2 sysconfig]# service iptables start
iptables: Applying firewall rules:                         [  OK  ]
[root@one-node2 sysconfig]# iptables -S
-P INPUT ACCEPT
-P FORWARD ACCEPT
-P OUTPUT ACCEPT
-A INPUT -i virbr0 -p udp -m udp --dport 53 -j ACCEPT
-A INPUT -i virbr0 -p tcp -m tcp --dport 53 -j ACCEPT
-A INPUT -i virbr0 -p udp -m udp --dport 67 -j ACCEPT
-A INPUT -i virbr0 -p tcp -m tcp --dport 67 -j ACCEPT
-A INPUT -i eth1 -j ACCEPT
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -j REJECT --reject-with icmp-host-prohibited
-A FORWARD -d 192.168.125.0/24 -o virbr0 -m state --state RELATED,ESTABLISHED -j ACCEPT
```

```
-A FORWARD -s 192.168.125.0/24 -i virbr0 -j ACCEPT
-A FORWARD -i virbr0 -o virbr0 -j ACCEPT
-A FORWARD -o virbr0 -j REJECT --reject-with icmp-port-unreachable
-A FORWARD -i virbr0 -j REJECT --reject-with icmp-port-unreachable
-A FORWARD -j REJECT --reject-with icmp-host-prohibited
[root@one-node2 sysconfig]#
```

Ahora probamos la consola desde el Sunstone, a ver si funciona:

```
[jamontes@Braiz ~]$ ssh -L 9869:192.168.123.2:9869 root@Testit
Last login: Sun Oct 20 18:42:55 2013 from 192.168.80.10
[root@Testit ~]#

[jamontes@Braiz ~]$ ssh -L 29876:192.168.123.2:29876 root@Testit
Last login: Sun Oct 20 19:08:17 2013 from 192.168.80.10
[root@Testit ~]#
```

Ahora si que podemos acceder sin problemas a la consola VNC de las máquinas. Un problema menos. Ahora paramos las 3 máquinas virtuales, para hacerles un snapshot y de paso clonarlas:

```
[root@Testit ~]# virsh list --all
 Id    Name                           State
----------------------------------------------------
 -     centos64_x86_64                shut off
 -     one-admin                      shut off
 -     one-node1                      shut off
 -     one-node2                      shut off
 -     opennebula_frontend            shut off

[root@Testit ~]# virsh snapshot-list one-admin
 Name                 Creation Time             State
------------------------------------------------------------
 one-admin_base       2013-10-07 13:02:26 +0200 shutoff

[root@Testit ~]# virsh snapshot-list one-node1
 Name                 Creation Time             State
------------------------------------------------------------
 one-node1_base       2013-10-07 13:10:48 +0200 shutoff

[root@Testit ~]# virsh snapshot-list one-node2
 Name                 Creation Time             State
------------------------------------------------------------
 one-node2_base       2013-10-07 13:11:12 +0200 shutoff

[root@Testit ~]#
```

Creamos nuevos snapshots, y después clonamos las imágenes para poder experimentar aparte:

```
[root@Testit ~]# virsh snapshot-create-as one-admin one-admin_working1 "working with dummy network"
```

```
Domain snapshot one-admin_working1 created
[root@Testit ~]# virsh snapshot-create-as one-node1 one-node1_working1 "working with dummy network"
Domain snapshot one-node1_working1 created
[root@Testit ~]# virsh snapshot-create-as one-node2 one-node2_working1 "working with dummy network"
Domain snapshot one-node2_working1 created
[root@Testit ~]#
```

Ahora clonamos las tres imágenes. aprovecharemos los dos hosts para trabajar con el 802.1Q.

```
[root@Testit ~]# virt-clone --prompt
What is the name of the original virtual machine?
one-admin
What is the name for the cloned virtual machine?
one-admin-clone
What would you like to use as the cloned disk (file path) for '/home/libvirtimages/one-admin.qcow2'?
/home/libvirtimages/one-admin-clone.qcow2
Cloning one-admin.qcow2
| 3.5 GB     01:08

Clone 'one-admin-clone' created successfully.
[root@Testit ~]# ll /home/libvirtimages/
total 23162504
-rwxr-xr-x. 1 root root 42949672960 Oct  5 04:27 centos64_x86_64.img
-rw-r--r--. 1 root root  2967339008 Oct  5 04:54 centos64_x86_64.qcow2
-rwxr-xr-x. 1 root root  3753509376 Oct 20 22:35 one-admin-clone.qcow2
-rwxr-xr-x. 1 root root  3753509376 Oct 20 22:26 one-admin.qcow2
-rwxr-xr-x. 1 root root  3380806144 Oct 20 22:27 one-node1.qcow2
-rwxr-xr-x. 1 root root  3392471552 Oct 20 22:28 one-node2.qcow2
-rwxr-xr-x. 1 root root  2967732224 Oct  6 02:14 opennebula_frontend.qcow2
[root@Testit ~]#

[root@Testit ~]# virt-clone --prompt
What is the name of the original virtual machine?
one-node1
What is the name for the cloned virtual machine?
one-node3
What would you like to use as the cloned disk (file path) for '/home/libvirtimages/one-node1.qcow2'?
/home/libvirtimages/one-node3.qcow2
Cloning one-node1.qcow2
| 3.1 GB     01:01

Clone 'one-node3' created successfully.
[root@Testit ~]# virt-clone --prompt
What is the name of the original virtual machine?
one-node2
What is the name for the cloned virtual machine?
one-node4
```

```
What would you like to use as the cloned disk (file path) for '/home/libvirtimages/one-node2.qcow2'?
/home/libvirtimages/one-node4.qcow2
Cloning one-node2.qcow2
| 3.2 GB     01:01

Clone 'one-node4' created successfully.
[root@Testit ~]# ll /home/libvirtimages/
total 29738112
-rwxr-xr-x. 1 root root 42949672960 Oct  5 04:27 centos64_x86_64.img
-rw-r--r--. 1 root root  2967339008 Oct  5 04:54 centos64_x86_64.qcow2
-rwxr-xr-x. 1 root root  3753509376 Oct 20 22:35 one-admin-clone.qcow2
-rwxr-xr-x. 1 root root  3753509376 Oct 20 22:26 one-admin.qcow2
-rwxr-xr-x. 1 root root  3380806144 Oct 20 22:27 one-node1.qcow2
-rwxr-xr-x. 1 root root  3392471552 Oct 20 22:28 one-node2.qcow2
-rwxr-xr-x. 1 root root  3380806144 Oct 20 22:37 one-node3.qcow2
-rwxr-xr-x. 1 root root  3392471552 Oct 20 22:42 one-node4.qcow2
-rwxr-xr-x. 1 root root  2967732224 Oct  6 02:14 opennebula_frontend.qcow2
[root@Testit ~]#
```

Bien, ahora entramos en los dos hosts (node3 y node4) y cambiamos las IPs:

```
[root@Testit ~]# virsh start one-node3
Domain one-node3 started

[root@Testit ~]# virsh start one-node4
Domain one-node4 started

[root@Testit ~]# virsh list --all
 Id    Name                           State
----------------------------------------------------
 7     one-node3                      running
 8     one-node4                      running
 -     centos64_x86_64                shut off
 -     one-admin                      shut off
 -     one-admin-clone                shut off
 -     one-node1                      shut off
 -     one-node2                      shut off
 -     opennebula_frontend            shut off
```

Configuramos los ficheros /etc/hosts de todas las máquinas, incluidas el servidor NFS. Además modificamos las IPs y las MACs en los hosts 3 y 4 para que peudan coexistir con los otros dos. Con esto tendremos un entorno heterogéneo lo más completo posible. Ahora vamos a comprobar que todas las máquinas pueden acceder a todas de forma automática. Ya está todo configurado en las 5 máquinas y el servidor físico.

Lo siguiente que tenemos que hacer es trabajar con las templates, y sobre todo las de las vnet. Vamos a crear una plantilla de red que utilice el bridge por defecto de los hosts. Algo así como esto:

```
[oneadmin@one-admin template_files]$ more public1.net
```

```
NAME = "Internet LAN"
TYPE = "RANGED"
BRIDGE = "virbr0"
VLAN = NO

NETWORK_ADDRESS = "192.168.125.0/24"
GATEWAY = "192.168.125.1"
DNS = "192.168.125.1"
IP_START = "192.168.125.2"
IP_END = "192.168.125.254"
[oneadmin@one-admin template_files]$
```

Vamos a probarlo:

```
[oneadmin@one-admin template_files]$ onevnet create public1.net
ID: 0
[oneadmin@one-admin template_files]$ onevnet list
  ID USER         GROUP        NAME            CLUSTER      TYPE BRIDGE   LEASES
   0 oneadmin     oneadmin     Internet LAN    -               R virbr0        0
[oneadmin@one-admin template_files]$ onevnet show 0
VIRTUAL NETWORK 0 INFORMATION
ID             : 0
NAME           : Internet LAN
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : virbr0
VLAN           : No
USED LEASES    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

VIRTUAL NETWORK TEMPLATE
DNS="192.168.125.1"
GATEWAY="192.168.125.1"
NETWORK_ADDRESS="192.168.125.0/24"
NETWORK_MASK="255.255.255.0"

RANGE
IP_START       : 192.168.125.2
IP_END         : 192.168.125.254

VIRTUAL MACHINES
```

```
[oneadmin@one-admin template_files]$ onevnet chmod 0 644
[oneadmin@one-admin template_files]$ onevnet show 0
VIRTUAL NETWORK 0 INFORMATION
ID             : 0
NAME           : Internet LAN
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : virbr0
VLAN           : No
USED LEASES    : 0

PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

VIRTUAL NETWORK TEMPLATE
DNS="192.168.125.1"
GATEWAY="192.168.125.1"
NETWORK_ADDRESS="192.168.125.0/24"
NETWORK_MASK="255.255.255.0"

RANGE
IP_START       : 192.168.125.2
IP_END         : 192.168.125.254

VIRTUAL MACHINES

[oneadmin@one-admin template_files]$
```

Ahora creamos otro template para la red privada por 802.1Q:

```
[oneadmin@one-admin template_files]$ more priv_vlan6.net
NAME = "VLAN6"
TYPE = "RANGED"
PHYDEV = "eth2"
VLAN = "YES"
VLAN_ID = 6
BRIDGE  = "brhm6"

NETWORK_ADDRESS = "192.168.126.0/24"
[oneadmin@one-admin template_files]$ onevnet create priv_vlan6.net
ID: 1
[oneadmin@one-admin template_files]$ onevnet list
```

```
  ID USER         GROUP        NAME            CLUSTER      TYPE BRIDGE   LEASES
   0 oneadmin     oneadmin     Internet LAN    -               R virbr0        0
   1 oneadmin     oneadmin     VLAN6           -               R brhm6         0
[oneadmin@one-admin template_files]$ onevnet chmod 1 644
[oneadmin@one-admin template_files]$ onevnet show 1
VIRTUAL NETWORK 1 INFORMATION
ID             : 1
NAME           : VLAN6
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : brhm6
VLAN           : Yes
PHYSICAL DEVICE: eth2
VLAN ID        : 6
USED LEASES    : 0

PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

VIRTUAL NETWORK TEMPLATE
NETWORK_ADDRESS="192.168.126.0/24"
NETWORK_MASK="255.255.255.0"

RANGE
IP_START       : 192.168.126.1
IP_END         : 192.168.126.254

VIRTUAL MACHINES

[oneadmin@one-admin template_files]$
```

Ahora copiamos la plantilla original que teníamos para la VM tty de pruebas sin red, y creamos una nueva plantilla con sólo el interfaz de red pública:

```
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                10/20 00:31:36
[oneadmin@one-admin template_files]$ onetemplate show 0
TEMPLATE 0 INFORMATION
ID             : 0
NAME           : tty template
USER           : oneadmin
GROUP          : oneadmin
```

```
REGISTER TIME  : 10/20 00:31:36

PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
OS=[
  ARCH="x86_64" ]
REQUIREMENTS="ID=\"6\" | ID=\"7\""
[oneadmin@one-admin template_files]$ onetemplate clone 0 "tty public"
ID: 1
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                10/20 00:31:36
   1 oneadmin        oneadmin        tty public                  10/21 16:20:21
[oneadmin@one-admin template_files]$ onetemplate clone 0 "tty public"
ID: 1
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                10/20 00:31:36
   1 oneadmin        oneadmin        tty public                  10/21 16:20:21
[oneadmin@one-admin template_files]$ onetemplate show 1 -v
TEMPLATE 1 INFORMATION
ID             : 1
NAME           : tty public
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 10/21 16:20:21

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CPU="0.1"
```

```
DISK=[
  IMAGE_ID="0" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
OS=[
  ARCH="x86_64" ]
REQUIREMENTS="ID=\"6\" | ID=\"7\""
[oneadmin@one-admin template_files]$ more tty_public.tmpl
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
OS=[
  ARCH="x86_64" ]
NIC = [ NETWORK="Internet LAN", MODEL="virtio" ]
REQUIREMENTS="ID=\"6\" | ID=\"7\""
[oneadmin@one-admin template_files]$ onetemplate update 1 tty_public.tmpl
[oneadmin@one-admin template_files]$ onetemplate chmod 1 644
[oneadmin@one-admin template_files]$ onetemplate show 1
TEMPLATE 1 INFORMATION
ID             : 1
NAME           : tty public
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 10/21 16:20:21

PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
NIC=[
```

```
  MODEL="virtio",
  NETWORK="Internet LAN" ]
OS=[
  ARCH="x86_64" ]
REQUIREMENTS="ID=\"6\" | ID=\"7\""
[oneadmin@one-admin template_files]$ more tty_public.tmpl
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
OS=[
  ARCH="x86_64" ]
NIC = [ NETWORK="Internet LAN", MODEL="virtio" ]
REQUIREMENTS="ID=\"6\" | ID=\"7\""
[oneadmin@one-admin template_files]$
```

Ya lo tenemos. Ahora vamos a probar a instanciar una máquina a través de la línea de comandos, en lugar de usar el Sunstone:

```
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                                REGTIME
   0 oneadmin        oneadmin        tty template                10/20 00:31:36
   1 oneadmin        oneadmin        tty public                  10/21 16:20:21
[oneadmin@one-admin template_files]$
[oneadmin@one-admin template_files]$ onetemplate instantiate 1 --name "tty_public1"
VM ID: 40
[oneadmin@one-admin template_files]$ onevm top
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    40 oneadmin oneadmin tty_public1     runn   15     64M one-node2    0d 00h01
^C
[oneadmin@one-admin template_files]$ onevm show  40
VIRTUAL MACHINE 40 INFORMATION
ID                  : 40
NAME                : tty_public1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
START TIME          : 10/21 16:58:11
END TIME            : -
DEPLOY ID           : one-40
```

```
VIRTUAL MACHINE MONITORING
USED CPU            : 15
NET_TX              : 0K
USED MEMORY         : 64M
NET_RX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    ttylinux - kvm                     file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.2   02:00:c0:a8:7d:02
                                           fe80::400:c0ff:fea8:7d02

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node2       none             none  10/21 16:58:37   0d 00h01m   0h00m01s

USER TEMPLATE
SCHED_REQUIREMENTS="ID=\"6\" | ID=\"7\""

VIRTUAL MACHINE TEMPLATE
CPU="0.1"
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="5940",
  TYPE="VNC" ]
MEMORY="64"
OS=[
  ARCH="x86_64" ]
TEMPLATE_ID="1"
VMID="40"
[oneadmin@one-admin template_files]$
```

Parece que no se ha quejado, y que funciona. Vamos a verlo en el host one-node2:

```
virbr0    Link encap:Ethernet  HWaddr 52:54:00:15:2B:DB
          inet addr:192.168.125.1  Bcast:192.168.125.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
```

```
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)

vnet0     Link encap:Ethernet  HWaddr FE:00:C0:A8:7D:02
          inet6 addr: fe80::fc00:c0ff:fea8:7d02/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:500
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)

[root@one-node2 ~]# brctl show
bridge name     bridge id               STP enabled     interfaces
virbr0          8000.525400152bdb       yes             virbr0-nic
                                                        vnet0
[root@one-node2 ~]# arp -a
? (192.168.125.2) at <incomplete> on virbr0
server-nfs (192.168.123.1) at 52:54:00:7d:68:1e [ether] on eth1
one-admin (192.168.123.2) at 52:54:00:d8:9e:2d [ether] on eth1
[root@one-node2 ~]#
```

Se ve que queda reflejado la MAC y la IPv6 en el interfaz vnet0, pero no accedemos por ping a la máquina virtual. Debe de ser un problema de contextualización. Probamos con diferentes templates, tanto de red como de máquinas, hasta que nos funcione una de ellas. Vamos a probar con una modificación en la red, a ver si conseguimos que levante el interface:

```
[oneadmin@one-admin template_files]$ diff tty_public2.tmpl tty_public.tmpl
8,10c8,10
< FEATURES=[
<   ACPI="no" ]
< NIC = [ NETWORK="Internet LAN" ]
---
> OS=[
>   ARCH="x86_64" ]
> NIC = [ NETWORK="Internet LAN", MODEL="virtio" ]
[oneadmin@one-admin template_files]$  onetemplate clone 1 "tty public2"
ID: 2
[oneadmin@one-admin template_files]$ onetemplate update 2 tty_public2.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 2
TEMPLATE 2 INFORMATION
ID             : 2
NAME           : tty public2
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 10/22 00:02:56
```

```
PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
NIC=[
  NETWORK="Internet LAN" ]
REQUIREMENTS="ID=\"6\" | ID=\"7\""
[oneadmin@one-admin template_files]$
```

Y probamos a instanciar otra máquina, a ver si esta vez se deja acceder.

```
[oneadmin@one-admin template_files]$ onetemplate instantiate 2 --name "tty_public2"
VM ID: 41
[oneadmin@one-admin template_files]$ onevm top
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   99     64M one-node2    0d 00h00
^C

[oneadmin@one-admin template_files]$ onevm show 41
VIRTUAL MACHINE 41 INFORMATION
ID                  : 41
NAME                : tty_public2
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
START TIME          : 10/22 00:11:04
END TIME            : -
DEPLOY ID           : one-41

VIRTUAL MACHINE MONITORING
NET_RX              : 1K
NET_TX              : 0K
USED CPU            : 15
```

```
USED MEMORY         : 64M

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    ttylinux - kvm                     file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.2   02:00:c0:a8:7d:02
                                           fe80::400:c0ff:fea8:7d02

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node2       none             none  10/22 00:11:07   0d 00h00m   0h00m01s

USER TEMPLATE
SCHED_REQUIREMENTS="ID=\"6\" | ID=\"7\""

VIRTUAL MACHINE TEMPLATE
CPU="0.1"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="5941",
  TYPE="VNC" ]
MEMORY="64"
TEMPLATE_ID="2"
VMID="41"
[oneadmin@one-admin template_files]$
```

Vaya!! ahora si que podemos acceder!!! Creo que tiene que ver con lo del interfaz de red tipo virtio.

```
[root@one-node2 ~]# ping 192.168.125.2
PING 192.168.125.2 (192.168.125.2) 56(84) bytes of data.
64 bytes from 192.168.125.2: icmp_seq=1 ttl=64 time=0.373 ms
64 bytes from 192.168.125.2: icmp_seq=2 ttl=64 time=0.424 ms
^C
--- 192.168.125.2 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1582ms
rtt min/avg/max/mdev = 0.373/0.398/0.424/0.032 ms
```

```
[root@one-node2 ~]#
[root@one-node2 ~]# ssh 192.168.125.2
The authenticity of host '192.168.125.2 (192.168.125.2)' can't be established.
RSA key fingerprint is 5b:d6:3a:a9:8a:53:21:66:70:0c:b7:26:34:45:b1:27.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.125.2' (RSA) to the list of known hosts.
root@192.168.125.2's password:

Chop wood, carry water.

#
# netstat -nr
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
192.168.125.0   0.0.0.0         255.255.255.0   U         0 0          0 eth0
0.0.0.0         192.168.125.1   0.0.0.0         UG        0 0          0 eth0
#  ifconfig
eth0      Link encap:Ethernet  HWaddr 02:00:C0:A8:7D:02
          inet addr:192.168.125.2  Bcast:192.168.125.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:714 errors:0 dropped:0 overruns:0 frame:0
          TX packets:518 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:65247 (63.7 KiB)  TX bytes:77131 (75.3 KiB)
          Interrupt:11 Base address:0xc100

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

Estupendo. Ahora nos queda probar el tema del 802.1q, a ver si se deja pasar el tema de las VLANs entre las máquinas virtuales. Primero damos de alta los dos nodos nuevos noe-node3 y one-node4:

```
[oneadmin@one-admin ~]$ onehost create one-node3 -i kvm -v qemu -n 802.1Q
ID: 8
[oneadmin@one-admin ~]$ onehost create one-node4 -i kvm -v qemu -n 802.1Q
ID: 9
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   6 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   7 one-node2       -           1     10 / 100 (10%)  64M / 996.7M (6%) on
   8 one-node3       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
```

```
   9 one-node4       -           0                 -                 - init
[oneadmin@one-admin ~]$ onehost show 8
HOST 8 INFORMATION
ID                    : 8
NAME                  : one-node3
CLUSTER               : -
STATE                 : MONITORED
IM_MAD                : kvm
VM_MAD                : qemu
VN_MAD                : 802.1Q
LAST MONITORING TIME  : 10/22 01:06:35

HOST SHARES
TOTAL MEM             : 996.7M
USED MEM (REAL)       : 108.6M
USED MEM (ALLOCATED)  : 0K
TOTAL CPU             : 100
USED CPU (REAL)       : 0
USED CPU (ALLOCATED)  : 0
RUNNING VMS           : 0

MONITORING INFORMATION
ARCH="x86_64"
CPUSPEED="3292"
FREECPU="100.0"
FREEMEMORY="909324"
HOSTNAME="one-node3"
HYPERVISOR="kvm"
MODELNAME="QEMU Virtual CPU version (cpu64-rhel6)"
NETRX="3424862"
NETTX="283182"
TOTALCPU="100"
TOTALMEMORY="1020576"
USEDCPU="0.0"
USEDMEMORY="111252"

VIRTUAL MACHINES

    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME

[oneadmin@one-admin ~]$
```

Ahora clonamos la plantilla que nos funciona para dar de alta una máquina en los nodos 3 y 4:

```
[oneadmin@one-admin ~]$ onetemplate list
  ID USER            GROUP           NAME                                REGTIME
```

```
   0 oneadmin        oneadmin        tty template                10/20 00:31:36
   1 oneadmin        oneadmin        tty public                  10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                 10/22 00:02:56
[oneadmin@one-admin ~]$ onetemplate clone 2 "tty public nodes 3 4"
ID: 3
[oneadmin@one-admin ~]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                10/20 00:31:36
   1 oneadmin        oneadmin        tty public                  10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                 10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4        10/22 01:10:12
[oneadmin@one-admin ~]$
```

Ahora modificamos la plantilla para contemplar los nodos 3 y 4:

```
[oneadmin@one-admin ~]$ cd template_files/
[oneadmin@one-admin template_files]$ ll
total 20
-rw-rw-r-- 1 oneadmin oneadmin 128 Oct 21 16:12 priv_vlan6.net
-rw-rw-r-- 1 oneadmin oneadmin 206 Oct 21 15:59 public1.net
-rw-rw-r-- 1 oneadmin oneadmin 204 Oct 21 23:54 public2.net
-rw-rw-r-- 1 oneadmin oneadmin 185 Oct 21 23:57 tty_public2.tmpl
-rw-rw-r-- 1 oneadmin oneadmin 199 Oct 21 16:35 tty_public.tmpl
[oneadmin@one-admin template_files]$ cp tty_public2.tmpl tty_public3.tmpl
[oneadmin@one-admin template_files]$ vi tty_public3.tmpl
[oneadmin@one-admin template_files]$ diff tty_public3.tmpl tty_public2.tmpl
11c11
< REQUIREMENTS="ID=\"8\" | ID=\"9\""
---
> REQUIREMENTS="ID=\"6\" | ID=\"7\""
[oneadmin@one-admin template_files]$ onetemplate update 3 tty_public3.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 3
TEMPLATE 3 INFORMATION
ID             : 3
NAME           : tty public nodes 3 4
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 10/22 01:10:12

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
```

```
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
NIC=[
  NETWORK="Internet LAN" ]
REQUIREMENTS="ID=\"8\" | ID=\"9\""
[oneadmin@one-admin template_files]$
```

Bien, ahora probamos a instanciar una nueva máquina en los nodos 3/4

```
[oneadmin@one-admin template_files]$ onetemplate instantiate 3 --name "tty_public3_nodes34"
VM ID: 42
[oneadmin@one-admin template_files]$ onevm top
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   17     64M one-node2    0d 01h16
    42 oneadmin oneadmin tty_public3_nod fail    0      0K              0d 00h00
^C
[oneadmin@one-admin template_files]$
```

El comando ha fallado. Hay algo que no nos funciona bien. vamos a ver los logs.

```
Tue Oct 22 01:27:10 2013 [VMM][I]: sudo: sorry, you must have a tty to run sudo
```

Bien, esto suele ocurrir en CentOS/RedHat/Fedora y tiene que ver con la siguientes líneas en el fichero /etc/sudoers:

```
Defaults requiretty
Defaults !visiblepw
```

Comentado esas línea en el /etc/sudoers de los hosts el tema queda resuelto. La explicación viene aquí:

```
http://blog.zenlinux.com/2008/02/centos-5-configuration-tweak-for-sudo/
```

Vamos a hacerlo en los 4 nodos. Ahora probamos de nuevo a instanciar una máquina, a ver que ocurre. Vuelve a fallar, pero por una razón diferente:

```
Tue Oct 22 01:47:09 2013 [VMM][I]: sudo: /sbin/brctl: command not found
```

He aquí la razón:

```
[oneadmin@one-admin template_files]$ type brctl
brctl is /usr/sbin/brctl
```

Tenemos que revisar las rutas de los comandos vconfig, brctl, ip, según nos dice en el link del blog:

```
http://opennebula.org/documentation:rel4.2:hm-vlan
```

Vamos a ello. Seguimos la ruta de todos los comandos contenidos en el fichero /var/lib/one/remotes/vnm/OpenNebulaNetwork.rb, tal y como se explica aquí:

```
http://opennebula.org/documentation:rel4.2:nm
```

```
[oneadmin@one-admin template_files]$ type iptables
iptables is /sbin/iptables
```

```
[oneadmin@one-admin template_files]$ type brctl
brctl is /usr/sbin/brctl
[oneadmin@one-admin template_files]$ type ip
ip is /sbin/ip
[oneadmin@one-admin template_files]$ type vconfig
vconfig is /sbin/vconfig
[oneadmin@one-admin template_files]$ type lsmod
lsmod is /sbin/lsmod
```

Vamos a dejar el fichero /var/lib/one/remotes/vnm/OpenNebulaNetwork.rb con las rutas correctas en los paquetes que tenemos instalados.

Antes:

```
COMMANDS = {
  :ebtables => "sudo /sbin/ebtables",
  :iptables => "sudo /sbin/iptables",
  :brctl    => "sudo /sbin/brctl",
  :ip       => "sudo /sbin/ip",
  :vconfig  => "sudo /sbin/vconfig",
  :virsh    => "virsh -c qemu:///system",
  :xm       => "sudo /usr/sbin/xm",
  :ovs_vsctl=> "sudo /usr/bin/ovs-vsctl",
  :ovs_ofctl=> "sudo /usr/bin/ovs-ofctl",
  :lsmod    => "/sbin/lsmod"
}
```

Ahora:

```
[oneadmin@one-admin vnm]$ diff OpenNebulaNetwork.rb OpenNebulaNetwork.rb.org
35c35
<   :brctl    => "sudo /usr/sbin/brctl",
---
>   :brctl    => "sudo /sbin/brctl",
```

El único cambio estaba en la ruta del comando brctl, que en CentOS está dentro de /usr/sbin/. Arrancamos de nuevo la misma instancia:

```
[oneadmin@one-admin vnm]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   17     64M one-node2    0d 01h47
    42 oneadmin oneadmin tty_public3_nod fail    0      0K              0d 00h20
[oneadmin@one-admin vnm]$ onevm delete 42 --recreate
[oneadmin@one-admin vnm]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   17     64M one-node2    0d 01h47
    42 oneadmin oneadmin tty_public3_nod pend    0      0K              0d 00h20
[oneadmin@one-admin vnm]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   17     64M one-node2    0d 01h48
    42 oneadmin oneadmin tty_public3_nod fail    0      0K              0d 00h32
[oneadmin@one-admin vnm]$
```

Vuelve a fallar. Revisamos de nuevo lo que ha pasado... Ya lo sabemos, tenemos que hacer un onehost sync para que resincronice los ejecutables correctamente.

```
[oneadmin@one-admin vnm]$ onehost sync
```

Ahora lo revisamos en los nodos 3 y 4, para estar seguros que ejecuta bien el comando.

Nota: los ejecutables del directorio remotes, en los hosts se encuentran en /var/tmp/one/vnm/

```
[root@one-node3 ~]# ll /var/tmp/one/vnm/OpenNebulaNetwork.rb
-rw-r--r--. 1 oneadmin oneadmin 4657 Oct 22 02:01 /var/tmp/one/vnm/OpenNebulaNetwork.rb
[root@one-node3 ~]#
```

Bien, vamos a instanciarla de nuevo. A ver si ahora hay suerte:

```
[oneadmin@one-admin vnm]$ onevm delete 42 --recreate
[oneadmin@one-admin vnm]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   17     64M one-node2    0d 01h54
    42 oneadmin oneadmin tty_public3_nod fail    0      0K              0d 00h39
[oneadmin@one-admin vnm]$
```

Vemos los logs. Vamos a probar de nuevo instanciando una nueva máquina:

```
[oneadmin@one-admin 802.1Q]$ onetemplate instantiate 3 --name "tty_public4_nodes34"
VM ID: 43
[oneadmin@one-admin 802.1Q]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   16     64M one-node2    0d 02h00
    43 oneadmin oneadmin tty_public4_nod prol    0      0K one-node4    0d 00h00
[oneadmin@one-admin 802.1Q]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   16     64M one-node2    0d 02h00
    43 oneadmin oneadmin tty_public4_nod fail    0      0K              0d 00h00
[oneadmin@one-admin 802.1Q]$

[oneadmin@one-admin 802.1Q]$ onevm show 43
VIRTUAL MACHINE 43 INFORMATION
ID                  : 43
NAME                : tty_public4_nodes34
USER                : oneadmin
GROUP               : oneadmin
STATE               : FAILED
LCM_STATE           : LCM_INIT
RESCHED             : No
START TIME          : 10/22 02:11:31
END TIME            : 10/22 02:11:39
DEPLOY ID           : -

VIRTUAL MACHINE MONITORING
NET_TX              : 0K
```

```
USED CPU            : 0
USED MEMORY         : 0K
NET_RX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    ttylinux - kvm                     file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.3   02:00:c0:a8:7d:03
                                           fe80::400:c0ff:fea8:7d03

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node4       none             erro  10/22 02:11:37   0d 00h00m   0h00m01s

USER TEMPLATE
SCHED_REQUIREMENTS="ID=\"8\" | ID=\"9\""

VIRTUAL MACHINE TEMPLATE
CPU="0.1"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="5943",
  TYPE="VNC" ]
MEMORY="64"
TEMPLATE_ID="3"
VMID="43"
[oneadmin@one-admin 802.1Q]$
```

Aquí está la causa:

```
[root@Testit ~]# ssh one-node4
Last login: Tue Oct 22 01:43:45 2013 from 192.168.123.1
[root@one-node4 ~]# cd /var/tmp/one/ ; fgrep -r brctl *
vnm/OpenNebulaNetwork.rb:  :brctl    => "sudo /sbin/brctl",
vnm/OpenNebulaNetwork.rb:        brctl_exit =`#{COMMANDS[:brctl]} show`
vnm/OpenNebulaNetwork.rb:        brctl_exit.split("\n")[1..-1].each do |l|
vnm/802.1Q/HostManaged.rb:        OpenNebula.exec_and_log("#{COMMANDS[:brctl]} addbr #{bridge}")
```

```
vnm/802.1Q/HostManaged.rb:        OpenNebula.exec_and_log("#{COMMANDS[:brctl]} addif #{bridge}
#{dev}")
[root@one-node4 one]#
```

El fichero no ha sido actualizado, por alguna razón que desconocemos. Hacemos de nuevo un sync:

```
[root@one-node4 vnm]# ll OpenNebulaNetwork.rb
-rw-r--r--. 1 oneadmin oneadmin 4653 Oct 22 01:06 OpenNebulaNetwork.rb
[root@one-node4 vnm]#

[oneadmin@one-admin vnm]$ onehost sync
[oneadmin@one-admin vnm]$ onehost show 9
HOST 9 INFORMATION
ID                    : 9
NAME                  : one-node4
CLUSTER               : -
STATE                 : MONITORED
IM_MAD                : kvm
VM_MAD                : qemu
VN_MAD                : 802.1Q
LAST MONITORING TIME  : 10/22 02:22:00

[root@one-node4 vnm]# ll OpenNebulaNetwork.rb
-rw-r--r--. 1 oneadmin oneadmin 4653 Oct 22 01:06 OpenNebulaNetwork.rb
[root@one-node4 vnm]#
```

Por alguna extraña razón no se ha actualizado el fichero en este host. Es posible que esté pendiente de ejecución en el scheduler. Tendremos que hacerlo a mano:

```
[oneadmin@one-admin vnm]$ scp -Cp OpenNebulaNetwork.rb oneadmin@one-node4:/var/tmp/one/vnm/
OpenNebulaNetwork.rb
100% 4657     4.6KB/s   00:00
[oneadmin@one-admin vnm]$

[root@one-node4 vnm]# ll OpenNebulaNetwork.rb
-rw-r--r--. 1 oneadmin oneadmin 4657 Oct 22 01:57 OpenNebulaNetwork.rb
[root@one-node4 vnm]# date
Tue Oct 22 02:27:30 CEST 2013
[root@one-node4 vnm]#
```

Ahora si que lo tenemos OK:

```
[root@one-node4 vnm]# cd /var/tmp/one/ ; fgrep -r brctl *
vnm/OpenNebulaNetwork.rb:  :brctl    => "sudo /usr/sbin/brctl",
vnm/OpenNebulaNetwork.rb:        brctl_exit =`#{COMMANDS[:brctl]} show`
vnm/OpenNebulaNetwork.rb:        brctl_exit.split("\n")[1..-1].each do |l|
vnm/802.1Q/HostManaged.rb:        OpenNebula.exec_and_log("#{COMMANDS[:brctl]} addbr #{bridge}")
vnm/802.1Q/HostManaged.rb:        OpenNebula.exec_and_log("#{COMMANDS[:brctl]} addif #{bridge}
#{dev}")
[root@one-node4 one]#
```

Vamos a repetir la operación en los nodos 1 y 2. Ya está. Está todo OK, ahora vamos a reinstanciar la máquina a ver que ocurre esta vez:

```
[oneadmin@one-admin vnm]$ onevm delete 43 --recreate
[oneadmin@one-admin vnm]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   19     64M one-node2    0d 02h20
    43 oneadmin oneadmin tty_public4_nod runn   60     64M one-node4    0d 00h00
[oneadmin@one-admin vnm]$ onevm show 43
VIRTUAL MACHINE 43 INFORMATION
ID                  : 43
NAME                : tty_public4_nodes34
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node4
START TIME          : 10/22 02:11:31
END TIME            : 10/22 02:11:39
DEPLOY ID           : one-43

VIRTUAL MACHINE MONITORING
USED MEMORY         : 64M
USED CPU            : 60
NET_RX              : 0K
NET_TX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                               TYPE SAVE SAVE_AS
  0 hda    ttylinux - kvm                      file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.3   02:00:c0:a8:7d:03
                                           fe80::400:c0ff:fea8:7d03

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION          REAS           START        TIME     PROLOG
  0 one-node4       none            erro  10/22 02:11:37   0d 00h00m   0h00m01s
  1 one-node4       none            none  10/22 02:31:07   0d 00h00m   0h00m01s
```

```
USER TEMPLATE
SCHED_REQUIREMENTS="ID=\"8\" | ID=\"9\""

VIRTUAL MACHINE TEMPLATE
CPU="0.1"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="5943",
  TYPE="VNC" ]
MEMORY="64"
TEMPLATE_ID="3"
VMID="43"
[oneadmin@one-admin vnm]$
```

Menos mal! Parece que ha funcionado.

```
[root@Testit ~]# ssh one-node4
Last login: Tue Oct 22 02:18:53 2013 from 192.168.123.1
[root@one-node4 ~]# ping 192.168.125.3
PING 192.168.125.3 (192.168.125.3) 56(84) bytes of data.
64 bytes from 192.168.125.3: icmp_seq=1 ttl=64 time=8.80 ms
64 bytes from 192.168.125.3: icmp_seq=2 ttl=64 time=0.602 ms
64 bytes from 192.168.125.3: icmp_seq=3 ttl=64 time=0.340 ms
^C
--- 192.168.125.3 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2203ms
rtt min/avg/max/mdev = 0.340/3.248/8.804/3.930 ms
[root@one-node4 ~]#
```

Ahora nos toca crear otra plantilla con el interfaz privado usando la VLAN6.

```
[oneadmin@one-admin template_files]$ diff tty_public4.tmpl tty_public3.tmpl
11d10
< NIC = [ NETWORK="VLAN6" ]
[oneadmin@one-admin template_files]$ onetemplate clone 3 "tty public 2 NICs nodes 3 4"
ID: 4
[oneadmin@one-admin template_files]$ onetemplate update 4 tty_public4.tmpl
[oneadmin@one-admin template_files]$ onetemplate chmod 4 644
[oneadmin@one-admin template_files]$ onetemplate show 4
TEMPLATE 4 INFORMATION
ID             : 4
NAME           : tty public 2 NICs nodes 3 4
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 10/22 11:27:40
```

```
PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  NETWORK="VLAN6" ]
REQUIREMENTS="ID=\"8\" | ID=\"9\""
[oneadmin@one-admin template_files]$
```

Por último instanciamos una máquina, y cruzamos los dedos....

```
[oneadmin@one-admin template_files]$ onetemplate instantiate 4 --name "tty_public_2_nic_nodes34"
VM ID: 44
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   16     64M one-node2    0d 11h20
    43 oneadmin oneadmin tty_public4_nod runn   13     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni          0      0K one-node3    0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   16     64M one-node2    0d 11h20
    43 oneadmin oneadmin tty_public4_nod runn   13     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni fail     0      0K one-node3    0d 00h00
[oneadmin@one-admin template_files]$
```

Vemos los logs...

```
Tue Oct 22 11:31:11 2013 [VMM][I]: /var/tmp/one/vnm/802.1Q/../OpenNebulaNic.rb:31:in `new_nic':
undefined method `new' for nil:NilClass (NoMethodError)
```

Este error es diferente. Al tener que crear el bridge para asignarlo a la VLAN, la cosa ya cambia. Hemos encontrado la explicación en este link:

```
http://lists.opennebula.org/pipermail/users-opennebula.org/2012-November/021131.html
```

Y la causa es que el driver del 802.1Q intenta localizar la arquitectura de virtualización mediante el comando lsmod (buscando por kvm_{intel,amd}). En nuestro caso, como los hosts usan virtualización anidada mediante emulación con qemu, no aparece el módulo kvm_intel o kvm_amd, y por tanto aparece un nil en la función devuelta.

La solución consiste en pasarle al driver la arquitectura de virtualización. según dice en el siguiente link del mismo hilo:

```
http://lists.opennebula.org/pipermail/users-opennebula.org/2012-November/021151.html
```

Vamos a seguir el código del driver para poner el workaround. Este problema sólo nos ocurre por usar una maqueta con los host virtualizados. En OpenNebulaNetwork.rb cambiamos esto:

```
    def detect_hypervisor
        lsmod       = `#{COMMANDS[:lsmod]}`
        xen_file    = "/proc/xen/capabilities"

        if File.exists?(xen_file)
            "xen"
        elsif lsmod.match(/kvm/)
            "kvm"
        else
            nil
        end
    end
```

Por esto otro:

```
    def detect_hypervisor
        lsmod       = `#{COMMANDS[:lsmod]}`
        xen_file    = "/proc/xen/capabilities"

        if File.exists?(xen_file)
            "xen"
        else
        # JAM changed this to allow nested virtualization with qemu.
            "kvm"
        end
    end
```

Ahora hacemos un onehost sync para copiar la nueva configuración y asegurarnos que los host actualizan el workaround.

```
[oneadmin@one-admin vnm]$ onehost sync
```

Como no queremos esperar al siguiente ciclo de monitorización, lo actualizamos nosotros a mano:

```
[oneadmin@one-admin vnm]$ scp -Cp OpenNebulaNetwork.rb oneadmin@one-node1:/var/tmp/one/vnm/
OpenNebulaNetwork.rb                                          100% 4669     4.6KB/s   00:00
[oneadmin@one-admin vnm]$ scp -Cp OpenNebulaNetwork.rb oneadmin@one-node3:/var/tmp/one/vnm/
OpenNebulaNetwork.rb                                          100% 4669     4.6KB/s   00:00
[oneadmin@one-admin vnm]$ scp -Cp OpenNebulaNetwork.rb oneadmin@one-node4:/var/tmp/one/vnm/
OpenNebulaNetwork.rb                                          100% 4669     4.6KB/s   00:00
[oneadmin@one-admin vnm]$ scp -Cp OpenNebulaNetwork.rb oneadmin@one-node2:/var/tmp/one/vnm/
OpenNebulaNetwork.rb                                          100% 4669     4.6KB/s   00:00
[oneadmin@one-admin vnm]$
```

Ahora relanzamos la máquina virtual, a ver si se queja:

```
[oneadmin@one-admin template_files]$ onevm delete 44 --recreate
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   14     64M one-node2    0d 13h24
    43 oneadmin oneadmin tty_public4_nod runn   15     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni pend    0      0K              0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   16     64M one-node2    0d 13h25
    43 oneadmin oneadmin tty_public4_nod runn   16     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   17     64M one-node3    0d 00h00
[oneadmin@one-admin template_files]$
```

Y vemos en el nodo 3 como se ha creado el bridge y la VLAN:

```
[root@one-node3 ~]# brctl show
bridge name     bridge id               STP enabled     interfaces
brhm6           8000.525400bcb5e5       no              eth2.6
                                                        vnet1
virbr0          8000.52540060cfcf       yes             virbr0-nic
                                                        vnet0
[root@one-node3 ~]# cat /proc/net/vlan/config
VLAN Dev name    | VLAN ID
Name-Type: VLAN_NAME_TYPE_RAW_PLUS_VID_NO_PAD
eth2.6         | 6  | eth2
[root@one-node3 ~]# cat /proc/net/vlan/eth2.6
eth2.6  VID: 6   REORDER_HDR: 1  dev->priv_flags: 2001
         total frames received            0
          total bytes received            0
      Broadcast/Multicast Rcvd            0

      total frames transmitted           16
       total bytes transmitted         1216
            total headroom inc            4
           total encap on xmit           16
Device: eth2
INGRESS priority mappings: 0:0  1:0  2:0  3:0  4:0  5:0  6:0 7:0
 EGRESS priority mappings:
[root@one-node3 ~]#
```

Tenemos que ver por qué no habilita el STP en el subinterfaz. Lo demás parece que está OK. Vamos a probar a levantar un interfaz en el nodo1, que sabemos que funciona, a ver si podemos hacer ping a la máquina. En el host one-node1 creamos un interfaz con la VLAN 6:

```
[root@one-node1 ~]# vconfig add eth2 6
Added VLAN with VID == 6 to IF -:eth2:-
[root@one-node1 ~]# ifconfig eth2.6 192.168.126.3 netmask 255.255.255.0 up
[root@one-node1 ~]# ping 192.168.126.3
PING 192.168.126.3 (192.168.126.3) 56(84) bytes of data.
```

```
64 bytes from 192.168.126.3: icmp_seq=1 ttl=64 time=0.156 ms
64 bytes from 192.168.126.3: icmp_seq=2 ttl=64 time=0.033 ms
^C
--- 192.168.126.3 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1825ms
rtt min/avg/max/mdev = 0.033/0.094/0.156/0.062 ms
[root@one-node1 ~]# ping 192.168.126.1
PING 192.168.126.1 (192.168.126.1) 56(84) bytes of data.
^C
--- 192.168.126.1 ping statistics ---
64 packets transmitted, 0 received, 100% packet loss, time 63117ms
```

No recibimos nada, no vemos el otro extremo. Vamos a habilitar el spaning-tree en el nodo 3 en el bridge, a ver que ocurre:

```
[root@one-node3 ~]# brctl show
bridge name     bridge id               STP enabled     interfaces
brhm6           8000.525400bcb5e5       no              eth2.6
                                                        vnet1
virbr0          8000.52540060cfcf       yes             virbr0-nic
                                                        vnet0
[root@one-node3 ~]# brctl stp brhm6 yes
[root@one-node3 ~]#
[root@one-node3 ~]# brctl show
bridge name     bridge id               STP enabled     interfaces
brhm6           8000.525400bcb5e5       yes             eth2.6
                                                        vnet1
virbr0          8000.52540060cfcf       yes             virbr0-nic
                                                        vnet0
```

Ahora hacemos un ping desde el nodo1 y vemos si se incrementan los paquetes recibidos, tanto en el nodo 3 como en el 1. En el nodo 3 se reciben paquetes y se envían de vuelta por el bridge:

```
[root@one-node3 ~]# cat /proc/net/vlan/eth2.6
eth2.6  VID: 6   REORDER_HDR: 1  dev->priv_flags: 2001
         total frames received          269
          total bytes received        22040
      Broadcast/Multicast Rcvd            6

      total frames transmitted          578
       total bytes transmitted        34528
            total headroom inc           31
           total encap on xmit          578
Device: eth2
INGRESS priority mappings: 0:0  1:0  2:0  3:0  4:0  5:0  6:0 7:0
 EGRESS priority mappings:
[root@one-node3 ~]# cat /proc/net/vlan/eth2.6
eth2.6  VID: 6   REORDER_HDR: 1  dev->priv_flags: 2001
```

```
         total frames received          311
          total bytes received        25680
      Broadcast/Multicast Rcvd            6

      total frames transmitted          600
       total bytes transmitted        35768
            total headroom inc           32
           total encap on xmit          600
Device: eth2
INGRESS priority mappings: 0:0  1:0  2:0  3:0  4:0  5:0  6:0 7:0
 EGRESS priority mappings:
[root@one-node3 ~]#
```

Es decir, que el nodo 3 si que ve los paquetes enviados por el nodo 1, y además los devuelve a través de la VLAN (es decir, es la máquina virtual la que devuelve los paquetes).

```
[root@one-node1 ~]# arp -a
server-nfs (192.168.123.1) at 52:54:00:7d:68:1e [ether] on eth1
? (192.168.126.2) at <incomplete> on eth2.6
? (192.168.126.1) at 02:00:c0:a8:7e:01 [ether] on eth2.6
one-admin (192.168.123.2) at 52:54:00:d8:9e:2d [ether] on eth1
[root@one-node1 ~]#
```

Y en la máquina virtual esa MAC corresponde efectivamente con la mac del interfaz eth1 en la máquina virtual.

```
eth1      Link encap:Ethernet  HWaddr 02:00:C0:A8:7E:01
          inet addr:192.168.126.1  Bcast:192.168.126.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:107 errors:0 dropped:0 overruns:0 frame:0
          TX packets:709 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:6420 (6.2 KiB)  TX bytes:68266 (66.6 KiB)
          Interrupt:11 Base address:0xc200
```

Pero en el nodo3 no es él quien resuelve el ARP de la IP del nodo 1:

```
[root@one-node3 ~]# arp -a
server-nfs (192.168.123.1) at 52:54:00:7d:68:1e [ether] on eth1
one-admin (192.168.123.2) at 52:54:00:d8:9e:2d [ether] on eth1
? (192.168.122.1) at 52:54:00:7e:a9:0c [ether] on eth0
? (192.168.125.4) at 02:00:c0:a8:7d:04 [ether] on virbr0
```

Esto es algo que le toca hacer a la máquina virtual:

```
# arp -a
? (192.168.126.3) at 52:54:00:73:4D:BE [ether]  on eth1
? (192.168.125.1) at 52:54:00:60:CF:CF [ether]  on eth0
#
```

Y comprobamos que efectivamente, esa es la mac que hemos levantado en el interfaz eth2.6 del nodo1:

```
eth2.6    Link encap:Ethernet  HWaddr 52:54:00:73:4D:BE
          inet addr:192.168.126.3  Bcast:192.168.126.255  Mask:255.255.255.0
```

```
          inet6 addr: fe80::5054:ff:fe73:4dbe/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:84 errors:0 dropped:0 overruns:0 frame:0
          TX packets:450 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:4512 (4.4 KiB)  TX bytes:43316 (42.3 KiB)
```

Pero si no se ven entre sí, es porque tenemos puesta algún tipo de reglas en las hipervisoras, o en las iptables. Debe de estarse filtrando en las hipervisoras de los hosts de virtualización. No queda otra. Vamos a crear otra máquina virtual del mismo tipo. Primero eliminamos el subinterfaz en el nodo 1:

```
[root@one-node1 ~]# ifconfig eth2.6 192.168.126.3 netmask 255.255.255.0 down
[root@one-node1 ~]# vconfig rem eth2.6
Removed VLAN -:eth2.6:-
[root@one-node1 ~]#
[root@one-node1 ~]# cat /proc/net/vlan/config
VLAN Dev name    | VLAN ID
Name-Type: VLAN_NAME_TYPE_RAW_PLUS_VID_NO_PAD
[root@one-node1 ~]#
```

Ahora instanciamos otra máquina en la pareja de hosts 3/4:

```
[oneadmin@one-admin template_files]$ onetemplate instantiate 4 --name "tty_public_3_nic_nodes34"
VM ID: 45
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   18     64M one-node2    0d 15h49
    43 oneadmin oneadmin tty_public4_nod runn   15     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   16     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni prol    0      0K one-node4    0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   18     64M one-node2    0d 15h49
    43 oneadmin oneadmin tty_public4_nod runn   14     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   16     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn    0     64M one-node4    0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   18     64M one-node2    0d 16h04
    43 oneadmin oneadmin tty_public4_nod runn   15     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   16     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   15     64M one-node4    0d 00h15
[oneadmin@one-admin template_files]$ onevm show 45
VIRTUAL MACHINE 45 INFORMATION
ID                  : 45
NAME                : tty_public_3_nic_nodes34
USER                : oneadmin
GROUP               : oneadmin
```

```
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node4
START TIME          : 10/22 16:00:23
END TIME            : -
DEPLOY ID           : one-45

VIRTUAL MACHINE MONITORING
USED MEMORY         : 64M
NET_RX              : 25K
USED CPU            : 15
NET_TX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    ttylinux - kvm                     file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.5   02:00:c0:a8:7d:05
                                           fe80::400:c0ff:fea8:7d05
  1 VLAN6                 yes brhm6        192.168.126.2   02:00:c0:a8:7e:02
                                           fe80::400:c0ff:fea8:7e02

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION          REAS           START        TIME     PROLOG
  0 one-node4       none            none  10/22 16:00:37   0d 00h15m   0h00m01s

USER TEMPLATE
SCHED_REQUIREMENTS="ID=\"8\" | ID=\"9\""

VIRTUAL MACHINE TEMPLATE
CPU="0.1"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="5945",
  TYPE="VNC" ]
```

```
MEMORY="64"
TEMPLATE_ID="4"
VMID="45"
[oneadmin@one-admin template_files]$
```

Comprobamos que podemos acceder a las máquinas, y que resuelven correctamente las MACs, pero no conseguimos que se vean entre si. Esta es el la máquina (45) del nodo3:

```
# arp -a
? (192.168.125.1) at 52:54:00:60:CF:CF [ether]  on eth0
? (192.168.126.2) at 02:00:C0:A8:7E:02 [ether]  on eth1
#
```

Y esta es la del nodo 4 (la 44):

```
# arp -a
? (192.168.126.1) at 02:00:C0:A8:7E:01 [ether]  on eth1
? (192.168.125.1) at 52:54:00:15:2B:DB [ether]  on eth0
#
```

Vamos a desactivar el STP en ambos bridges, tal y como lo configura por defecto el OpenNebula:

```
[root@one-node3 ~]# brctl show
bridge name     bridge id               STP enabled     interfaces
brhm6           8000.525400bcb5e5       yes             eth2.6
                                                        vnet1
virbr0          8000.52540060cfcf       yes             virbr0-nic
                                                        vnet0
[root@one-node3 ~]# brctl stp brhm6 no
[root@one-node3 ~]# brctl show
bridge name     bridge id               STP enabled     interfaces
brhm6           8000.525400bcb5e5       no              eth2.6
                                                        vnet1
virbr0          8000.52540060cfcf       yes             virbr0-nic
                                                        vnet0
[root@one-node3 ~]#

[root@one-node4 ~]# brctl show
bridge name     bridge id               STP enabled     interfaces
brhm6           8000.525400ae3849       yes             eth2.6
                                                        vnet2
virbr0          8000.525400152bdb       yes             virbr0-nic
                                                        vnet0
                                                        vnet1
[root@one-node4 ~]# brctl stp brhm6 no
[root@one-node4 ~]# brctl show
bridge name     bridge id               STP enabled     interfaces
brhm6           8000.525400ae3849       no              eth2.6
                                                        vnet2
virbr0          8000.525400152bdb       yes             virbr0-nic
```

```
                                                vnet0
                                                vnet1
[root@one-node4 ~]#
```

Vamos a comprobar las iptables en los nodos. En principio no vemos nada especial en los hosts, y hemos comprobado que podemos acceder a los puertos sin restricciones. Hemos encontrado este link de IBM sobre el tema del 802.1Q y los filtros aplicados a los bridges:

http://pic.dhe.ibm.com/infocenter/lnxinfo/v3r0m0/index.jsp?topic=%2Fliaat%2Fliaatkvmsecconfvlans.htm

Nos dice que cambiemos esto en /etc/sysctl.conf

```
net.bridge.bridge-nf-call-arptables = 1
net.bridge.bridge-nf-call-iptables = 1
net.bridge.bridge-nf-call-ip6tables = 1
```

A esto:

```
net.bridge.bridge-nf-call-arptables = 0
net.bridge.bridge-nf-call-iptables = 0
net.bridge.bridge-nf-call-ip6tables = 0
```

A continuación debemos hacer un sysctl -p para que tome los cambios, y comprobarlo con un sysctl -a | grep "bridge-nf". Vamos a probarlo, por si es cierto. Lo hacemos en los nodos 3 y 4, que son los afectados:

```
[root@one-node4 ~]# sysctl -a | grep "bridge-nf"
net.bridge.bridge-nf-call-arptables = 1
net.bridge.bridge-nf-call-iptables = 1
net.bridge.bridge-nf-call-ip6tables = 1
net.bridge.bridge-nf-filter-vlan-tagged = 0
net.bridge.bridge-nf-filter-pppoe-tagged = 0
[root@one-node4 ~]# fgrep "bridge-nf" /etc/sysctl.conf
net.bridge.bridge-nf-call-ip6tables = 0
net.bridge.bridge-nf-call-iptables = 0
net.bridge.bridge-nf-call-arptables = 0
[root@one-node4 ~]#
```

Mira por donde!, en el fichero de configuración ya estaba modificado. Sólo nos queda hacer el sysctl -p para que tome los cambios.

```
[root@one-node4 ~]# sysctl -p
net.ipv4.ip_forward = 0
net.ipv4.conf.default.rp_filter = 1
net.ipv4.conf.default.accept_source_route = 0
kernel.sysrq = 0
kernel.core_uses_pid = 1
net.ipv4.tcp_syncookies = 1
net.bridge.bridge-nf-call-ip6tables = 0
net.bridge.bridge-nf-call-iptables = 0
net.bridge.bridge-nf-call-arptables = 0
kernel.msgmnb = 65536
kernel.msgmax = 65536
kernel.shmmax = 68719476736
kernel.shmall = 4294967296
```

```
[root@one-node4 ~]#
```

Hacemos la misma prueba en el nodo 3.

```
[root@one-node3 ~]# sysctl -a | grep "bridge-nf"
net.bridge.bridge-nf-call-arptables = 1
net.bridge.bridge-nf-call-iptables = 1
net.bridge.bridge-nf-call-ip6tables = 1
net.bridge.bridge-nf-filter-vlan-tagged = 0
net.bridge.bridge-nf-filter-pppoe-tagged = 0
[root@one-node3 ~]# fgrep "bridge-nf" /etc/sysctl.conf
net.bridge.bridge-nf-call-ip6tables = 0
net.bridge.bridge-nf-call-iptables = 0
net.bridge.bridge-nf-call-arptables = 0
[root@one-node3 ~]# sysctl -p
net.ipv4.ip_forward = 0
net.ipv4.conf.default.rp_filter = 1
net.ipv4.conf.default.accept_source_route = 0
kernel.sysrq = 0
kernel.core_uses_pid = 1
net.ipv4.tcp_syncookies = 1
net.bridge.bridge-nf-call-ip6tables = 0
net.bridge.bridge-nf-call-iptables = 0
net.bridge.bridge-nf-call-arptables = 0
kernel.msgmnb = 65536
kernel.msgmax = 65536
kernel.shmmax = 68719476736
kernel.shmall = 4294967296
[root@one-node3 ~]#
```

Probamos de nuevo entre las máquinas, a ver si se ven.

```
# ping 192.168.126.1
PING 192.168.126.1 (192.168.126.1): 56 data bytes
64 bytes from 192.168.126.1: seq=0 ttl=64 time=4.543 ms
64 bytes from 192.168.126.1: seq=1 ttl=64 time=1.680 ms
64 bytes from 192.168.126.1: seq=2 ttl=64 time=1.286 ms
64 bytes from 192.168.126.1: seq=3 ttl=64 time=1.362 ms
64 bytes from 192.168.126.1: seq=4 ttl=64 time=1.322 ms
64 bytes from 192.168.126.1: seq=5 ttl=64 time=1.180 ms

--- 192.168.126.1 ping statistics ---
6 packets transmitted, 6 packets received, 0% packet loss
round-trip min/avg/max = 1.180/1.895/4.543 ms
```

Era por eso!!!. La de tiempo que hemos perdido... Bueno, ya sabemos que era por eso, que no hace falta habilitar el STP en el bridge asociado al subinterfaz físico en el host. También sabemos que no hay que configurar el virtio en el interfaz ethernet de la maquina virtualizada. Por último sabemos que no hace falta tocar nada en los filtros de red del KVM. Vamos a crear dos instancias adicionales, para confirmarlo.

```
[oneadmin@one-admin template_files]$ onetemplate instantiate 4 --name "tty_public_%i_nic_nodes34" -m
4
VM ID: 46
VM ID: 47
VM ID: 48
VM ID: 49
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   19     64M one-node2    0d 18h43
    43 oneadmin oneadmin tty_public4_nod runn   15     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   17     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   14     64M one-node4    0d 02h54
    46 oneadmin oneadmin tty_public_0_ni runn   13     64M one-node3    0d 00h02
    47 oneadmin oneadmin tty_public_1_ni runn   10     64M one-node4    0d 00h02
    48 oneadmin oneadmin tty_public_2_ni runn   14     64M one-node3    0d 00h02
    49 oneadmin oneadmin tty_public_3_ni runn   13     64M one-node4    0d 00h02
[oneadmin@one-admin template_files]$ onevnet list
  ID USER         GROUP        NAME            CLUSTER      TYPE BRIDGE   LEASES
   0 oneadmin     oneadmin     Internet LAN    -               R virbr0        8
   1 oneadmin     oneadmin     VLAN6           -               R brhm6         6
[oneadmin@one-admin template_files]$ onevnet show 1
VIRTUAL NETWORK 1 INFORMATION
ID             : 1
NAME           : VLAN6
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : brhm6
VLAN           : Yes
PHYSICAL DEVICE: eth2
VLAN ID        : 6
USED LEASES    : 6

PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

VIRTUAL NETWORK TEMPLATE
NETWORK_ADDRESS="192.168.126.0/24"
NETWORK_MASK="255.255.255.0"

RANGE
IP_START       : 192.168.126.1
```

```
IP_END         : 192.168.126.254


USED LEASES
LEASE=[ MAC="02:00:c0:a8:7e:01", IP="192.168.126.1", IP6_LINK="fe80::400:c0ff:fea8:7e01", USED="1",
VID="44" ]
LEASE=[ MAC="02:00:c0:a8:7e:02", IP="192.168.126.2", IP6_LINK="fe80::400:c0ff:fea8:7e02", USED="1",
VID="45" ]
LEASE=[ MAC="02:00:c0:a8:7e:03", IP="192.168.126.3", IP6_LINK="fe80::400:c0ff:fea8:7e03", USED="1",
VID="46" ]
LEASE=[ MAC="02:00:c0:a8:7e:04", IP="192.168.126.4", IP6_LINK="fe80::400:c0ff:fea8:7e04", USED="1",
VID="47" ]
LEASE=[ MAC="02:00:c0:a8:7e:05", IP="192.168.126.5", IP6_LINK="fe80::400:c0ff:fea8:7e05", USED="1",
VID="48" ]
LEASE=[ MAC="02:00:c0:a8:7e:06", IP="192.168.126.6", IP6_LINK="fe80::400:c0ff:fea8:7e06", USED="1",
VID="49" ]


VIRTUAL MACHINES


    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    44 oneadmin oneadmin tty_public_2_ni runn   18     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   14     64M one-node4    0d 02h55
    46 oneadmin oneadmin tty_public_0_ni runn   15     64M one-node3    0d 00h03
    47 oneadmin oneadmin tty_public_1_ni runn   13     64M one-node4    0d 00h03
    48 oneadmin oneadmin tty_public_2_ni runn   15     64M one-node3    0d 00h03
    49 oneadmin oneadmin tty_public_3_ni runn   11     64M one-node4    0d 00h03
[oneadmin@one-admin template_files]$
```

Con esto ya sabemos de un vistazo las máquinas e IPs que tenemos corriendo. Vamos a comprobar que podemos hacer ping desde cualquier máquina al resto.

```
ping 192.168.126.255
PING 192.168.126.255 (192.168.126.255): 56 data bytes


--- 192.168.126.255 ping statistics ---
7 packets transmitted, 0 packets received, 100% packet loss
```

Vemos que el broadcast está desactivado. ¿Es posible que no tengan la IP de broadcast configurada en los interfaces? Seguimos con todas las IPs:

```
 ping 192.168.126.1
PING 192.168.126.1 (192.168.126.1): 56 data bytes
64 bytes from 192.168.126.1: seq=0 ttl=64 time=0.749 ms
64 bytes from 192.168.126.1: seq=1 ttl=64 time=0.483 ms


--- 192.168.126.1 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 0.483/0.616/0.749 ms


ping 192.168.126.2
PING 192.168.126.2 (192.168.126.2): 56 data bytes
64 bytes from 192.168.126.2: seq=0 ttl=64 time=11.484 ms
```

```
64 bytes from 192.168.126.2: seq=1 ttl=64 time=6.468 ms

--- 192.168.126.2 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 6.468/8.976/11.484 ms

ping 192.168.126.3
PING 192.168.126.3 (192.168.126.3): 56 data bytes
64 bytes from 192.168.126.3: seq=0 ttl=64 time=8.036 ms
64 bytes from 192.168.126.3: seq=1 ttl=64 time=1.968 ms

--- 192.168.126.3 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 1.968/5.002/8.036 ms

ping 192.168.126.4
PING 192.168.126.4 (192.168.126.4): 56 data bytes
64 bytes from 192.168.126.4: seq=0 ttl=64 time=6.337 ms
64 bytes from 192.168.126.4: seq=1 ttl=64 time=1.491 ms
64 bytes from 192.168.126.4: seq=2 ttl=64 time=1.414 ms

--- 192.168.126.4 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 1.414/3.080/6.337 ms

ping 192.168.126.5
PING 192.168.126.5 (192.168.126.5): 56 data bytes
64 bytes from 192.168.126.5: seq=0 ttl=64 time=5.239 ms
64 bytes from 192.168.126.5: seq=1 ttl=64 time=2.044 ms
64 bytes from 192.168.126.5: seq=2 ttl=64 time=1.779 ms

--- 192.168.126.5 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 1.779/3.020/5.239 ms

ping 192.168.126.6
PING 192.168.126.6 (192.168.126.6): 56 data bytes
64 bytes from 192.168.126.6: seq=0 ttl=64 time=7.324 ms
64 bytes from 192.168.126.6: seq=1 ttl=64 time=1.698 ms
64 bytes from 192.168.126.6: seq=2 ttl=64 time=1.325 ms

--- 192.168.126.6 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 1.325/3.449/7.324 ms
```

Por otra parte, en el host donde están los servidores del cluster virtualizados, a pesar de tener los bridges configurados para soportar todas las máquinas, los filtros siguen activados:

```
[root@Testit ~]# sysctl -a | grep "bridge-nf"
net.bridge.bridge-nf-call-arptables = 1
net.bridge.bridge-nf-call-iptables = 1
net.bridge.bridge-nf-call-ip6tables = 1
net.bridge.bridge-nf-filter-vlan-tagged = 0
net.bridge.bridge-nf-filter-pppoe-tagged = 0
[root@Testit ~]#
```

Tenemos que comprobar que esto funciona de forma estable sin problemas cada vez que se invoque una nueva VLAN, y sobre todo cada vez que se reinicie un host. libvirt también tiene sus propias reglas de filtrado preconfiguradas:

```
http://pic.dhe.ibm.com/infocenter/lnxinfo/v3r0m0/index.jsp?topic=%2Fliaat%2Fliaatkvmsecconfvlans.htm
```

Vamos a probar el tema de las migraciones, y la redundancia. Vamos a reiniciar el nodo 3, para comprobar que ocurre con las máquinas virtuales, si se mantienen los cambios que hemos hecho en el fichero sysctl.conf, etc... Ahora mismo tenemos las siguientes máquinas en funcionamiento:

```
[root@one-node3 ~]# virsh list --all
 Id    Name                           State
----------------------------------------------------

 1     one-44                         running
 2     one-46                         running
 3     one-48                         running

[root@one-node4 ~]# virsh list --all
 Id    Name                           State
----------------------------------------------------

 1     one-43                         running
 2     one-45                         running
 3     one-47                         running
 4     one-49                         running

[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   17     64M one-node2    1d 10h25
    43 oneadmin oneadmin tty_public4_nod runn   16     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   16     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   15     64M one-node4    0d 18h35
    46 oneadmin oneadmin tty_public_0_ni runn   11     64M one-node3    0d 15h43
    47 oneadmin oneadmin tty_public_1_ni runn   16     64M one-node4    0d 15h43
    48 oneadmin oneadmin tty_public_2_ni runn   12     64M one-node3    0d 15h43
    49 oneadmin oneadmin tty_public_3_ni runn   11     64M one-node4    0d 15h43
```

Vamos a reiniciar el nodo3, con lo que las máquinas 44, 46, y 48 deberían de caer y migrarse al nodo 4. Vamos a verlo. De momento no ocurre absolutamente nada. Las

máquinas parece seguir corriendo en el nodo 3. Pasados unos 30s aprox, aparecen en estado unkn, pero así se mantienen en el top:

```
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   13     64M one-node2    1d 10h28
    43 oneadmin oneadmin tty_public4_nod runn   15     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni unkn   15     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   14     64M one-node4    0d 18h39
    46 oneadmin oneadmin tty_public_0_ni unkn   12     64M one-node3    0d 15h47
    47 oneadmin oneadmin tty_public_1_ni runn   13     64M one-node4    0d 15h47
    48 oneadmin oneadmin tty_public_2_ni unkn   12     64M one-node3    0d 15h47
    49 oneadmin oneadmin tty_public_3_ni runn   12     64M one-node4    0d 15h47
```

Ahora se está reiniciando el nodo3. Ya está reiniciado, pero las máquinas no se recuperan. Vemos el estado de los host:

```
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   6 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   7 one-node2       -           1     10 / 100 (10%)  64M / 996.7M (6%) update
   8 one-node3       -           3     30 / 100 (30%) 192M / 996.7M (19% update
   9 one-node4       -           4     40 / 100 (40%) 256M / 996.7M (25% on
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   6 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   7 one-node2       -           1     10 / 100 (10%)  64M / 996.7M (6%) on
   8 one-node3       -           3     30 / 100 (30%) 192M / 996.7M (19% on
   9 one-node4       -           4     40 / 100 (40%) 256M / 996.7M (25% on
```

Vamos a ver si conseguimos recuperarlas mediante línea de comando:

```
[oneadmin@one-admin ~]$ onevm delete 44 --recreate
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   19     64M one-node2    1d 10h53
    43 oneadmin oneadmin tty_public4_nod runn   16     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni pend   15     64M              0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   14     64M one-node4    0d 19h04
    46 oneadmin oneadmin tty_public_0_ni unkn   12     64M one-node3    0d 16h11
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn    8     64M one-node2    1d 10h54
    43 oneadmin oneadmin tty_public4_nod runn   15     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   99     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   14     64M one-node4    0d 19h05
    46 oneadmin oneadmin tty_public_0_ni unkn   12     64M one-node3    0d 16h13
    47 oneadmin oneadmin tty_public_1_ni runn   13     64M one-node4    0d 16h13
    48 oneadmin oneadmin tty_public_2_ni unkn   12     64M one-node3    0d 16h13
    49 oneadmin oneadmin tty_public_3_ni runn   13     64M one-node4    0d 16h13
[oneadmin@one-admin ~]$ onevm delete 46 --recreate
```

```
[oneadmin@one-admin ~]$ onevm delete 48 --recreate
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   15     64M one-node2    1d 10h55
    43 oneadmin oneadmin tty_public4_nod runn   15     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   15     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   14     64M one-node4    0d 19h06
    46 oneadmin oneadmin tty_public_0_ni prol   12     64M one-node3    0d 16h14
    47 oneadmin oneadmin tty_public_1_ni runn   13     64M one-node4    0d 16h14
    48 oneadmin oneadmin tty_public_2_ni prol   12     64M one-node4    0d 16h14
    49 oneadmin oneadmin tty_public_3_ni runn   12     64M one-node4    0d 16h14
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn    9     64M one-node2    1d 10h56
    43 oneadmin oneadmin tty_public4_nod runn   14     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn    2     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   13     64M one-node4    0d 19h06
    46 oneadmin oneadmin tty_public_0_ni runn   97     64M one-node3    0d 16h14
    47 oneadmin oneadmin tty_public_1_ni runn   12     64M one-node4    0d 16h14
    48 oneadmin oneadmin tty_public_2_ni unkn   12     64M one-node4    0d 16h14
    49 oneadmin oneadmin tty_public_3_ni runn   11     64M one-node4    0d 16h14
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn    9     64M one-node2    1d 10h56
    43 oneadmin oneadmin tty_public4_nod runn   14     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn    2     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   13     64M one-node4    0d 19h06
    46 oneadmin oneadmin tty_public_0_ni runn   97     64M one-node3    0d 16h14
    47 oneadmin oneadmin tty_public_1_ni runn   12     64M one-node4    0d 16h14
    48 oneadmin oneadmin tty_public_2_ni runn   11     64M one-node4    0d 16h14
    49 oneadmin oneadmin tty_public_3_ni runn   11     64M one-node4    0d 16h14
[oneadmin@one-admin ~]$ onevnet show 1
VIRTUAL NETWORK 1 INFORMATION
ID             : 1
NAME           : VLAN6
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : brhm6
VLAN           : Yes
PHYSICAL DEVICE: eth2
VLAN ID        : 6
USED LEASES    : 6
```

```
PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

VIRTUAL NETWORK TEMPLATE
NETWORK_ADDRESS="192.168.126.0/24"
NETWORK_MASK="255.255.255.0"

RANGE
IP_START       : 192.168.126.1
IP_END         : 192.168.126.254

USED LEASES
LEASE=[ MAC="02:00:c0:a8:7e:01", IP="192.168.126.1", IP6_LINK="fe80::400:c0ff:fea8:7e01", USED="1",
VID="44" ]
LEASE=[ MAC="02:00:c0:a8:7e:02", IP="192.168.126.2", IP6_LINK="fe80::400:c0ff:fea8:7e02", USED="1",
VID="45" ]
LEASE=[ MAC="02:00:c0:a8:7e:03", IP="192.168.126.3", IP6_LINK="fe80::400:c0ff:fea8:7e03", USED="1",
VID="46" ]
LEASE=[ MAC="02:00:c0:a8:7e:04", IP="192.168.126.4", IP6_LINK="fe80::400:c0ff:fea8:7e04", USED="1",
VID="47" ]
LEASE=[ MAC="02:00:c0:a8:7e:05", IP="192.168.126.5", IP6_LINK="fe80::400:c0ff:fea8:7e05", USED="1",
VID="48" ]
LEASE=[ MAC="02:00:c0:a8:7e:06", IP="192.168.126.6", IP6_LINK="fe80::400:c0ff:fea8:7e06", USED="1",
VID="49" ]

VIRTUAL MACHINES

    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    44 oneadmin oneadmin tty_public_2_ni runn   14     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   15     64M one-node4    0d 19h07
    46 oneadmin oneadmin tty_public_0_ni runn   14     64M one-node3    0d 16h15
    47 oneadmin oneadmin tty_public_1_ni runn   17     64M one-node4    0d 16h15
    48 oneadmin oneadmin tty_public_2_ni runn    9     64M one-node4    0d 16h15
    49 oneadmin oneadmin tty_public_3_ni runn   13     64M one-node4    0d 16h15
[oneadmin@one-admin ~]$ onevnet show 0
VIRTUAL NETWORK 0 INFORMATION
ID             : 0
NAME           : Internet LAN
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : virbr0
VLAN           : No
USED LEASES    : 8
```

```
PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

VIRTUAL NETWORK TEMPLATE
DNS="192.168.125.1"
GATEWAY="192.168.125.1"
NETWORK_ADDRESS="192.168.125.0/24"
NETWORK_MASK="255.255.255.0"

RANGE
IP_START       : 192.168.125.2
IP_END         : 192.168.125.254

USED LEASES
LEASE=[ MAC="02:00:c0:a8:7d:02", IP="192.168.125.2", IP6_LINK="fe80::400:c0ff:fea8:7d02", USED="1",
VID="41" ]
LEASE=[ MAC="02:00:c0:a8:7d:03", IP="192.168.125.3", IP6_LINK="fe80::400:c0ff:fea8:7d03", USED="1",
VID="43" ]
LEASE=[ MAC="02:00:c0:a8:7d:04", IP="192.168.125.4", IP6_LINK="fe80::400:c0ff:fea8:7d04", USED="1",
VID="44" ]
LEASE=[ MAC="02:00:c0:a8:7d:05", IP="192.168.125.5", IP6_LINK="fe80::400:c0ff:fea8:7d05", USED="1",
VID="45" ]
LEASE=[ MAC="02:00:c0:a8:7d:06", IP="192.168.125.6", IP6_LINK="fe80::400:c0ff:fea8:7d06", USED="1",
VID="46" ]
LEASE=[ MAC="02:00:c0:a8:7d:07", IP="192.168.125.7", IP6_LINK="fe80::400:c0ff:fea8:7d07", USED="1",
VID="47" ]
LEASE=[ MAC="02:00:c0:a8:7d:08", IP="192.168.125.8", IP6_LINK="fe80::400:c0ff:fea8:7d08", USED="1",
VID="48" ]
LEASE=[ MAC="02:00:c0:a8:7d:09", IP="192.168.125.9", IP6_LINK="fe80::400:c0ff:fea8:7d09", USED="1",
VID="49" ]

VIRTUAL MACHINES

    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   17     64M one-node2    1d 10h57
    43 oneadmin oneadmin tty_public4_nod runn   15     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   14     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   15     64M one-node4    0d 19h07
    46 oneadmin oneadmin tty_public_0_ni runn   14     64M one-node3    0d 16h15
    47 oneadmin oneadmin tty_public_1_ni runn   15     64M one-node4    0d 16h15
    48 oneadmin oneadmin tty_public_2_ni runn   10     64M one-node4    0d 16h15
    49 oneadmin oneadmin tty_public_3_ni runn   12     64M one-node4    0d 16h15
```

En el nodo3 recién reiniciado, no se mantienen las reglas de filtrado de sysctl.conf:

```
[root@one-node3 ~]# sysctl -a | fgrep bridge-nf
```

```
net.bridge.bridge-nf-call-arptables = 1
net.bridge.bridge-nf-call-iptables = 1
net.bridge.bridge-nf-call-ip6tables = 1
net.bridge.bridge-nf-filter-vlan-tagged = 0
net.bridge.bridge-nf-filter-pppoe-tagged = 0
[root@one-node3 ~]# fgrep bridge-nf /etc/sysctl.conf
net.bridge.bridge-nf-call-ip6tables = 0
net.bridge.bridge-nf-call-iptables = 0
net.bridge.bridge-nf-call-arptables = 0

[root@one-node3 ~]# sysctl -p
net.ipv4.ip_forward = 1
net.ipv4.conf.default.rp_filter = 1
net.ipv4.conf.default.accept_source_route = 0
kernel.sysrq = 0
kernel.core_uses_pid = 1
net.ipv4.tcp_syncookies = 1
net.bridge.bridge-nf-call-ip6tables = 0
net.bridge.bridge-nf-call-iptables = 0
net.bridge.bridge-nf-call-arptables = 0
kernel.msgmnb = 65536
kernel.msgmax = 65536
kernel.shmmax = 68719476736
kernel.shmall = 4294967296
```

Como los cambios no son persistentes en cada reinicio, tendremos que hacer cambios en las iptables para permitir que el tráfico pase a través de los bridges de forma transparente.

```
https://bugs.launchpad.net/ubuntu/+source/ufw/+bug/573461
```

Vamos a meter la regla en iptables, pero la configuración optima es que no tenga que aplicar ninguna regla de filtrado.

```
[root@one-node3 ~]# echo "-I FORWARD -m physdev --physdev-is-bridged -j ACCEPT" >
/etc/sysconfig/iptables-forward-bridged
[root@one-node3 ~]# lokkit --custom-rules=ipv4:filter:/etc/sysconfig/iptables-forward-bridged
[root@one-node3 ~]# iptables-save
# Generated by iptables-save v1.4.7 on Wed Oct 23 11:59:25 2013
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [21:2520]
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -j REJECT --reject-with icmp-host-prohibited
-A FORWARD -m physdev --physdev-is-bridged -j ACCEPT
-A FORWARD -j REJECT --reject-with icmp-host-prohibited
```

```
COMMIT
# Completed on Wed Oct 23 11:59:25 2013
[root@one-node3 ~]# service libvirtd reload
Reloading libvirtd configuration:                          [  OK  ]
[root@one-node3 ~]# iptables-save
# Generated by iptables-save v1.4.7 on Wed Oct 23 11:59:52 2013
*mangle
:PREROUTING ACCEPT [6:456]
:INPUT ACCEPT [6:456]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [3:396]
:POSTROUTING ACCEPT [3:396]
-A POSTROUTING -o virbr0 -p udp -m udp --dport 68 -j CHECKSUM --checksum-fill
COMMIT
# Completed on Wed Oct 23 11:59:52 2013
# Generated by iptables-save v1.4.7 on Wed Oct 23 11:59:52 2013
*nat
:PREROUTING ACCEPT [0:0]
:POSTROUTING ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
-A POSTROUTING -s 192.168.125.0/24 ! -d 192.168.125.0/24 -p tcp -j MASQUERADE --to-ports 1024-65535
-A POSTROUTING -s 192.168.125.0/24 ! -d 192.168.125.0/24 -p udp -j MASQUERADE --to-ports 1024-65535
-A POSTROUTING -s 192.168.125.0/24 ! -d 192.168.125.0/24 -j MASQUERADE
COMMIT
# Completed on Wed Oct 23 11:59:52 2013
# Generated by iptables-save v1.4.7 on Wed Oct 23 11:59:52 2013
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [4:688]
-A INPUT -i virbr0 -p udp -m udp --dport 53 -j ACCEPT
-A INPUT -i virbr0 -p tcp -m tcp --dport 53 -j ACCEPT
-A INPUT -i virbr0 -p udp -m udp --dport 67 -j ACCEPT
-A INPUT -i virbr0 -p tcp -m tcp --dport 67 -j ACCEPT
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -j REJECT --reject-with icmp-host-prohibited
-A FORWARD -d 192.168.125.0/24 -o virbr0 -m state --state RELATED,ESTABLISHED -j ACCEPT
-A FORWARD -s 192.168.125.0/24 -i virbr0 -j ACCEPT
-A FORWARD -i virbr0 -o virbr0 -j ACCEPT
-A FORWARD -o virbr0 -j REJECT --reject-with icmp-port-unreachable
-A FORWARD -i virbr0 -j REJECT --reject-with icmp-port-unreachable
-A FORWARD -m physdev --physdev-is-bridged -j ACCEPT
```

```
-A FORWARD -j REJECT --reject-with icmp-host-prohibited
COMMIT
# Completed on Wed Oct 23 11:59:52 2013
[root@one-node3 ~]#
```

La regla anterior es un workaround, porque lo ideal es mantener desactivado las reglas de filtrado en el kernel. Ahora migramos las dos máquinas que nos quedan en el nodo3, al nodo4, antes de reiniciar de nuevo el nodo3 y ver los cambios.

```
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   20     64M one-node2    1d 12h31
    43 oneadmin oneadmin tty_public4_nod runn   16     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   18     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   15     64M one-node4    0d 20h42
    46 oneadmin oneadmin tty_public_0_ni runn   13     64M one-node3    0d 17h50
    47 oneadmin oneadmin tty_public_1_ni runn   16     64M one-node4    0d 17h50
    48 oneadmin oneadmin tty_public_2_ni runn   11     64M one-node4    0d 17h50
    49 oneadmin oneadmin tty_public_3_ni runn   13     64M one-node4    0d 17h50
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   6 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   7 one-node2       -           1     10 / 100 (10%)  64M / 996.7M (6%) on
   8 one-node3       -           2     20 / 100 (20%) 128M / 996.7M (12% on
   9 one-node4       -           5     50 / 100 (50%) 320M / 996.7M (32% on
[oneadmin@one-admin ~]$ onevm migrate 44,46 9 --live -v
VM 44: migrating to 9
VM 46: migrating to 9
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   14     64M one-node2    1d 12h33
    43 oneadmin oneadmin tty_public4_nod runn   11     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   12     64M one-node4    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   13     64M one-node4    0d 20h44
    46 oneadmin oneadmin tty_public_0_ni runn   10     64M one-node4    0d 17h52
    47 oneadmin oneadmin tty_public_1_ni runn   11     64M one-node4    0d 17h52
    48 oneadmin oneadmin tty_public_2_ni runn   10     64M one-node4    0d 17h52
    49 oneadmin oneadmin tty_public_3_ni runn   11     64M one-node4    0d 17h52
[oneadmin@one-admin ~]$
```

La migración sí que ha sido rápida. Muy rápida. Probamos a reiniciar de nuevo el nodo3.

```
[root@one-node3 ~]# diff sysctl_dump_reboot.txt sysctl_dump_after_p.txt
38c38
< kernel.random.entropy_avail = 173
---
> kernel.random.entropy_avail = 131
42c42
< kernel.random.uuid = 1e9912cb-fc21-42da-8b16-27080c00012e
```

```
---
> kernel.random.uuid = 08fd54df-dfc4-4bb0-ac39-e8f4680fb11b
146,147c146,147
< fs.inode-nr = 10868   186
< fs.inode-state = 10868        186     0       0       0       0       0
---
> fs.inode-nr = 25734   186
> fs.inode-state = 25734        186     0       0       0       0       0
151c151
< fs.dentry-state = 11247       5291    45      0       0       0
---
> fs.dentry-state = 26150       20191   45      0       0       0
1027,1029c1027,1029
< net.bridge.bridge-nf-call-arptables = 1
< net.bridge.bridge-nf-call-iptables = 1
< net.bridge.bridge-nf-call-ip6tables = 1
---
> net.bridge.bridge-nf-call-arptables = 0
> net.bridge.bridge-nf-call-iptables = 0
> net.bridge.bridge-nf-call-ip6tables = 0
```

Está confirmado que la carga del módulo bridge es la responsable de activar las reglas de filtrado. Vamos a apagar los nodos 1 y 2, para poder recrearlos con los mismos valores que el nodo 3 y nodo 4 (802.1Q).

```
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   6 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   7 one-node2       -           1     10 / 100 (10%)  64M / 996.7M (6%) on
   8 one-node3       -           7     70 / 100 (70%) 448M / 996.7M (44% on
   9 one-node4       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
[oneadmin@one-admin ~]$ onehost delete 6
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   7 one-node2       -           1     10 / 100 (10%)  64M / 996.7M (6%) on
   8 one-node3       -           7     70 / 100 (70%) 448M / 996.7M (44% update
   9 one-node4       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    41 oneadmin oneadmin tty_public2     runn   16     64M one-node2    1d 15h02
    43 oneadmin oneadmin tty_public4_nod runn    9     64M one-node3    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   12     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   12     64M one-node3    0d 23h12
    46 oneadmin oneadmin tty_public_0_ni runn   10     64M one-node3    0d 20h20
    47 oneadmin oneadmin tty_public_1_ni runn   12     64M one-node3    0d 20h20
    48 oneadmin oneadmin tty_public_2_ni runn   10     64M one-node3    0d 20h20
    49 oneadmin oneadmin tty_public_3_ni runn   12     64M one-node3    0d 20h20
```

```
[oneadmin@one-admin ~]$ onevm delete 41
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    43 oneadmin oneadmin tty_public4_nod runn    9     64M one-node3    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   12     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   12     64M one-node3    0d 23h13
    46 oneadmin oneadmin tty_public_0_ni runn   10     64M one-node3    0d 20h20
    47 oneadmin oneadmin tty_public_1_ni runn   12     64M one-node3    0d 20h20
    48 oneadmin oneadmin tty_public_2_ni runn   12     64M one-node3    0d 20h20
    49 oneadmin oneadmin tty_public_3_ni runn   12     64M one-node3    0d 20h20
[oneadmin@one-admin ~]$ onehost delete 7
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   8 one-node3       -           7     70 / 100 (70%) 448M / 996.7M (44% on
   9 one-node4       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
```

Ahora vamos a migrar unas cuantas máquinas del nodo 3 al 4:

```
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    43 oneadmin oneadmin tty_public4_nod runn    8     64M one-node3    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   10     64M one-node3    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   12     64M one-node3    0d 23h15
    46 oneadmin oneadmin tty_public_0_ni runn   10     64M one-node3    0d 20h23
    47 oneadmin oneadmin tty_public_1_ni runn   12     64M one-node3    0d 20h23
    48 oneadmin oneadmin tty_public_2_ni runn   13     64M one-node3    0d 20h23
    49 oneadmin oneadmin tty_public_3_ni runn   12     64M one-node3    0d 20h23
[oneadmin@one-admin ~]$ onevm migrate 43,44,45 9 --live -v
VM 43: migrating to 9
VM 44: migrating to 9
VM 45: migrating to 9
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    43 oneadmin oneadmin tty_public4_nod runn   10     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn   11     64M one-node4    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn   11     64M one-node4    0d 23h16
    46 oneadmin oneadmin tty_public_0_ni runn   10     64M one-node3    0d 20h24
    47 oneadmin oneadmin tty_public_1_ni runn   11     64M one-node3    0d 20h24
    48 oneadmin oneadmin tty_public_2_ni runn   13     64M one-node3    0d 20h24
    49 oneadmin oneadmin tty_public_3_ni runn   11     64M one-node3    0d 20h24
```

Ahora vamos a crear unas 20 máquinas virtuales entre los dos host (nodos 3 y 4):

```
[oneadmin@one-admin ~]$ onetemplate instantiate 4 --name "tty_public_%i+4_nic_nodes34" -m 20
VM ID: 50
VM ID: 51
VM ID: 52
VM ID: 53
VM ID: 54
```

```
VM ID: 55
VM ID: 56
VM ID: 57
VM ID: 58
VM ID: 59
VM ID: 60
VM ID: 61
VM ID: 62
VM ID: 63
VM ID: 64
VM ID: 65
VM ID: 66
VM ID: 67
VM ID: 68
VM ID: 69
```

Bien, vemos que se nos quedan 7 máquinas en estado pending, debido a que no hay mas recursos de CPU (cada máquina virtual consume 0.1 CPUs), y el host sólo tiene una CPU asignada y 1G de RAM. Es decir, que puede asignar todos los recursos que tenga físicamente el host (incluso sin dejar recursos de CPU para el propio host).

```
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST            TIME
    43 oneadmin oneadmin tty_public4_nod runn    8     64M one-node4    0d 00h00
    44 oneadmin oneadmin tty_public_2_ni runn    8     64M one-node4    0d 00h00
    45 oneadmin oneadmin tty_public_3_ni runn    7     64M one-node4    0d 23h39
    46 oneadmin oneadmin tty_public_0_ni runn    7     64M one-node3    0d 20h47
    47 oneadmin oneadmin tty_public_1_ni runn    6     64M one-node3    0d 20h47
    48 oneadmin oneadmin tty_public_2_ni runn   10     64M one-node3    0d 20h47
    49 oneadmin oneadmin tty_public_3_ni runn    6     64M one-node3    0d 20h47
    50 oneadmin oneadmin tty_public_0+4_ runn    8     64M one-node4    0d 00h15
    51 oneadmin oneadmin tty_public_1+4_ runn    6     64M one-node3    0d 00h15
    52 oneadmin oneadmin tty_public_2+4_ runn    8     64M one-node4    0d 00h15
    53 oneadmin oneadmin tty_public_3+4_ runn   10     64M one-node3    0d 00h15
    54 oneadmin oneadmin tty_public_4+4_ runn    8     64M one-node4    0d 00h15
    55 oneadmin oneadmin tty_public_5+4_ runn    5     64M one-node3    0d 00h15
    56 oneadmin oneadmin tty_public_6+4_ runn    7     64M one-node4    0d 00h15
    57 oneadmin oneadmin tty_public_7+4_ runn    7     64M one-node3    0d 00h15
    58 oneadmin oneadmin tty_public_8+4_ runn    7     64M one-node4    0d 00h15
    59 oneadmin oneadmin tty_public_9+4_ runn    9     64M one-node3    0d 00h15
    60 oneadmin oneadmin tty_public_10+4 runn    7     64M one-node4    0d 00h15
    61 oneadmin oneadmin tty_public_11+4 runn    7     64M one-node3    0d 00h15
    62 oneadmin oneadmin tty_public_12+4 runn    7     64M one-node4    0d 00h15
    63 oneadmin oneadmin tty_public_13+4 pend    0      0K              0d 00h15
    64 oneadmin oneadmin tty_public_14+4 pend    0      0K              0d 00h15
    65 oneadmin oneadmin tty_public_15+4 pend    0      0K              0d 00h15
    66 oneadmin oneadmin tty_public_16+4 pend    0      0K              0d 00h15
    67 oneadmin oneadmin tty_public_17+4 pend    0      0K              0d 00h15
```

```
    68 oneadmin oneadmin tty_public_18+4 pend    0      0K              0d 00h15
    69 oneadmin oneadmin tty_public_19+4 pend    0      0K              0d 00h15
```

Borramos todas las máquinas virtuales creadas:

```
[oneadmin@one-admin ~]$ onevm delete 43..69 -v
VM 43: deleted
VM 44: deleted
VM 45: deleted
VM 46: deleted
VM 47: deleted
VM 48: deleted
VM 49: deleted
VM 50: deleted
VM 51: deleted
VM 52: deleted
VM 53: deleted
VM 54: deleted
VM 55: deleted
VM 56: deleted
VM 57: deleted
VM 58: deleted
VM 59: deleted
VM 60: deleted
VM 61: deleted
VM 62: deleted
VM 63: deleted
VM 64: deleted
VM 65: deleted
VM 66: deleted
VM 67: deleted
VM 68: deleted
VM 69: deleted
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
```

Reiniciamos los nodos 1 y 2. Damos de alta los nodos con 802.1Q:

```
[oneadmin@one-admin ~]$ onehost create one-node1 -i kvm -v qemu -n 802.1Q
ID: 10
[oneadmin@one-admin ~]$ onehost create one-node2 -i kvm -v qemu -n 802.1Q
ID: 11
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   8 one-node3       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
   9 one-node4       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
  10 one-node1       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
  11 one-node2       -           0       0 / 100 (0%)   0K / 996.7M (0%) on
```

```
[oneadmin@one-admin ~]$ onehost show 10
HOST 10 INFORMATION
ID                    : 10
NAME                  : one-node1
CLUSTER               : -
STATE                 : MONITORED
IM_MAD                : kvm
VM_MAD                : qemu
VN_MAD                : 802.1Q
LAST MONITORING TIME  : 10/23 17:17:01

HOST SHARES
TOTAL MEM             : 996.7M
USED MEM (REAL)       : 79.2M
USED MEM (ALLOCATED)  : 0K
TOTAL CPU             : 100
USED CPU (REAL)       : 0
USED CPU (ALLOCATED)  : 0
RUNNING VMS           : 0

MONITORING INFORMATION
ARCH="x86_64"
CPUSPEED="3292"
FREECPU="99.7"
FREEMEMORY="939500"
HOSTNAME="one-node1"
HYPERVISOR="kvm"
MODELNAME="QEMU Virtual CPU version (cpu64-rhel6)"
NETRX="800130"
NETTX="169592"
TOTALCPU="100"
TOTALMEMORY="1020576"
USEDCPU="0.299999999999997"
USEDMEMORY="81076"

VIRTUAL MACHINES

    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME

[oneadmin@one-admin ~]$ onehost show 11
HOST 11 INFORMATION
ID                    : 11
NAME                  : one-node2
CLUSTER               : -
STATE                 : MONITORING_MONITORED
```

```
IM_MAD                : kvm
VM_MAD                : qemu
VN_MAD                : 802.1Q
LAST MONITORING TIME  : 10/23 17:19:18

HOST SHARES
TOTAL MEM             : 996.7M
USED MEM (REAL)       : 78.8M
USED MEM (ALLOCATED)  : 0K
TOTAL CPU             : 100
USED CPU (REAL)       : 0
USED CPU (ALLOCATED)  : 0
RUNNING VMS           : 0

MONITORING INFORMATION
ARCH="x86_64"
CPUSPEED="3292"
FREECPU="100.0"
FREEMEMORY="939908"
HOSTNAME="one-node2"
HYPERVISOR="kvm"
MODELNAME="QEMU Virtual CPU version (cpu64-rhel6)"
NETRX="746030"
NETTX="120200"
TOTALCPU="100"
TOTALMEMORY="1020576"
USEDCPU="0.0"
USEDMEMORY="80668"

VIRTUAL MACHINES

    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
```

Ahora editamos las plantillas de creación de máquinas virtuales. El objetivo es conseguir que se puedan dar de alta en cualquier host.

```
[oneadmin@one-admin template_files]$ onetemplate clone 4 "tty 2 NICs"
ID: 5
[oneadmin@one-admin template_files]$ diff tty_public4.tmpl tty_public5.tmpl
12d11
< REQUIREMENTS="ID=\"8\" | ID=\"9\""
[oneadmin@one-admin template_files]$ onetemplate update 5 tty_public5.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 5
TEMPLATE 5 INFORMATION
ID             : 5
NAME           : tty 2 NICs
```

```
USER            : oneadmin
GROUP           : oneadmin
REGISTER TIME   : 10/23 17:24:04

PERMISSIONS
OWNER           : um-
GROUP           : ---
OTHER           : ---

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  NETWORK="VLAN6" ]
[oneadmin@one-admin template_files]$ onetemplate chmod 5 644
[oneadmin@one-admin template_files]$ onetemplate show 5
TEMPLATE 5 INFORMATION
ID              : 5
NAME            : tty 2 NICs
USER            : oneadmin
GROUP           : oneadmin
REGISTER TIME   : 10/23 17:24:04

PERMISSIONS
OWNER           : um-
GROUP           : u--
OTHER           : u--

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
```

```
  TYPE="VNC" ]
MEMORY="64"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  NETWORK="VLAN6" ]
[oneadmin@one-admin template_files]$
```

Ahora vamos a instanciar 40 máquinas virtuales (el límite teórico máximo entre los 4 hosts):

```
[oneadmin@one-admin ~]$ onetemplate instantiate 5 --name "tty%i 2 NICs" -m 40 -v
VM ID: 70
VMTEMPLATE 5: instantiated
VM ID: 71
VMTEMPLATE 5: instantiated
VM ID: 72
VMTEMPLATE 5: instantiated
VM ID: 73
VMTEMPLATE 5: instantiated
VM ID: 74
VMTEMPLATE 5: instantiated
VM ID: 75
VMTEMPLATE 5: instantiated
VM ID: 76
VMTEMPLATE 5: instantiated
VM ID: 77
VMTEMPLATE 5: instantiated
VM ID: 78
VMTEMPLATE 5: instantiated
VM ID: 79
VMTEMPLATE 5: instantiated
VM ID: 80
VMTEMPLATE 5: instantiated
VM ID: 81
VMTEMPLATE 5: instantiated
VM ID: 82
VMTEMPLATE 5: instantiated
VM ID: 83
VMTEMPLATE 5: instantiated
VM ID: 84
VMTEMPLATE 5: instantiated
VM ID: 85
VMTEMPLATE 5: instantiated
VM ID: 86
VMTEMPLATE 5: instantiated
VM ID: 87
VMTEMPLATE 5: instantiated
```

```
VM ID: 88
VMTEMPLATE 5: instantiated
VM ID: 89
VMTEMPLATE 5: instantiated
VM ID: 90
VMTEMPLATE 5: instantiated
VM ID: 91
VMTEMPLATE 5: instantiated
VM ID: 92
VMTEMPLATE 5: instantiated
VM ID: 93
VMTEMPLATE 5: instantiated
VM ID: 94
VMTEMPLATE 5: instantiated
VM ID: 95
VMTEMPLATE 5: instantiated
VM ID: 96
VMTEMPLATE 5: instantiated
VM ID: 97
VMTEMPLATE 5: instantiated
VM ID: 98
VMTEMPLATE 5: instantiated
VM ID: 99
VMTEMPLATE 5: instantiated
VM ID: 100
VMTEMPLATE 5: instantiated
VM ID: 101
VMTEMPLATE 5: instantiated
VM ID: 102
VMTEMPLATE 5: instantiated
VM ID: 103
VMTEMPLATE 5: instantiated
VM ID: 104
VMTEMPLATE 5: instantiated
VM ID: 105
VMTEMPLATE 5: instantiated
VM ID: 106
VMTEMPLATE 5: instantiated
VM ID: 107
VMTEMPLATE 5: instantiated
VM ID: 108
VMTEMPLATE 5: instantiated
VM ID: 109
VMTEMPLATE 5: instantiated
[oneadmin@one-admin ~]$
```

Vemos el estado de las máquinas:

```
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn    7     64M one-node2    0d 00h01
    71 oneadmin oneadmin tty1 2 NICs     runn   15     64M one-node1    0d 00h01
    72 oneadmin oneadmin tty2 2 NICs     runn   15     64M one-node4    0d 00h01
    73 oneadmin oneadmin tty3 2 NICs     runn    3     64M one-node3    0d 00h01
    74 oneadmin oneadmin tty4 2 NICs     runn   12     64M one-node2    0d 00h01
    75 oneadmin oneadmin tty5 2 NICs     runn   97     64M one-node1    0d 00h01
    76 oneadmin oneadmin tty6 2 NICs     runn   97     64M one-node4    0d 00h01
    77 oneadmin oneadmin tty7 2 NICs     runn   85     64M one-node3    0d 00h01
    78 oneadmin oneadmin tty8 2 NICs     pend    0      0K              0d 00h01
    79 oneadmin oneadmin tty9 2 NICs     pend    0      0K              0d 00h01
    80 oneadmin oneadmin tty10 2 NICs    pend    0      0K              0d 00h01
    81 oneadmin oneadmin tty11 2 NICs    pend    0      0K              0d 00h01
    82 oneadmin oneadmin tty12 2 NICs    pend    0      0K              0d 00h01
    83 oneadmin oneadmin tty13 2 NICs    pend    0      0K              0d 00h01
    84 oneadmin oneadmin tty14 2 NICs    pend    0      0K              0d 00h01
    85 oneadmin oneadmin tty15 2 NICs    pend    0      0K              0d 00h01
    86 oneadmin oneadmin tty16 2 NICs    pend    0      0K              0d 00h01
    87 oneadmin oneadmin tty17 2 NICs    pend    0      0K              0d 00h01
    88 oneadmin oneadmin tty18 2 NICs    pend    0      0K              0d 00h01
    89 oneadmin oneadmin tty19 2 NICs    pend    0      0K              0d 00h01
    90 oneadmin oneadmin tty20 2 NICs    pend    0      0K              0d 00h01
    91 oneadmin oneadmin tty21 2 NICs    pend    0      0K              0d 00h01
    92 oneadmin oneadmin tty22 2 NICs    pend    0      0K              0d 00h01
    93 oneadmin oneadmin tty23 2 NICs    pend    0      0K              0d 00h01
    94 oneadmin oneadmin tty24 2 NICs    pend    0      0K              0d 00h01
    95 oneadmin oneadmin tty25 2 NICs    pend    0      0K              0d 00h01
    96 oneadmin oneadmin tty26 2 NICs    pend    0      0K              0d 00h01
    97 oneadmin oneadmin tty27 2 NICs    pend    0      0K              0d 00h01
    98 oneadmin oneadmin tty28 2 NICs    pend    0      0K              0d 00h01
    99 oneadmin oneadmin tty29 2 NICs    pend    0      0K              0d 00h01
   100 oneadmin oneadmin tty30 2 NICs    pend    0      0K              0d 00h01
   101 oneadmin oneadmin tty31 2 NICs    pend    0      0K              0d 00h01
   102 oneadmin oneadmin tty32 2 NICs    pend    0      0K              0d 00h01
   103 oneadmin oneadmin tty33 2 NICs    pend    0      0K              0d 00h01
   104 oneadmin oneadmin tty34 2 NICs    pend    0      0K              0d 00h01
   105 oneadmin oneadmin tty35 2 NICs    pend    0      0K              0d 00h01
   106 oneadmin oneadmin tty36 2 NICs    pend    0      0K              0d 00h01
   107 oneadmin oneadmin tty37 2 NICs    pend    0      0K              0d 00h01
   108 oneadmin oneadmin tty38 2 NICs    pend    0      0K              0d 00h01
   109 oneadmin oneadmin tty39 2 NICs    pend    0      0K              0d 00h01
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
```

```
  70 oneadmin oneadmin tty0 2 NICs     runn    9     64M one-node2    0d 00h07
  71 oneadmin oneadmin tty1 2 NICs     runn    7     64M one-node1    0d 00h07
  72 oneadmin oneadmin tty2 2 NICs     runn    8     64M one-node4    0d 00h07
  73 oneadmin oneadmin tty3 2 NICs     runn    8     64M one-node3    0d 00h07
  74 oneadmin oneadmin tty4 2 NICs     runn    9     64M one-node2    0d 00h07
  75 oneadmin oneadmin tty5 2 NICs     runn    8     64M one-node1    0d 00h07
  76 oneadmin oneadmin tty6 2 NICs     runn    9     64M one-node4    0d 00h07
  77 oneadmin oneadmin tty7 2 NICs     runn    8     64M one-node3    0d 00h07
  78 oneadmin oneadmin tty8 2 NICs     runn    7     64M one-node2    0d 00h07
  79 oneadmin oneadmin tty9 2 NICs     runn    7     64M one-node1    0d 00h07
  80 oneadmin oneadmin tty10 2 NICs    runn    9     64M one-node4    0d 00h07
  81 oneadmin oneadmin tty11 2 NICs    runn    9     64M one-node3    0d 00h07
  82 oneadmin oneadmin tty12 2 NICs    runn    7     64M one-node2    0d 00h07
  83 oneadmin oneadmin tty13 2 NICs    runn    6     64M one-node1    0d 00h07
  84 oneadmin oneadmin tty14 2 NICs    runn    9     64M one-node4    0d 00h07
  85 oneadmin oneadmin tty15 2 NICs    runn    9     64M one-node3    0d 00h07
  86 oneadmin oneadmin tty16 2 NICs    runn    7     64M one-node2    0d 00h07
  87 oneadmin oneadmin tty17 2 NICs    runn    9     64M one-node1    0d 00h07
  88 oneadmin oneadmin tty18 2 NICs    runn    9     64M one-node4    0d 00h07
  89 oneadmin oneadmin tty19 2 NICs    runn    8     64M one-node3    0d 00h07
  90 oneadmin oneadmin tty20 2 NICs    runn    8     64M one-node2    0d 00h07
  91 oneadmin oneadmin tty21 2 NICs    runn    9     64M one-node1    0d 00h07
  92 oneadmin oneadmin tty22 2 NICs    runn    8     64M one-node4    0d 00h07
  93 oneadmin oneadmin tty23 2 NICs    runn    8     64M one-node3    0d 00h07
  94 oneadmin oneadmin tty24 2 NICs    runn    9     64M one-node2    0d 00h07
  95 oneadmin oneadmin tty25 2 NICs    runn    8     64M one-node1    0d 00h07
  96 oneadmin oneadmin tty26 2 NICs    runn    7     64M one-node4    0d 00h07
  97 oneadmin oneadmin tty27 2 NICs    runn    8     64M one-node3    0d 00h07
  98 oneadmin oneadmin tty28 2 NICs    runn    8     64M one-node2    0d 00h07
  99 oneadmin oneadmin tty29 2 NICs    runn    8     64M one-node1    0d 00h07
 100 oneadmin oneadmin tty30 2 NICs    runn    8     64M one-node4    0d 00h07
 101 oneadmin oneadmin tty31 2 NICs    runn    8     64M one-node3    0d 00h07
 102 oneadmin oneadmin tty32 2 NICs    runn    7     64M one-node2    0d 00h07
 103 oneadmin oneadmin tty33 2 NICs    runn    7     64M one-node1    0d 00h07
 104 oneadmin oneadmin tty34 2 NICs    runn    8     64M one-node4    0d 00h07
 105 oneadmin oneadmin tty35 2 NICs    runn    8     64M one-node3    0d 00h07
 106 oneadmin oneadmin tty36 2 NICs    runn    9     64M one-node2    0d 00h07
 107 oneadmin oneadmin tty37 2 NICs    runn    8     64M one-node1    0d 00h07
 108 oneadmin oneadmin tty38 2 NICs    runn    8     64M one-node4    0d 00h07
 109 oneadmin oneadmin tty39 2 NICs    runn    8     64M one-node3    0d 00h07
```

Ya tenemos 40 máquinas virtuales corriendo entre los 4 nodos (en realidad son 45 máquinas virtuales). Como hemos reducido los recursos de los hosts a prácticamente nada, todo va mucho más despacio, incluida la latencia de los bridges al hacer ping entre las máquinas.

Proseguimos con las tareas de configuración. Vamos a trabajar con el router virtual, importado del AppMarket. Primero creamos una plantilla de red con una nueva VLAN, con la idea de crear el router virtual para la nueva red.

```
[oneadmin@one-admin template_files]$ more priv_vlan7.net
NAME = "VLAN7"
TYPE = "RANGED"
PHYDEV = "eth2"
VLAN = "YES"
VLAN_ID = 7
BRIDGE  = "brhm7"

NETWORK_ADDRESS = "192.168.127.0/24"
GATEWAY = "192.168.127.1"
DNS = "192.168.127.1"
IP_START = "192.168.127.2"
IP_END = "192.168.127.254"
```

Importamos la plantilla:

```
[oneadmin@one-admin template_files]$ onevnet create priv_vlan7.net
ID: 2
[oneadmin@one-admin template_files]$ onevnet list
  ID USER         GROUP        NAME            CLUSTER      TYPE BRIDGE   LEASES
   0 oneadmin     oneadmin     Internet LAN    -               R virbr0        2
   1 oneadmin     oneadmin     VLAN6           -               R brhm6         2
   2 oneadmin     oneadmin     VLAN7           -               R brhm7         0
[oneadmin@one-admin template_files]$ onevnet show 2
VIRTUAL NETWORK 2 INFORMATION
ID             : 2
NAME           : VLAN7
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : brhm7
VLAN           : Yes
PHYSICAL DEVICE: eth2
VLAN ID        : 7
USED LEASES    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

VIRTUAL NETWORK TEMPLATE
DNS="192.168.127.1"
```

```
GATEWAY="192.168.127.1"
NETWORK_ADDRESS="192.168.127.0/24"
NETWORK_MASK="255.255.255.0"

RANGE
IP_START       : 192.168.127.2
IP_END         : 192.168.127.254

VIRTUAL MACHINES

[oneadmin@one-admin template_files]$ onevnet chmod 2 644
[oneadmin@one-admin template_files]$ onevnet show 2
VIRTUAL NETWORK 2 INFORMATION
ID             : 2
NAME           : VLAN7
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : brhm7
VLAN           : Yes
PHYSICAL DEVICE: eth2
VLAN ID        : 7
USED LEASES    : 0

PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

VIRTUAL NETWORK TEMPLATE
DNS="192.168.127.1"
GATEWAY="192.168.127.1"
NETWORK_ADDRESS="192.168.127.0/24"
NETWORK_MASK="255.255.255.0"

RANGE
IP_START       : 192.168.127.2
IP_END         : 192.168.127.254

VIRTUAL MACHINES
```

Ahora creamos la plantilla para el router virtual de esa red:

```
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    2
```

```
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No rdy     0
[oneadmin@one-admin template_files]$ oneimage show 1
IMAGE 1 INFORMATION
ID             : 1
NAME           : OpenNebula 4.2 Virtual Router
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : default
TYPE           : OS
REGISTER TIME  : 10/19 23:58:57
PERSISTENT     : No
SOURCE         : /var/lib/one/datastores/1/02ef41c6f84cea17ab28902251e72634
PATH           : http://marketplace.c12g.com/appliance/51f2a09f8fb81d4d19000004/download
SIZE           : 83M
STATE          : rdy
RUNNING_VMS    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="Virtual Router"
DEV_PREFIX="hd"
DRIVER="raw"
MD5="78d46f5516c08e0d96a8dc92aa26c838"
SHA1="a2a538027d5f9f9fcbbad6c8adad3f67d2de5242"

VIRTUAL MACHINES
```

Vemos que la imagen del router virtual es la 1. Preparamos la plantilla para el router con la red 7 y la red de salida por defecto. Hacemos una prueba sencilla, para ver como lo contextualiza:

```
[oneadmin@one-admin template_files]$ more router_vlan7.tmpl
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
FEATURES=[
  ACPI="no" ]
```

```
ROOT_PUBKEY = "$USER[SSH_PUBLIC_KEY]"
TARGET     = "hdb"
PRIVNET    = "$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]"
PUBNET     = "$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]"
TEMPLATE   = "$TEMPLATE"
DHCP       = "NO"
RADVD      = "NO" # Only useful for an IPv6 private network
DNS        = "8.8.4.4 8.8.8.8"
SEARCH     = "local.domain"
FORWARDING = "2222:192.168.127.2:22"
```

Vamos a importar la plantilla:

```
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                                REGTIME
   0 oneadmin        oneadmin        tty template                10/20 00:31:36
   1 oneadmin        oneadmin        tty public                  10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                 10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4        10/22 01:10:12
   4 oneadmin        oneadmin        tty public 2 NICs nodes 3 4 10/22 11:27:40
   5 oneadmin        oneadmin        tty 2 NICs                  10/23 17:24:04
[oneadmin@one-admin template_files]$ onetemplate clone 5 "routervlan7"
ID: 6
[oneadmin@one-admin template_files]$ onetemplate update 6  router_vlan7.tmpl
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                                REGTIME
   0 oneadmin        oneadmin        tty template                10/20 00:31:36
   1 oneadmin        oneadmin        tty public                  10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                 10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4        10/22 01:10:12
   4 oneadmin        oneadmin        tty public 2 NICs nodes 3 4 10/22 11:27:40
   5 oneadmin        oneadmin        tty 2 NICs                  10/23 17:24:04
   6 oneadmin        oneadmin        routervlan7                 12/02 16:47:34
[oneadmin@one-admin template_files]$ onetemplate show 6
TEMPLATE 6 INFORMATION
ID             : 6
NAME           : routervlan7
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/02 16:47:34

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
```

```
CPU="0.2"
DHCP="NO"
DISK=[
  IMAGE_ID="1" ]
DNS="8.8.4.4 8.8.8.8"
FEATURES=[
  ACPI="no" ]
FORWARDING="2222:192.168.127.2:22"
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
PRIVNET="$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]"
PUBNET="$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]"
RADVD="NO"
ROOT_PUBKEY="$USER[SSH_PUBLIC_KEY]"
SEARCH="local.domain"
TARGET="hdb"
TEMPLATE="$TEMPLATE"
```

Vamos a hacer una prueba instanciando el router. Es muy probable que nos de un error y que no funcione a la primera:

```
[oneadmin@one-admin template_files]$ onetemplate instantiate 6 --name "router_vlan7_1"
VM ID: 110
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node3   40d 00h26
    71 oneadmin oneadmin tty1 2 NICs     runn   14     64M one-node1   40d 00h26
   110 oneadmin oneadmin router_vlan7_1  prol    0      0K one-node2    0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   14     64M one-node3   40d 00h28
    71 oneadmin oneadmin tty1 2 NICs     runn   16     64M one-node1   40d 00h28
   110 oneadmin oneadmin router_vlan7_1  runn    2    200M one-node2    0d 00h01
[oneadmin@one-admin template_files]$ onevm show 110
VIRTUAL MACHINE 110 INFORMATION
ID                  : 110
NAME                : router_vlan7_1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
START TIME          : 12/02 16:55:04
```

```
END TIME            : -
DEPLOY ID           : one-110

VIRTUAL MACHINE MONITORING
NET_RX              : 0K
NET_TX              : 0K
USED CPU            : 4
USED MEMORY         : 200M

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                               TYPE SAVE SAVE_AS
  0 hda    OpenNebula 4.2 Virtual Router       file   NO       -

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION          REAS           START        TIME     PROLOG
  0 one-node2       none            none  12/02 16:55:12   0d 00h01m   0h00m43s

USER TEMPLATE
DHCP="NO"
DNS="8.8.4.4 8.8.8.8"
FORWARDING="2222:192.168.127.2:22"
PRIVNET="$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]"
PUBNET="$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]"
RADVD="NO"
ROOT_PUBKEY="$USER[SSH_PUBLIC_KEY]"
SEARCH="local.domain"
TARGET="hdb"
TEMPLATE="$TEMPLATE"

VIRTUAL MACHINE TEMPLATE
CPU="0.2"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6010",
  TYPE="VNC" ]
MEMORY="200"
TEMPLATE_ID="6"
VMID="110"
```

```
[oneadmin@one-admin template_files]$ onevnet list
  ID USER         GROUP        NAME            CLUSTER      TYPE BRIDGE   LEASES
   0 oneadmin     oneadmin     Internet LAN    -               R virbr0        2
   1 oneadmin     oneadmin     VLAN6           -               R brhm6         2
   2 oneadmin     oneadmin     VLAN7           -               R brhm7         0
```

Parece que la plantilla no funciona como se esperaba. Vamos a destruir la máquina virtual y meter los parámetros de la red dentro del CONTEXT. Seguimos la documentación:

```
http://opennebula.org/documentation:rel4.2:router
http://opennebula.org/documentation:rel4.2:cong
```

```
[oneadmin@one-admin template_files]$ onevm delete 110
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node3   40d 00h35
    71 oneadmin oneadmin tty1 2 NICs     runn   16     64M one-node1   40d 00h35
```

Modificamos la plantilla y metemos los parámetros dentro de la variable CONTEXT:

```
[oneadmin@one-admin template_files]$ more router_vlan7.tmpl
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
FEATURES=[
  ACPI="no" ]

TARGET     = "hdb"

CONTEXT=[
  ROOT_PUBKEY = "$USER[SSH_PUBLIC_KEY]",
  PRIVNET     = "$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]",
  PUBNET      = "$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  TEMPLATE    = "$TEMPLATE",
  DHCP        = "NO",
  RADVD       = "NO",
  DNS         = "8.8.4.4 8.8.8.8",
  SEARCH      = "local.domain",
  FORWARDING  = "2222:192.168.127.2:22" ]
[oneadmin@one-admin template_files]$ onetemplate update 6  router_vlan7.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 6
TEMPLATE 6 INFORMATION
ID             : 6
NAME           : routervlan7
```

```
USER            : oneadmin
GROUP           : oneadmin
REGISTER TIME   : 12/02 16:47:34

PERMISSIONS
OWNER           : um-
GROUP           : ---
OTHER           : ---

TEMPLATE CONTENTS
CONTEXT=[
  DHCP="NO",
  DNS="8.8.4.4 8.8.8.8",
  FORWARDING="2222:192.168.127.2:22",
  PRIVNET="$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]",
  PUBNET="$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  RADVD="NO",
  ROOT_PUBKEY="$USER[SSH_PUBLIC_KEY]",
  SEARCH="local.domain",
  TEMPLATE="$TEMPLATE" ]
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
TARGET="hdb"

[oneadmin@one-admin template_files]$ onetemplate instantiate 6 --name "router_vlan7_1"
VM ID: 111
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node3   40d 00h44
    71 oneadmin oneadmin tty1 2 NICs     runn   15     64M one-node1   40d 00h44
   111 oneadmin oneadmin router_vlan7_1  pend    0      0K              0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node3   40d 00h44
    71 oneadmin oneadmin tty1 2 NICs     runn   15     64M one-node1   40d 00h44
   111 oneadmin oneadmin router_vlan7_1  prol    0      0K one-node2    0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
```

```
    70 oneadmin oneadmin tty0 2 NICs     runn    17     64M one-node3   40d 00h44
    71 oneadmin oneadmin tty1 2 NICs     runn    13     64M one-node1   40d 00h44
   111 oneadmin oneadmin router_vlan7_1  runn     4    200M one-node2    0d 00h00
[oneadmin@one-admin template_files]$ onevm show 111
VIRTUAL MACHINE 111 INFORMATION
ID                  : 111
NAME                : router_vlan7_1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
START TIME          : 12/02 17:12:53
END TIME            : -
DEPLOY ID           : one-111

VIRTUAL MACHINE MONITORING
NET_TX              : 0K
USED CPU            : 4
USED MEMORY         : 200M
NET_RX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    OpenNebula 4.2 Virtual Router      file   NO       -

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION          REAS           START        TIME     PROLOG
  0 one-node2       none            none  12/02 17:13:12   0d 00h00m   0h00m05s

USER TEMPLATE
TARGET="hdb"

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DHCP="NO",
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  FORWARDING="2222:192.168.127.2:22",
```

```
  RADVD="NO",
  SEARCH="local.domain",
  TARGET="hdb",

TEMPLATE="PFZNPjxJRD4xMTE8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1
FPm9uZWFkbWluPC9HTkFNRT48TkFNRT5yb3V0ZXJfdmxhbjdfMTwvTkFNRT48UEVSTUlTU0lPTlM+PE9XTkVSX1U+MTwvT1dORVJf
VT48T1dORVJfTT4xPC9PV05FUl9NPjxPV05FUl9BPjA8L09XTkVSX0E+PEdST1VQX1U+MDwvR1JPVVBfVT48R1JPVVBfTT4wPC9HU
k9VUF9NPjxHUk9VUF9BPjA8L0dST1VQX0E+PE9USEVSX1U+MDwvT1RIRVJfVT48T1RIRVJfTT4wPC9PVEhFUl9NPjxPVEhFUl9BPj
A8L09USEVSX0E+PC9QRVJNSVNTU9OUz48TEFTVF9QT0xMPjA8L0xBU1RfUE9MTD48U1RBVEU+MTwvU1RBVEU+PExDTV9TVEFURT4
wPC9MQ01fU1RBVEU+PFJFU0NIRUQ+MDwvUkVTQ0hFRD48U1RJTUU+MTM4NjAwMDc3MzwvU1RJTUU+PEVUSU1FPjA8L0VUSU1FPjxE
RVBMT1lfSUQ+PC9ERVBMT1lfSUQ+PE1FTU9SWT4wPC9NRU1PUlk+PENQVT4wPC9DUFU+PERJU0s+PENMT05FPjwvW0NEQVRBW1lFU11dPj
wvQ0xPTkU+PERBVEFTVE9SRT48IVtDREFUQVtkZWZhdWx0XV0+PC9EQVRBU1RPUkU+PERBVEFTVE9SRV9JRD48IVtDREFUQVsxXV0
+PC9EQVRBU1RPUkVfSUQ+PERFVl9QUkVGSVg+PCFbQ0RBVEFbaGRdXT48L0RFVl9QUkVGSVg+PERJU0tfSUQ+PCFbQ0RBVEFbMF1d
PjwvRElTS19JRD48RFJJVkVSPjwvW0NEQVRBW3Jhd11dPjwvRFJJVkVSPjxJTUFHRT48IVtDREFUQVtPcGVuTmVidWxhIDQuMiBWa
XJ0dWFsIFJvdXRlcl1dPjwvSU1BR0U+PElNQUdFX0lEPjwvW0NEQVRBWzFdXT48L0lNQUdFX0lEPjxSRUFET05MWT48IVtDREFUQV
tOT11dPjwvUkVBRE9OTFk+PFNBVkU+PCFbQ0RBVEFbTk9dXT48L1NBVkU+PFNPVVJDRT48IVtDREFUQVsvdmFyL2xpYi9vbmUvZGF
0YXN0b3Jlcy8xLzAyZWY0MWM2Zjg0Y2VhMTdhYjI4OTAyMjUxZTcyNjM0XV0+PC9TT1VSQ0U+PFRBUkdFVD48IVtDREFUQVtoZGFd
XT48L1RBUkdFVD48VE1fTUFEPjwvW0NEQVRBW3NoYXJlZF1dPjwvVE1fTUFEPjxUWVBFPjwvW0NEQVRBW0ZJTEVdXT48L1RZUEU+P
C9ESVNLPjxNRU1PUlk+PCFbQ0RBVEFbMjAwXV0+PC9NRU1PUlk+PFRFTVBMQVRFX0lEPjwvW0NEQVRBWzZdXT48L1RFTVBMQVRFX0
lEPjxWTUlEPjwvW0NEQVRBWzExMV1dPjwvVk1JRD48L1RFTVBMQVRFPjxVU0VSX1RFTVBMQVRFPjxGRUFUVVJFUz48QUNQST48IVt
DREFUQVtub11dPjwvQUNQST48L0ZFQVRVUkVTPjxHUkFQSElDUz48TElTVEVOPjwvW0NEQVRBWzAuMC4wLjBdXT48L0xJU1RFTj48
VFlQRT48IVtDREFUQVtWTkNdXT48L1RZUEU+PC9HUkFQSElDUz48VEFSR0VUPjwvW0NEQVRBW2hkYl1dPjwvVEFSR0VUPjwvVVNFU
l9URU1QTEFURT48SElTVE9SWV9SRUNPUkRTLz48L1ZNPg==" ]
CPU="0.2"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6011",
  TYPE="VNC" ]
MEMORY="200"
TEMPLATE_ID="6"
VMID="111"
```

Ahora tiene mejor pinta, pero no estamos seguros de que haya cogido bien los interfaces de red.

```
[oneadmin@one-admin template_files]$ onevnet list
  ID USER         GROUP        NAME            CLUSTER      TYPE BRIDGE   LEASES
   0 oneadmin     oneadmin     Internet LAN    -               R virbr0        2
   1 oneadmin     oneadmin     VLAN6           -               R brhm6         2
   2 oneadmin     oneadmin     VLAN7           -               R brhm7         0
```

Pues no, no ha cogido las IPs de las plantillas. Supongo que es cuestión de hacer unas cuantas pruebas, hasta conseguir que nos funcione. Vamos a destruir de nuevo la máquina virtual, y a modificar la plantilla. Hemos encontrado un par de entradas en los foros sobre el tema:

```
http://comments.gmane.org/gmane.comp.distributed.opennebula.user/7360
http://www.mail-archive.com/users@lists.opennebula.org/msg12176.html
```

Destruimos la instancia y modificamos la plantilla:

```
[oneadmin@one-admin template_files]$ onevm delete 111
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
```

```
    70 oneadmin oneadmin tty0 2 NICs     runn    17     64M one-node3   40d 02h10
    71 oneadmin oneadmin tty1 2 NICs     runn    16     64M one-node1   40d 02h10
[oneadmin@one-admin template_files]$ more router_vlan7.tmpl
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
FEATURES=[
  ACPI="no" ]

NIC = [ NETWORK="Internet LAN" ]
NIC = [ NETWORK="VLAN7", IP="192.168.127.1" ]

CONTEXT=[
  TARGET      = "hdb",
  NETWORK     = "YES",
  ROOT_PUBKEY = "$USER[SSH_PUBLIC_KEY]",
  PRIVNET     = "$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]",
  PUBNET      = "$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  TEMPLATE    = "$TEMPLATE",
  DHCP        = "NO",
  RADVD       = "NO",
  DNS         = "8.8.4.4 8.8.8.8",
  SEARCH      = "local.domain",
  FORWARDING  = "2222:192.168.127.2:22" ]

[oneadmin@one-admin template_files]$ onetemplate update 6  router_vlan7.tmpl
[oneadmin@one-admin template_files]$ onetemplate instantiate 6 --name "router_vlan7_1"
[TemplateInstantiate] Error allocating a new virtual machine. Cannot get IP/MAC lease from virtual
network 2.
```

Eso ya está mucho mejor. Al menos se queja de algo en concreto. Se trata de la IP privada, parece que no le ha gustado que le hayamos puesto la IP en la plantilla. Vamos a clonar la plantilla para la instancia anterior con la VLAN6, para ver si también funciona usando la VLAN7.

```
[oneadmin@one-admin template_files]$ onetemplate clone 5 "tty 2 NICs VLAN7"
ID: 8
[oneadmin@one-admin template_files]$ onetemplate show 8
TEMPLATE 8 INFORMATION
ID             : 8
NAME           : tty 2 NICs VLAN7
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/03 15:56:57
```

```
PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  NETWORK="VLAN6" ]
[oneadmin@one-admin template_files]$ more tty_public6.tmpl
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
FEATURES=[
  ACPI="no" ]
NIC = [ NETWORK="VLAN7" ]
[oneadmin@one-admin template_files]$ onetemplate update 8 tty_public6.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 8
TEMPLATE 8 INFORMATION
ID             : 8
NAME           : tty 2 NICs VLAN7
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/03 15:56:57

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---
```

```
TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
NIC=[
  NETWORK="VLAN7" ]
[oneadmin@one-admin template_files]$ onetemplate instantiate 8 --name "tty NIC VLAN7 1"
VM ID: 112
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   16     64M one-node3   40d 23h32
    71 oneadmin oneadmin tty1 2 NICs     runn   16     64M one-node1   40d 23h32
   112 oneadmin oneadmin tty NIC VLAN7 1 runn   24     64M one-node2    0d 00h00
[oneadmin@one-admin template_files]$ onevm show 112
VIRTUAL MACHINE 112 INFORMATION
ID                  : 112
NAME                : tty NIC VLAN7 1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
START TIME          : 12/03 16:01:22
END TIME            : -
DEPLOY ID           : one-112

VIRTUAL MACHINE MONITORING
USED CPU            : 24
USED MEMORY         : 64M
NET_RX              : 0K
NET_TX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
```

```
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    ttylinux - kvm                     file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 VLAN7                 yes brhm7        192.168.127.2   02:00:c0:a8:7f:02
                                           fe80::400:c0ff:fea8:7f02

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node2       none             none   12/03 16:01:42   0d 00h00m   0h00m02s

VIRTUAL MACHINE TEMPLATE
CPU="0.1"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6012",
  TYPE="VNC" ]
MEMORY="64"
TEMPLATE_ID="8"
VMID="112"
```

Bien, lo que creemos que ha pasado es que hemos solicitado que se asigne la IP 192.168.127.1 en la plantilla, y esa IP no está dentro del rango de la plantilla de la VLAN7. Por eso no se instancia el router virtual. Vamos a confirmarlo eliminando la línea de la IP en la plantilla del router:

```
[oneadmin@one-admin template_files]$ more router_vlan7.tmpl
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
FEATURES=[
  ACPI="no" ]

NIC = [ NETWORK="Internet LAN" ]
NIC = [ NETWORK="VLAN7" ]

CONTEXT=[
  TARGET      = "hdb",
  NETWORK     = "YES",
  ROOT_PUBKEY = "$USER[SSH_PUBLIC_KEY]",
```

```
  PRIVNET     = "$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]",
  PUBNET      = "$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  TEMPLATE    = "$TEMPLATE",
  DHCP        = "NO",
  RADVD       = "NO",
  DNS         = "8.8.4.4 8.8.8.8",
  SEARCH      = "local.domain",
  FORWARDING  = "2222:192.168.127.2:22" ]
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                 10/20 00:31:36
   1 oneadmin        oneadmin        tty public                   10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                  10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4         10/22 01:10:12
   4 oneadmin        oneadmin        tty public 2 NICs nodes 3 4  10/22 11:27:40
   5 oneadmin        oneadmin        tty 2 NICs                   10/23 17:24:04
   6 oneadmin        oneadmin        routervlan7                  12/02 16:47:34
   8 oneadmin        oneadmin        tty 2 NICs VLAN7             12/03 15:56:57
[oneadmin@one-admin template_files]$ onetemplate show 6
TEMPLATE 6 INFORMATION
ID             : 6
NAME           : routervlan7
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/02 16:47:34

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CONTEXT=[
  DHCP="NO",
  DNS="8.8.4.4 8.8.8.8",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",
  PRIVNET="$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]",
  PUBNET="$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  RADVD="NO",
  ROOT_PUBKEY="$USER[SSH_PUBLIC_KEY]",
  SEARCH="local.domain",
  TARGET="hdb",
  TEMPLATE="$TEMPLATE" ]
CPU="0.2"
```

```
DISK=[
  IMAGE_ID="1" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  IP="192.168.127.1",
  NETWORK="VLAN7" ]
[oneadmin@one-admin template_files]$ onetemplate update 6  router_vlan7.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 6
TEMPLATE 6 INFORMATION
ID             : 6
NAME           : routervlan7
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/02 16:47:34

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CONTEXT=[
  DHCP="NO",
  DNS="8.8.4.4 8.8.8.8",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",
  PRIVNET="$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]",
  PUBNET="$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  RADVD="NO",
  ROOT_PUBKEY="$USER[SSH_PUBLIC_KEY]",
  SEARCH="local.domain",
  TARGET="hdb",
  TEMPLATE="$TEMPLATE" ]
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
FEATURES=[
  ACPI="no" ]
```

```
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  NETWORK="VLAN7" ]
[oneadmin@one-admin template_files]$ onetemplate instantiate 6 --name "router_vlan7_1"
VM ID: 113
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node3   40d 23h39
    71 oneadmin oneadmin tty1 2 NICs     runn   18     64M one-node1   40d 23h39
   112 oneadmin oneadmin tty NIC VLAN7 1 runn   16     64M one-node2    0d 00h07
   113 oneadmin oneadmin router_vlan7_1  pend    0      0K              0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   17     64M one-node3   40d 23h43
    71 oneadmin oneadmin tty1 2 NICs     runn   18     64M one-node1   40d 23h43
   112 oneadmin oneadmin tty NIC VLAN7 1 runn   14     64M one-node2    0d 00h11
   113 oneadmin oneadmin router_vlan7_1  runn    4    200M one-node4    0d 00h04
[oneadmin@one-admin template_files]$ onevm show 113
VIRTUAL MACHINE 113 INFORMATION
ID                  : 113
NAME                : router_vlan7_1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node4
START TIME          : 12/03 16:08:16
END TIME            : -
DEPLOY ID           : one-113

VIRTUAL MACHINE MONITORING
USED MEMORY         : 200M
NET_RX              : 6K
NET_TX              : 0K
USED CPU            : 4

PERMISSIONS
OWNER               : um-
GROUP               : ---
```

```
OTHER              : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    OpenNebula 4.2 Virtual Router      file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.68  02:00:c0:a8:7d:44
                                           fe80::400:c0ff:fea8:7d44
  1 VLAN7                 yes brhm7        192.168.127.3   02:00:c0:a8:7f:03
                                           fe80::400:c0ff:fea8:7f03

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node4       none             none  12/03 16:08:42   0d 00h03m   0h00m34s

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DHCP="NO",
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.68",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  ETH1_DNS="192.168.127.1",
  ETH1_GATEWAY="192.168.127.1",
  ETH1_IP="192.168.127.3",
  ETH1_MASK="255.255.255.0",
  ETH1_NETWORK="192.168.127.0/24",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",

PRIVNET="PFZORVQ+PElEPjI8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1F
Pm9uZWFkbWluPC9HTkFNRT48TkFNRT5WTEFONzwvTkFNRT48UEVSTUlTU0lPTlM+PE9XTkVSX1U+MTwvT1dORVJfVT48T1dORVJfT
T4xPC9PV05FUl9NPjxPV05FUl9BPjA8L09XTkVSX0E+PEdST1VQX1U+MTwvR1JPVVBfVT48R1JPVVBfTT4wPC9HUk9VUF9NPjxHUk
9VUF9BPjA8L0dST1VQX0E+PE9USEVSX1U+MTwvT1RIRVJfVT48T1RIRVJfTT4wPC9PVEhFUl9NPjxPVEhFUl9BPjA8L09USEVSX0E
+PC9QRVJNSVNTU9OUz48Q0xVU1RFUl9JRD4tMTwvQ0xVU1RFUl9JRD48Q0xVU1RFUj48L0NMVVNURVI+PFRZUEU+MDwvVFlQRT48
QlJJREdFPmJyaG03PC9CUklER0U+PFZMQU4+MTwvVkxBTj48UEhZREVWPmV0aDI8L1BIWURFVj48VkxBTl9JRD43PC9WTEFOX0lEP
jxHTE9CQUxfUFJFRklYLz48U0lURV9QUkVGSVgvPjxSQU5HRT48SVBfU1RBUlQ+MTkyLjE2OC4xMjcuMjwvSVBfU1RBUlQ+PElQX0
VORD4xOTIuMTY4LjEyNy4yNTQ8L0lQX0VORD48L1JBTkdFPjxUT1RBTF9MRUFTRVM+MjwvVE9UQUxfTEVBU0VTPjxURU1QTEFURT4
8RE5TPjwhW0NEQVRBWzE5Mi4xNjguMTI3LjFdXT48L0ROUz48R0FURVdBWT48IVtDREFUQVsxOTIuMTY4LjEyNy4xXV0+PC9HQVRF
V0FZPjxORVRXT1JLX0FERFJFU1M+PCFbQ0RBVEFbMTkyLjE2OC4xMjcuMC8yNF1dPjwvTkVUV09SS19BRERSRVNTPjxORVRXT1JLX
01BU0s+PCFbQ0RBVEFbMjU1LjI1NS4yNTUuMF1dPjwvTkVUV09SS19NQVNLPjwvVEVNUExBVEU+PE1BQz
4wMjowMDpjMDphODo3ZjowMjwvTUFDPjxJUD4xOTIuMTY4LjEyNy4yPC9JUD48SVA2X0xJTks+ZmU4MDo6NDAwOmMwZmY6ZmVhODo
3ZjAyPC9JUDZfTElOSz48VVNFRD4xPC9VU0VEPjxWSUQ+MTEyPC9WSUQ+PC9MRUFTRT48TEVBU0U+PE1BQz4wMjowMDpjMDphODo3
```

```
ZjowMzwvTUFDPjxJUD4xOTIuMTY4LjEyNy4zPC9JUD48SVA2X0xJTks+ZmU4MDo6NDAwOmMwZmY6ZmVhODo3ZjAzPC9JUDZfTElOS
z48VVNFRD4xPC9VU0VEPjxWSUQ+MTEzPC9WSUQ+PC9MRUFTRT48L0xFQVNFUz48L1ZORVQ+",

PUBNET="PFZORVQ+PElEPjA8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1FP
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  TARGET="hdb",

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```


```
CPU="0.2"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6013",
```

```
  TYPE="VNC" ]
MEMORY="200"
TEMPLATE_ID="6"
VMID="113"
```

Bien! por fin ha funcionado. El problema que vemos es que la plantilla asigna la primera IP válida del rango, lo que no es deseable. Esto tiene que ver con la forma en que configuramos la plantilla de red. Vamos a modificar la plantilla de red y a relanzar de nuevo la instancia del router, para ver si así toma la IP del gateway.

```
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   13     64M one-node3   40d 23h49
    71 oneadmin oneadmin tty1 2 NICs     runn   18     64M one-node1   40d 23h49
   112 oneadmin oneadmin tty NIC VLAN7 1 runn   17     64M one-node2    0d 00h17
   113 oneadmin oneadmin router_vlan7_1  runn    4    200M one-node4    0d 00h10
[oneadmin@one-admin template_files]$ onevm delete 112
[oneadmin@one-admin template_files]$ onevm delete 113
[oneadmin@one-admin template_files]$ more priv_vlan7.net
NAME = "VLAN7"
TYPE = "RANGED"
PHYDEV = "eth2"
VLAN = "YES"
VLAN_ID = 7
BRIDGE  = "brhm7"

NETWORK_ADDRESS = "192.168.127.0/24"
GATEWAY = "192.168.127.1"
DNS = "192.168.127.1"
IP_START = "192.168.127.2"
IP_END = "192.168.127.254"
[oneadmin@one-admin template_files]$ more priv_vlan7.net
NAME = "VLAN7"
TYPE = "RANGED"
PHYDEV = "eth2"
VLAN = "YES"
VLAN_ID = 7
BRIDGE  = "brhm7"

NETWORK_ADDRESS = "192.168.127.0/24"
GATEWAY = "192.168.127.1"
DNS = "192.168.127.1"
[oneadmin@one-admin template_files]$ onevnet list
  ID USER         GROUP        NAME            CLUSTER      TYPE BRIDGE   LEASES
   0 oneadmin     oneadmin     Internet LAN    -               R virbr0        2
   1 oneadmin     oneadmin     VLAN6           -               R brhm6         2
   2 oneadmin     oneadmin     VLAN7           -               R brhm7         0
```

```
[oneadmin@one-admin template_files]$ onevnet update 2 priv_vlan7.net
[oneadmin@one-admin template_files]$ onevnet show 2
VIRTUAL NETWORK 2 INFORMATION
ID             : 2
NAME           : VLAN7
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : brhm7
VLAN           : Yes
PHYSICAL DEVICE: eth2
VLAN ID        : 7
USED LEASES    : 0

PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

VIRTUAL NETWORK TEMPLATE
BRIDGE="brhm7"
DNS="192.168.127.1"
GATEWAY="192.168.127.1"
NAME="VLAN7"
NETWORK_ADDRESS="192.168.127.0/24"
PHYDEV="eth2"
TYPE="RANGED"
VLAN="YES"
VLAN_ID="7"

RANGE
IP_START       : 192.168.127.2
IP_END         : 192.168.127.254

VIRTUAL MACHINES
```

Aparentemente es el mismo resultado, pero tenemos que conseguir que el router tome la IP del gateway para que pueda salir al exterior. Ahora probamos de nuevo a instanciar el router virtual, a ver si se deja:

```
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   16     64M one-node3   40d 23h56
    71 oneadmin oneadmin tty1 2 NICs     runn   17     64M one-node1   40d 23h56
   114 oneadmin oneadmin router_vlan7_1  pend    0      0K              0d 00h00
```

```
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   16     64M one-node3   40d 23h57
    71 oneadmin oneadmin tty1 2 NICs     runn   15     64M one-node1   40d 23h57
   114 oneadmin oneadmin router_vlan7_1  runn    4    200M one-node2    0d 00h01
[oneadmin@one-admin template_files]$ onevm show 114
VIRTUAL MACHINE 114 INFORMATION
ID                  : 114
NAME                : router_vlan7_1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
START TIME          : 12/03 16:24:58
END TIME            : -
DEPLOY ID           : one-114

VIRTUAL MACHINE MONITORING
USED CPU            : 4
NET_RX              : 3K
NET_TX              : 0K
USED MEMORY         : 200M

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    OpenNebula 4.2 Virtual Router      file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0      192.168.125.68  02:00:c0:a8:7d:44
                                          fe80::400:c0ff:fea8:7d44
  1 VLAN7                 yes brhm7       192.168.127.3   02:00:c0:a8:7f:03
                                          fe80::400:c0ff:fea8:7f03

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION          REAS           START        TIME     PROLOG
  0 one-node2       none            none  12/03 16:25:12   0d 00h01m   0h00m06s
```

```
VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DHCP="NO",
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.68",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  ETH1_DNS="192.168.127.1",
  ETH1_GATEWAY="192.168.127.1",
  ETH1_IP="192.168.127.3",
  ETH1_NETWORK="192.168.127.0/24",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",

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W0ludGVybmV0IExBTl1dPjwvTkVUV09SSz48TkVUV09SS19JRD48IVtDREFUQVswXV0+PC9ORVRXT1JLX0lEPjxOSUNfSUQ+PCFbQ
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RTLz48L1ZNPg=="]

```
CPU="0.2"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6014",
  TYPE="VNC" ]
MEMORY="200"
TEMPLATE_ID="6"
VMID="114"
```

Pues no, ha tomado la IP 192.168.127.3. Esto no es lo que queremos. Vamos a revisar de nuevo la plantilla, y a modificarla para ver si así conseguimos que utilice la IP del gateway en el interfaz privado.

```
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   16     64M one-node3   41d 00h16
    71 oneadmin oneadmin tty1 2 NICs     runn   17     64M one-node1   41d 00h16
   114 oneadmin oneadmin router_vlan7_1  runn    4    200M one-node2    0d 00h19
[oneadmin@one-admin template_files]$ onevm delete 114
[oneadmin@one-admin template_files]$ more router_vlan7.tmpl
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
```

```
  TYPE="VNC" ]
MEMORY="200"
FEATURES=[
  ACPI="no" ]

NIC = [ NETWORK="Internet LAN" ]
NIC = [ NETWORK="VLAN7", IP="192.168.127.1" ]

CONTEXT=[
  TARGET      = "hdb",
  NETWORK     = "YES",
  ROOT_PUBKEY = "$USER[SSH_PUBLIC_KEY]",
  PRIVNET     = "$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]",
  PUBNET      = "$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  TEMPLATE    = "$TEMPLATE",
  DHCP        = "NO",
  RADVD       = "NO",
  DNS         = "8.8.4.4 8.8.8.8",
  SEARCH      = "local.domain",
  FORWARDING  = "2222:192.168.127.2:22" ]
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                10/20 00:31:36
   1 oneadmin        oneadmin        tty public                  10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                 10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4        10/22 01:10:12
   4 oneadmin        oneadmin        tty public 2 NICs nodes 3 4 10/22 11:27:40
   5 oneadmin        oneadmin        tty 2 NICs                  10/23 17:24:04
   6 oneadmin        oneadmin        routervlan7                 12/02 16:47:34
   8 oneadmin        oneadmin        tty 2 NICs VLAN7            12/03 15:56:57
[oneadmin@one-admin template_files]$ onetemplate update 6 router_vlan7.tmpl
[oneadmin@one-admin template_files]$ onetemplate instantiate 6 --name "router_vlan7_1"
[TemplateInstantiate] Error allocating a new virtual machine. Cannot get IP/MAC lease from virtual
network 2.
```

Lo mismo de antes. Vamos a revisar los ejemplos que aparecen en los blogs. Vamos a probar a activar el DHCP, a ver si así toma la IP del gateway, aunque después no lleguemos a utilizarlo en las máquinas virtuales.

```
[oneadmin@one-admin template_files]$ onetemplate update 6 router_vlan7.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 6
TEMPLATE 6 INFORMATION
ID             : 6
NAME           : routervlan7
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/02 16:47:34
```

```
PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CONTEXT=[
  DHCP="YES",
  DNS="8.8.4.4 8.8.8.8",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",
  PRIVNET="$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]",
  PUBNET="$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  RADVD="NO",
  ROOT_PUBKEY="$USER[SSH_PUBLIC_KEY]",
  SEARCH="local.domain",
  TARGET="hdb",
  TEMPLATE="$TEMPLATE" ]
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  IP="192.168.127.1",
  NETWORK="VLAN7" ]
[oneadmin@one-admin template_files]$ onetemplate instantiate 6 --name "router_vlan7_1"
[TemplateInstantiate] Error allocating a new virtual machine. Cannot get IP/MAC lease from virtual network 2.
```

Eliminamos la IP, pero mantenemos el DHCP:

```
[oneadmin@one-admin template_files]$ onetemplate update 6 router_vlan7.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 6
TEMPLATE 6 INFORMATION
ID             : 6
NAME           : routervlan7
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/02 16:47:34
```

```
PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CONTEXT=[
  DHCP="YES",
  DNS="8.8.4.4 8.8.8.8",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",
  PRIVNET="$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]",
  PUBNET="$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  RADVD="NO",
  ROOT_PUBKEY="$USER[SSH_PUBLIC_KEY]",
  SEARCH="local.domain",
  TARGET="hdb",
  TEMPLATE="$TEMPLATE" ]
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  NETWORK="VLAN7" ]
[oneadmin@one-admin template_files]$ onetemplate instantiate 6 --name "router_vlan7_1"
VM ID: 115
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   17     64M one-node3   41d 00h23
    71 oneadmin oneadmin tty1 2 NICs     runn   13     64M one-node1   41d 00h23
   115 oneadmin oneadmin router_vlan7_1  pend    0      0K              0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node3   41d 00h24
    71 oneadmin oneadmin tty1 2 NICs     runn   14     64M one-node1   41d 00h24
   115 oneadmin oneadmin router_vlan7_1  runn    3    200M one-node2    0d 00h00
[oneadmin@one-admin template_files]$ onevm show 115
```

```
VIRTUAL MACHINE 115 INFORMATION
ID                  : 115
NAME                : router_vlan7_1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
START TIME          : 12/03 16:52:20
END TIME            : -
DEPLOY ID           : one-115

VIRTUAL MACHINE MONITORING
USED CPU            : 3
NET_TX              : 0K
USED MEMORY         : 200M
NET_RX              : 1K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    OpenNebula 4.2 Virtual Router      file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.68  02:00:c0:a8:7d:44
                                           fe80::400:c0ff:fea8:7d44
  1 VLAN7                 yes brhm7        192.168.127.3   02:00:c0:a8:7f:03
                                           fe80::400:c0ff:fea8:7f03

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION          REAS           START        TIME     PROLOG
  0 one-node2       none            none  12/03 16:52:42   0d 00h00m   0h00m04s

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DHCP="YES",
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
```

```
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.68",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  ETH1_DNS="192.168.127.1",
  ETH1_GATEWAY="192.168.127.1",
  ETH1_IP="192.168.127.3",
  ETH1_NETWORK="192.168.127.0/24",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",

PRIVNET="PFZORVQ+PElEPjI8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1F
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  RADVD="NO",
  SEARCH="local.domain",
  TARGET="hdb",

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```

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W0ludGVybmV0IExBTl1dPjwvTkVUV09SSz48TkVUV09SS19JRD48IVtDREFUQVswXV0+PC9ORVRXT1JLX0lEPjxOSUNfSUQ+PCFbQ
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htN11dPjwvQlJJREdFPjxJUD48IVtDREFUQVsxOTIuMTY4LjEyNy4zXV0+PC9JUD48SVA2X0xJTks+PCFbQ0RBVEFbZmU4MDo6NDA
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RTLz48L1ZNPg=="]

```
CPU="0.2"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6015",
  TYPE="VNC" ]
MEMORY="200"
TEMPLATE_ID="6"
VMID="115"
```

Bueno, está claro lo que tenemos que hacer:

1) definir la plantilla de red con la IP del gateway dentro del rango.

2) Incluir la IP del gateway en la plantilla del router.

3) Crear la instancia del router en primer lugar, para asegurarse que la IP del gateway nunca queda asignada a ninguna máquina virtual.

Vamos a ello:

```
[oneadmin@one-admin template_files]$ onevm delete 115
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   14     64M one-node3   41d 00h27
    71 oneadmin oneadmin tty1 2 NICs     runn   15     64M one-node1   41d 00h27
[oneadmin@one-admin template_files]$ more priv_vlan7.net
NAME = "VLAN7"
TYPE = "RANGED"
PHYDEV = "eth2"
VLAN = "YES"
VLAN_ID = 7
BRIDGE  = "brhm7"

NETWORK_ADDRESS = "192.168.127.0/24"
```

```
GATEWAY = "192.168.127.1"
DNS = "192.168.127.1"
IP_START = "192.168.127.1"
IP_END = "192.168.127.254"
[oneadmin@one-admin template_files]$ more router_vlan7.tmpl
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
FEATURES=[
  ACPI="no" ]

NIC = [ NETWORK="Internet LAN" ]
NIC = [ NETWORK="VLAN7", IP="192.168.127.1" ]

CONTEXT=[
  TARGET      = "hdb",
  NETWORK     = "YES",
  ROOT_PUBKEY = "$USER[SSH_PUBLIC_KEY]",
  PRIVNET     = "$NETWORK[TEMPLATE, NETWORK=\"VLAN7\"]",
  PUBNET      = "$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  TEMPLATE    = "$TEMPLATE",
  DHCP        = "YES",
  RADVD       = "NO",
  DNS         = "8.8.4.4 8.8.8.8",
  SEARCH      = "local.domain",
  FORWARDING  = "2222:192.168.127.2:22" ]
[oneadmin@one-admin template_files]$ onevnet update 2 priv_vlan7.net
[oneadmin@one-admin template_files]$ onevnet show 2
VIRTUAL NETWORK 2 INFORMATION
ID             : 2
NAME           : VLAN7
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : brhm7
VLAN           : Yes
PHYSICAL DEVICE: eth2
VLAN ID        : 7
USED LEASES    : 0
```

```
PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

VIRTUAL NETWORK TEMPLATE
BRIDGE="brhm7"
DNS="192.168.127.1"
GATEWAY="192.168.127.1"
IP_END="192.168.127.254"
IP_START="192.168.127.1"
NAME="VLAN7"
NETWORK_ADDRESS="192.168.127.0/24"
PHYDEV="eth2"
TYPE="RANGED"
VLAN="YES"
VLAN_ID="7"

RANGE
IP_START       : 192.168.127.2
IP_END         : 192.168.127.254

VIRTUAL MACHINES
```

Esto no lo pilla bien. Y así no conseguiremos que el router tome la IP del gateway. Aunque la variable IP_START="192.168.127.1" esté OK, el rango efectivo es el que aparece debajo en el apartado RANGE. y obtenemos el mismo error:

```
[oneadmin@one-admin template_files]$ onetemplate instantiate 6 --name "router_vlan7_1"
[TemplateInstantiate] Error allocating a new virtual machine. Cannot get IP/MAC lease from virtual network 2.
```

Aquí podemos probar dos cosas:

1) Usar el DHCP, en cuyo caso no definiremos en la plantilla de red ni los campos GATEWAY, DNS, etc... dejando ese trabajo al router cuando pase los paquetes por DHCP.

2) No usar el DHCP, pero utilizar dos plantillas de red diferentes sobre la misma VLAN: una plantilla para el router, y otra plantilla para las máquinas virtuales.

En ambos casos hay que utilizar dos plantillas de red, así que vamos a por la opción de no usar el DHCP en el router, y a definir las dos plantillas.

```
[oneadmin@one-admin template_files]$ more router_vlan7.net
NAME = "RTVLAN7"
TYPE = "RANGED"
PHYDEV = "eth2"
VLAN = "YES"
VLAN_ID = 7
BRIDGE  = "brhm7"
```

```
NETWORK_ADDRESS = "192.168.127.0/24"
[oneadmin@one-admin template_files]$ onevnet create router_vlan7.net
ID: 3
[oneadmin@one-admin template_files]$ onevnet show 3
VIRTUAL NETWORK 3 INFORMATION
ID             : 3
NAME           : RTVLAN7
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : brhm7
VLAN           : Yes
PHYSICAL DEVICE: eth2
VLAN ID        : 7
USED LEASES    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

VIRTUAL NETWORK TEMPLATE
NETWORK_ADDRESS="192.168.127.0/24"
NETWORK_MASK="255.255.255.0"

RANGE
IP_START       : 192.168.127.1
IP_END         : 192.168.127.254

VIRTUAL MACHINES
```

La VLAN7 no la modificamos, y será la que utilicemos para las máquinas virtuales.

```
[oneadmin@one-admin template_files]$ onevnet show 2
VIRTUAL NETWORK 2 INFORMATION
ID             : 2
NAME           : VLAN7
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : brhm7
VLAN           : Yes
PHYSICAL DEVICE: eth2
VLAN ID        : 7
```

```
USED LEASES    : 0

PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

VIRTUAL NETWORK TEMPLATE
BRIDGE="brhm7"
DNS="192.168.127.1"
GATEWAY="192.168.127.1"
IP_END="192.168.127.254"
IP_START="192.168.127.1"
NAME="VLAN7"
NETWORK_ADDRESS="192.168.127.0/24"
PHYDEV="eth2"
TYPE="RANGED"
VLAN="YES"
VLAN_ID="7"

RANGE
IP_START       : 192.168.127.2
IP_END         : 192.168.127.254

VIRTUAL MACHINES
```

Ahora modificamos la plantilla del router virtual, para que utilice la nueva plantilla de red:

```
[oneadmin@one-admin template_files]$ more router_vlan7.tmpl
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
FEATURES=[
  ACPI="no" ]

NIC = [ NETWORK="Internet LAN" ]
NIC = [ NETWORK="RTVLAN7", IP="192.168.127.1" ]

CONTEXT=[
  TARGET      = "hdb",
  NETWORK     = "YES",
  ROOT_PUBKEY = "$USER[SSH_PUBLIC_KEY]",
```

```
  PRIVNET     = "$NETWORK[TEMPLATE, NETWORK=\"RTVLAN7\"]",
  PUBNET      = "$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  TEMPLATE    = "$TEMPLATE",
  DHCP        = "YES",
  RADVD       = "NO",
  DNS         = "8.8.4.4 8.8.8.8",
  SEARCH      = "local.domain",
  FORWARDING  = "2222:192.168.127.2:22" ]
[oneadmin@one-admin template_files]$ onetemplate update 6 router_vlan7.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 6
TEMPLATE 6 INFORMATION
ID             : 6
NAME           : routervlan7
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/02 16:47:34

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CONTEXT=[
  DHCP="NO",
  DNS="8.8.4.4 8.8.8.8",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",
  PRIVNET="$NETWORK[TEMPLATE, NETWORK=\"RTVLAN7\"]",
  PUBNET="$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  RADVD="NO",
  ROOT_PUBKEY="$USER[SSH_PUBLIC_KEY]",
  SEARCH="local.domain",
  TARGET="hdb",
  TEMPLATE="$TEMPLATE" ]
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="200"
NIC=[
```

```
  NETWORK="Internet LAN" ]
NIC=[
  IP="192.168.127.1",
  NETWORK="RTVLAN7" ]
[oneadmin@one-admin template_files]$ onetemplate instantiate 6 --name "router_vlan7_1"
VM ID: 116
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   17     64M one-node3   41d 01h28
    71 oneadmin oneadmin tty1 2 NICs     runn   18     64M one-node1   41d 01h28
   116 oneadmin oneadmin router_vlan7_1  pend    0      0K              0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node3   41d 01h29
    71 oneadmin oneadmin tty1 2 NICs     runn   16     64M one-node1   41d 01h29
   116 oneadmin oneadmin router_vlan7_1  runn    4    200M one-node2    0d 00h01
[oneadmin@one-admin template_files]$ onevm show 116
VIRTUAL MACHINE 116 INFORMATION
ID                  : 116
NAME                : router_vlan7_1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
START TIME          : 12/03 17:56:45
END TIME            : -
DEPLOY ID           : one-116

VIRTUAL MACHINE MONITORING
NET_RX              : 1K
USED MEMORY         : 200M
NET_TX              : 0K
USED CPU            : 4

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                               TYPE SAVE SAVE_AS
  0 hda    OpenNebula 4.2 Virtual Router       file   NO       -
```

```
VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.68  02:00:c0:a8:7d:44
                                           fe80::400:c0ff:fea8:7d44
  1 RTVLAN7               yes brhm7        192.168.127.1   02:00:c0:a8:7f:01
                                           fe80::400:c0ff:fea8:7f01


VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node2       none             none  12/03 17:57:12   0d 00h01m   0h00m04s


VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DHCP="NO",
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.68",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  ETH1_IP="192.168.127.1",
  ETH1_MASK="255.255.255.0",
  ETH1_NETWORK="192.168.127.0/24",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",

PRIVNET="PFZORVQ+PElEPjM8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1F
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```

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RD48L0xFQVNFPjwvTEVBU0VTPjwvVk5FVD4=",
  RADVD="NO",
  SEARCH="local.domain",
  TARGET="hdb",

TEMPLATE="PFZNPjxJRD4xMTY8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1
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UQ+PCFbQ0RBVEFbMV1dPjwvTklDX0lEPjxQSFlERVY+PCFbQ0RBVEFbZXRoMl1dPjwvUEhZREVWPjxWTEFOPjwhW0NEQVRBW1lFU1
1dPjwvVkxBTj48VkxBTl9JRD48IVtDREFUQVs3XV0+PC9WTEFOX0lEPjwvTklDPjxOSUNfSUQ+PCFbQ0RBVEFbMV1dPjwvTklDX0lE
URU1QTEFURV9JRD48IVtDREFUQVs2XV0+PC9URU1QTEFURV9JRD48VE1fTUFEPjwhW0NEQVRBW1lFU1dPjwvVE1fTUFEPjxURU1QT
EFURUEk+PCFbQ0RBVEFbbm9dXT48L0FDUEk+PC9GRUFUVVJFUz48R1JBUEhJQ1M+PExJU1RFTj48IVtDREFUQVswLjAuMC4wXV0+P
C9MSVNURU4+PFRZUEU+PCFbQ0RBVEFbVk5DXV0+PC9UWVBFPjwvR1JBUEhJQ1M+PC9VU0VSX1RFTVBMQVRFPjxISVNUT1JZX1JFQ0
9SRFMvPjwvVk0+"]
CPU="0.2"
FEATURES=[
  ACPI="no"]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6016",
  TYPE="VNC"]
MEMORY="200"
TEMPLATE_ID="6"
VMID="116"

Bien! Ya era hora. Ahora probamos con una máquina virtual de la misma red, a ver si nos funciona todo OK.

```
[oneadmin@one-admin template_files]$ onetemplate instantiate 8 --name "tty_vlan7_1"
VM ID: 117
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
```

```
    70 oneadmin oneadmin tty0 2 NICs     runn    15     64M one-node3   41d 01h37
    71 oneadmin oneadmin tty1 2 NICs     runn    17     64M one-node1   41d 01h37
   116 oneadmin oneadmin router_vlan7_1  runn     4    200M one-node2    0d 00h09
   117 oneadmin oneadmin tty_vlan7_1     runn     0      0K one-node4    0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn    15     64M one-node3   41d 01h38
    71 oneadmin oneadmin tty1 2 NICs     runn    16     64M one-node1   41d 01h38
   116 oneadmin oneadmin router_vlan7_1  runn     4    200M one-node2    0d 00h10
   117 oneadmin oneadmin tty_vlan7_1     runn    15     64M one-node4    0d 00h01
[oneadmin@one-admin template_files]$ onevm show 117
VIRTUAL MACHINE 117 INFORMATION
ID                  : 117
NAME                : tty_vlan7_1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node4
START TIME          : 12/03 18:06:08
END TIME            : -
DEPLOY ID           : one-117

VIRTUAL MACHINE MONITORING
NET_RX              : 0K
USED CPU            : 15
USED MEMORY         : 64M
NET_TX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                               TYPE SAVE SAVE_AS
  0 hda    ttylinux - kvm                      file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 VLAN7                 yes brhm7        192.168.127.3   02:00:c0:a8:7f:03
                                           fe80::400:c0ff:fea8:7f03

VIRTUAL MACHINE HISTORY
```

```
SEQ HOST            ACTION          REAS           START        TIME     PROLOG
  0 one-node4       none            none   12/03 18:06:12   0d 00h01m   0h00m02s

VIRTUAL MACHINE TEMPLATE
CPU="0.1"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6017",
  TYPE="VNC" ]
MEMORY="64"
TEMPLATE_ID="8"
VMID="117"
```

Tendremos que seguir mirándolo luego, porque la IP pública no responde desde el host 2. Vemos que la máquina virtual del router arranca, pero por algún motivo no se ve la IP del interfaz público. Es posible que no esté correctamente contextualizada, y ello implica configurar los interfaces de red. Vamos a modificar la plantilla del router a una configuración más fiable, obtenida como referencia en las listas de correo.

```
[oneadmin@one-admin template_files]$ more router_vlan7.tmpl
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
FEATURES=[
  ACPI="yes" ]

NIC = [ NETWORK="Internet LAN" ]
NIC = [
  NETWORK="RTVLAN7",
  IP="192.168.127.1" ]

CONTEXT=[
  TARGET         = "hdb",
  NETWORK        = "YES",
  SSH_PUBLIC_KEY = "$USER[SSH_PUBLIC_KEY]",
  PRIVNET        = "$NETWORK[TEMPLATE, NETWORK=\"RTVLAN7\"]",
  PUBNET         = "$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  TEMPLATE       = "$TEMPLATE",
```

```
  DHCP           = "NO",
  RADVD          = "NO",
  DNS            = "8.8.4.4 8.8.8.8",
  SEARCH         = "local.domain",
  FORWARDING     = "2222:192.168.127.2:22" ]
[oneadmin@one-admin template_files]$ onetemplate update 6 router_vlan7.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 6
TEMPLATE 6 INFORMATION
ID             : 6
NAME           : routervlan7
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/02 16:47:34

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CONTEXT=[
  DHCP="NO",
  DNS="8.8.4.4 8.8.8.8",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",
  PRIVNET="$NETWORK[TEMPLATE, NETWORK=\"RTVLAN7\"]",
  PUBNET="$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  RADVD="NO",
  SEARCH="local.domain",
  SSH_PUBLIC_KEY="$USER[SSH_PUBLIC_KEY]",
  TARGET="hdb",
  TEMPLATE="$TEMPLATE" ]
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
FEATURES=[
  ACPI="yes" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="512"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  IP="192.168.127.1",
```

```
  NETWORK="RTVLAN7" ]
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
```

Ahora creamos otra plantilla para una máquina virtual que nos permita acceder desde fuera a la VLAN7 y hacer ping al interfaz interno.

```
[oneadmin@one-admin template_files]$ onetemplate clone 8 "tty 2NICs VLAN7 inside"
ID: 9
[oneadmin@one-admin template_files]$ onetemplate show 9
TEMPLATE 9 INFORMATION
ID             : 9
NAME           : tty 2NICs VLAN7 inside
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/04 00:22:12

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
NIC=[
  NETWORK="VLAN7" ]
```

Ahora lo cambiamos por esto:

```
[oneadmin@one-admin template_files]$ more tty_public7.tmpl
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
FEATURES=[
  ACPI="no" ]
NIC = [ NETWORK="Internet LAN" ]
```

```
NIC = [ NETWORK="RTVLAN7" ]
[oneadmin@one-admin template_files]$ onetemplate update 9 tty_public7.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 9
TEMPLATE 9 INFORMATION
ID             : 9
NAME           : tty 2NICs VLAN7 inside
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/04 00:22:12

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  NETWORK="RTVLAN7" ]
```

Bien, ahora matamos el router actual, e instanciamos uno nuevo, junto con una máquina virtual que utilice la nueva plantilla.

```
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   19     64M one-node2   41d 07h57
    71 oneadmin oneadmin tty1 2 NICs     runn   13     64M one-node2   41d 07h57
   116 oneadmin oneadmin router_vlan7_1  runn    3    200M one-node2    0d 06h29
   117 oneadmin oneadmin tty_vlan7_1     runn   12     64M one-node4    0d 06h20
[oneadmin@one-admin template_files]$ onevm delete 116
[oneadmin@one-admin template_files]$ onetemplate instantiate 6 --name "router_vlan7_1"
VM ID: 118
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node2   41d 07h59
    71 oneadmin oneadmin tty1 2 NICs     runn   12     64M one-node2   41d 07h59
   117 oneadmin oneadmin tty_vlan7_1     runn   14     64M one-node4    0d 06h21
```

```
   118 oneadmin oneadmin router_vlan7_1  prol    0      0K one-node1    0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   12     64M one-node2   41d 08h00
    71 oneadmin oneadmin tty1 2 NICs     runn   10     64M one-node2   41d 08h00
   117 oneadmin oneadmin tty_vlan7_1     runn   13     64M one-node4    0d 06h23
   118 oneadmin oneadmin router_vlan7_1  runn   77    512M one-node1    0d 00h01
[oneadmin@one-admin template_files]$ onetemplate instantiate 9 --name "tty_vlan7_inside_1"
VM ID: 119
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   16     64M one-node2   41d 08h03
    71 oneadmin oneadmin tty1 2 NICs     runn   13     64M one-node2   41d 08h03
   117 oneadmin oneadmin tty_vlan7_1     runn   18     64M one-node4    0d 06h26
   118 oneadmin oneadmin router_vlan7_1  runn    1    512M one-node1    0d 00h04
   119 oneadmin oneadmin tty_vlan7_insid runn   15     64M one-node3    0d 00h01
[oneadmin@one-admin template_files]$ onevm show 118
VIRTUAL MACHINE 118 INFORMATION
ID                  : 118
NAME                : router_vlan7_1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node1
START TIME          : 12/04 00:27:38
END TIME            : -
DEPLOY ID           : one-118

VIRTUAL MACHINE MONITORING
NET_RX              : 10K
USED CPU            : 1
NET_TX              : 0K
USED MEMORY         : 512M

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                               TYPE SAVE SAVE_AS
  0 hda    OpenNebula 4.2 Virtual Router       file   NO       -
```

```
VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.68  02:00:c0:a8:7d:44
                                           fe80::400:c0ff:fea8:7d44
  1 RTVLAN7               yes brhm7        192.168.127.1   02:00:c0:a8:7f:01
                                           fe80::400:c0ff:fea8:7f01

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node1       none             none  12/04 00:27:42   0d 00h06m   0h00m40s

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DHCP="NO",
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.68",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  ETH1_IP="192.168.127.1",
  ETH1_MASK="255.255.255.0",
  ETH1_NETWORK="192.168.127.0/24",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",

PRIVNET="PFZORVQ+PElEPjM8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1F
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fQT48L1BFUk1JU1NJT05TPjxDTFVTVEVSX0lEPi0xPC9DTFVTVEVSX0lEPjxDTFVTVEVSPjwvQ0xVU1RFUj48VFlQRT4wPC9UWVBF
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FPjxORVRXT1JLX0FERFJFU1M+PCFbQ0RBVEFbMTkyLjE2OC4xMjcuMC8yNF1dPjwvTkVUV09SS19BRERSRVNTPjxORVRXT1JLX01B
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jowMDpjMDphODo3ZjowMTwvTUFDPjxJUD4xOTIuMTY4LjEyNy4xPC9JUD48SVA2X0xJTks+ZmU4MDo6NDAwOmMwZmY6ZmVhODo3Zj
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PUBNET="PFZORVQ+PElEPjA8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1FP
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9XTkVSX00+MTwvT1dORVJfTT48T1dORVJfQT4wPC9PV05FUl9BPjxHUk9VUF9VPjE8L0dST1VQX1U+PEdST1VQX00+MDwvR1JPVVB
fTT48R1JPVVBfQT4wPC9HUk9VUF9BPjxPVEhFUl9VPjE8L09USEVSX1U+PE9USEVSX00+MDwvT1RIRVJfTT48T1RIRVJfQT4wPC9P
VEhFUl9BPjwvUEVSTUlTU0lPTlM+PENMVVNURVJfSUQ+LTE8L0NMVVNURVJfSUQ+PENMVVNURVI+PC9DTFVTVEVSPjxUWVBFPjA8L
1RZUEU+PEJSSURHRT52aXJicjA8L0JSSURHRT48VkxBTj4wPC9WTEFOPjxQSFlERVYvPjxWTEFOX0lELz48R0xPQkFMX1BSRUZJWC
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ERSRVNTPjwvTkVUV09SS19BRERSRVNTPjxORVRXT1JLX01BU0s+PCFbQ0RBVEFbMTkyLjE2OC4xMjUuMV1dPjwvR0FURVdBWT48TkVUV09SS19BR
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```

PjxVU0VEPjE8L1VTRUQ+PFZJRD43MDwvVklEPjwvTEVBU0U+PExFQVNFPjxNQUM+MDI6MDA6YzA6YTg6N2Q6MWU8L01BQz48SVA+M
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RD48L0xFQVNFPjwvTEVBU0VTPjwvVk5FVD4=",
  RADVD="NO",
  SEARCH="local.domain",
  TARGET="hdb",

TEMPLATE="PFZNPjxJRD4xMTg8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1
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wPC9MQ01fU1RBVEU+PFJFU0NIRUQ+MDwvUkVTQ0hFRD48U1RJTUU+MTM4NjExMzI1ODwvU1RJTUU+PEVUSU1FPjA8L0VUSU1FPjxE
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W0ludGVybmV0IExBTl1dPjwvTkVUV09SSz48TkVUV09SS19JRD48IVtDREFUQVswXV0+PC9ORVRXT1JLX0lEPjxOSUNfSUQ+PCFbQ
0RBVEFbMF1dPjwvTklDX0lEPjxXTEFOPjwhW0NEQVRBW05PXV0+PC9WTEFOPjwvTklDPjxOSUNfSUQ+PCFbQ0RBVEFbZmU4MDo6NDA
wOmMwZmY6ZmVhODo3ZjAxXV0+PC9JUDZfTElOSz48TUFDPjwhW0NEQVRBWzAyOjAwOmMwOmE4OjdmOjAxXV0+PC9NQUM+PE5FVFdP
Uks+PCFbQ0RBVEFbUlRWTEFON11dPjwvTkVUV09SSz48TkVUV09SS19JRD48IVtDREFUQVszXV0+PC9ORVRXT1JLX0lEPjxOSUNfS
UQ+PCFbQ0RBVEFbMV1dPjwvTklDX0lEPjxQSFlERVY+PCFbQ0RBVEFbZXRoMl1dPjwvUEhZREVWPjxWTEFOPjwhW0NEQVRBW1lFU1
1dPjwvVkxBTj48VkxBTl9JRD48IVtDREFUQVs3XV0+PC9WTEFOX0lEPjwvTklDPjxOSUNfSUQ+PCFbQ0RBVEFbMV1dPjwvTklDX0l
D48L0FSQ0g+PEJPT1Q+PCFbQ0RBVEFbaGRdXT48L0JPT1Q+PC9PUz48VEVNUExBVEVfSUQ+PCFbQ0RBVEFbNl1dPjwvVEVNUExBVEVf
SUQ+PFZNSUQ+PCFbQ0RBVEFbMTE4XV0+PC9WTUlEPjwvVEVNUExBVEU+PFFVTRVJfVEVNUExBVEU+PEZFQVRVUkVTPjxBQ1BJPjwhW
0NEQVRBW3llc11dPjwvQUNQST48L0ZFQVRVUkVTPjxHUkFQSElDUz48TElTVEVOPjwhW0NEQVRBWzAuMC4wLjBdXT48L0xJU1RFTj
48VFlQRT48IVtDREFUQVtWTkNdXT48L1RZUEU+PC9HUkFQSElDUz48L1VTRVJfVEVNUExBVEU+PEhJU1RPUllfUkVDT1JEUy8+PC9
WTT4="]
CPU="0.2"
FEATURES=[
  ACPI="yes"]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6018",
  TYPE="VNC"]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd"]
TEMPLATE_ID="6"
VMID="118"
[oneadmin@one-admin template_files]$ onevm show 119
VIRTUAL MACHINE 119 INFORMATION
ID   : 119

```
NAME                : tty_vlan7_inside_1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node3
START TIME          : 12/04 00:30:23
END TIME            : -
DEPLOY ID           : one-119

VIRTUAL MACHINE MONITORING
USED MEMORY         : 64M
NET_RX              : 8K
USED CPU            : 18
NET_TX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    ttylinux - kvm                     file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.69  02:00:c0:a8:7d:45
                                           fe80::400:c0ff:fea8:7d45
  1 RTVLAN7               yes brhm7        192.168.127.2   02:00:c0:a8:7f:02
                                           fe80::400:c0ff:fea8:7f02

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION          REAS           START        TIME     PROLOG
  0 one-node3       none            none  12/04 00:30:42   0d 00h04m   0h00m05s

VIRTUAL MACHINE TEMPLATE
CPU="0.1"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6019",
  TYPE="VNC" ]
```

```
MEMORY="64"
TEMPLATE_ID="9"
VMID="119"
```

Vamos a probarlo. Primero con la máquina virtual:

```
[root@one-node3 ~]# ping 192.168.125.69
PING 192.168.125.69 (192.168.125.69) 56(84) bytes of data.
64 bytes from 192.168.125.69: icmp_seq=1 ttl=64 time=9.69 ms
64 bytes from 192.168.125.69: icmp_seq=2 ttl=64 time=0.768 ms
64 bytes from 192.168.125.69: icmp_seq=3 ttl=64 time=0.486 ms
64 bytes from 192.168.125.69: icmp_seq=4 ttl=64 time=0.491 ms
64 bytes from 192.168.125.69: icmp_seq=5 ttl=64 time=0.265 ms
64 bytes from 192.168.125.69: icmp_seq=6 ttl=64 time=0.341 ms
64 bytes from 192.168.125.69: icmp_seq=7 ttl=64 time=0.353 ms
```

Ahora con el router:

```
[root@one-node1 ~]# ping 192.168.125.68
PING 192.168.125.68 (192.168.125.68) 56(84) bytes of data.
64 bytes from 192.168.125.68: icmp_seq=1 ttl=64 time=20.5 ms
64 bytes from 192.168.125.68: icmp_seq=2 ttl=64 time=0.711 ms
64 bytes from 192.168.125.68: icmp_seq=3 ttl=64 time=0.535 ms
64 bytes from 192.168.125.68: icmp_seq=4 ttl=64 time=0.516 ms
64 bytes from 192.168.125.68: icmp_seq=5 ttl=64 time=0.477 ms
^C
--- 192.168.125.68 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4297ms
rtt min/avg/max/mdev = 0.477/4.550/20.514/7.982 ms
```

Vaya!!! ahora si que responde a ping. Igual era por el tema del ACPI, o que necesitaba más memoria; a saber. Exploramos los puertos que tiene el router abiertos en la parte pública:

```
[root@one-node1 ~]# nmap -sT 192.168.125.68

Starting Nmap 5.51 ( http://nmap.org ) at 2013-12-04 00:40 CET
Nmap scan report for 192.168.125.68
Host is up (0.011s latency).
Not shown: 998 closed ports
PORT     STATE    SERVICE
22/tcp   open     ssh
2222/tcp filtered EtherNet/IP-1
MAC Address: 02:00:C0:A8:7D:44 (Unknown)

Nmap done: 1 IP address (1 host up) scanned in 2.53 seconds
```

Vemos que permite el SSH y el port forwarding. Probamos a entrar, a ver si nos funciona el utilizar la clave pública de oneadmin:

```
[root@one-node1 ~]# su - oneadmin
[oneadmin@one-node1 ~]$ ssh root@192.168.125.68
The authenticity of host '192.168.125.68 (192.168.125.68)' can't be established.
RSA key fingerprint is aa:b2:85:2f:9f:17:37:ec:90:3e:12:d7:d0:a8:4c:7d.
```

```
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.125.68' (RSA) to the list of known hosts.
root@192.168.125.68's password:
Permission denied, please try again.
root@192.168.125.68's password:
Permission denied, please try again.
root@192.168.125.68's password:
Permission denied (publickey,password,keyboard-interactive).
```

Pues no, no nos ha funcionado. Probaremos a hacerlo de otra forma más tarde. Ahora vamos a probar el tema del interfaz interno. Para ello tenemos que acceder desde la otra máquina virtual, cuyo interfaz privado se encuentra en la misma VLAN que la del router.

```
[root@one-node3 ~]# ssh root@192.168.125.69
The authenticity of host '192.168.125.69 (192.168.125.69)' can't be established.
RSA key fingerprint is 5b:d6:3a:a9:8a:53:21:66:70:0c:b7:26:34:45:b1:27.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.125.69' (RSA) to the list of known hosts.
root@192.168.125.69's password:

Chop wood, carry water.

# ping 192.168.127.1
PING 192.168.127.1 (192.168.127.1): 56 data bytes
64 bytes from 192.168.127.1: seq=0 ttl=64 time=6.828 ms
64 bytes from 192.168.127.1: seq=1 ttl=64 time=2.027 ms
64 bytes from 192.168.127.1: seq=2 ttl=64 time=1.503 ms
64 bytes from 192.168.127.1: seq=3 ttl=64 time=1.632 ms
64 bytes from 192.168.127.1: seq=4 ttl=64 time=1.577 ms
64 bytes from 192.168.127.1: seq=5 ttl=64 time=1.274 ms
64 bytes from 192.168.127.1: seq=6 ttl=64 time=1.495 ms
64 bytes from 192.168.127.1: seq=7 ttl=64 time=1.546 ms

--- 192.168.127.1 ping statistics ---
8 packets transmitted, 8 packets received, 0% packet loss
round-trip min/avg/max = 1.274/2.235/6.828 ms
```

Pues si, ha funcionado. Probamos con la otra máquina virtual, que ya se encontraba en la VLAN 7:

```
# ping 192.168.127.3
PING 192.168.127.3 (192.168.127.3): 56 data bytes
64 bytes from 192.168.127.3: seq=0 ttl=64 time=7.809 ms
64 bytes from 192.168.127.3: seq=1 ttl=64 time=1.520 ms
64 bytes from 192.168.127.3: seq=2 ttl=64 time=1.469 ms
64 bytes from 192.168.127.3: seq=3 ttl=64 time=1.317 ms
64 bytes from 192.168.127.3: seq=4 ttl=64 time=0.758 ms
64 bytes from 192.168.127.3: seq=5 ttl=64 time=1.258 ms
```

```
--- 192.168.127.3 ping statistics ---
6 packets transmitted, 6 packets received, 0% packet loss
round-trip min/avg/max = 0.758/2.355/7.809 ms
```

Vamos a probar a entrar en esa máquina, para ver si desde ella tenemos acceso al exterior a través del router:

```
# ssh root@192.168.127.3
Host '192.168.127.3' is not in the trusted hosts file.
(fingerprint md5 5b:d6:3a:a9:8a:53:21:66:70:0c:b7:26:34:45:b1:27)
Do you want to continue connecting? (y/n) yes
root@192.168.127.3's password:

Chop wood, carry water.

# who
USER       TTY      IDLE      TIME            HOST
root       pts/0    00:00     Dec  3 23:48:38 192.168.127.2
# netstat -nr
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
192.168.127.0   0.0.0.0         255.255.255.0   U         0 0          0 eth0
0.0.0.0         192.168.127.1   0.0.0.0         UG        0 0          0 eth0
# ping 192.168.127.1
PING 192.168.127.1 (192.168.127.1): 56 data bytes
64 bytes from 192.168.127.1: seq=0 ttl=64 time=7.218 ms
64 bytes from 192.168.127.1: seq=1 ttl=64 time=1.911 ms
64 bytes from 192.168.127.1: seq=2 ttl=64 time=1.563 ms

--- 192.168.127.1 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 1.563/3.564/7.218 ms

# ping 192.100.0.250
PING 192.100.0.250 (192.100.0.250): 56 data bytes
64 bytes from 192.100.0.250: seq=0 ttl=251 time=13.912 ms
64 bytes from 192.100.0.250: seq=1 ttl=251 time=15.121 ms
64 bytes from 192.100.0.250: seq=2 ttl=251 time=13.529 ms
64 bytes from 192.100.0.250: seq=3 ttl=251 time=21.527 ms
64 bytes from 192.100.0.250: seq=4 ttl=251 time=17.006 ms
64 bytes from 192.100.0.250: seq=5 ttl=251 time=12.026 ms
64 bytes from 192.100.0.250: seq=6 ttl=251 time=13.481 ms
64 bytes from 192.100.0.250: seq=7 ttl=251 time=13.673 ms
64 bytes from 192.100.0.250: seq=8 ttl=251 time=14.269 ms
64 bytes from 192.100.0.250: seq=9 ttl=251 time=14.198 ms
64 bytes from 192.100.0.250: seq=10 ttl=251 time=13.586 ms
64 bytes from 192.100.0.250: seq=11 ttl=251 time=12.040 ms
```

```
64 bytes from 192.100.0.250: seq=12 ttl=251 time=16.976 ms


--- 192.100.0.250 ping statistics ---
13 packets transmitted, 13 packets received, 0% packet loss
round-trip min/avg/max = 12.026/14.718/21.527 ms
```

Pues si, el router hace bien su papel, aunque como las máquinas virtuales están todas emuladas, y no usamos el virtIO en los interfaces de red, la latencia se nota, con un par de milisegundos más que cuando lo hacemos desde la máquina física:

```
[root@Testit ~]# ping 192.100.0.250
PING 192.100.0.250 (192.100.0.250) 56(84) bytes of data.
64 bytes from 192.100.0.250: icmp_seq=1 ttl=254 time=12.0 ms
64 bytes from 192.100.0.250: icmp_seq=2 ttl=254 time=12.2 ms
64 bytes from 192.100.0.250: icmp_seq=3 ttl=254 time=8.97 ms
64 bytes from 192.100.0.250: icmp_seq=4 ttl=254 time=11.8 ms
64 bytes from 192.100.0.250: icmp_seq=5 ttl=254 time=12.1 ms
64 bytes from 192.100.0.250: icmp_seq=6 ttl=254 time=13.1 ms
64 bytes from 192.100.0.250: icmp_seq=7 ttl=254 time=13.3 ms
64 bytes from 192.100.0.250: icmp_seq=8 ttl=254 time=15.8 ms
^C
--- 192.100.0.250 ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7491ms
rtt min/avg/max/mdev = 8.970/12.461/15.885/1.795 ms
[root@Testit ~]#
```

Ahora tenemos que conseguir poder entrar en el router, bien a través de un password conocido, o bien a través de la clave pública. Vamos a probar de las dos formas:

- Según este link: http://opennebula.org/documentation:archives:rel4.2:router
- Podemos definir directamente la clave pública a través de la variable ROOT_PUBKEY, bien la password directamente encriptada mediante el comando openssl passwd -1 en la variable ROOT_PASSWORD.

Nosotros probaremos ambos caminos. Primero probaremos con el tema de la clave pública. Esto es lo que tenemos como clave pública para el usuario oneadmin:

```
ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin
```

Vamos a modificar la plantilla e incluirlo, a ver si se lo traga.

```
[oneadmin@one-admin template_files]$ more router_vlan7.tmpl
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
```

```
  TYPE="VNC" ]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
FEATURES=[
  ACPI="yes" ]

NIC = [ NETWORK="Internet LAN" ]
NIC = [
  NETWORK="RTVLAN7",
  IP="192.168.127.1" ]

CONTEXT=[
  TARGET         = "hdb",
  NETWORK        = "YES",
  SSH_PUBLIC_KEY = "ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  PRIVNET        = "$NETWORK[TEMPLATE, NETWORK=\"RTVLAN7\"]",
  PUBNET         = "$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  TEMPLATE       = "$TEMPLATE",
  DHCP           = "NO",
  RADVD          = "NO",
  DNS            = "8.8.4.4 8.8.8.8",
  SEARCH         = "local.domain",
  FORWARDING     = "2222:192.168.127.2:22" ]
[oneadmin@one-admin template_files]$ onetemplate update 6 router_vlan7.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 6
TEMPLATE 6 INFORMATION
ID             : 6
NAME           : routervlan7
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/02 16:47:34

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CONTEXT=[
```

```
  DHCP="NO",
  DNS="8.8.4.4 8.8.8.8",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",
  PRIVNET="$NETWORK[TEMPLATE, NETWORK=\"RTVLAN7\"]",
  PUBNET="$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  RADVD="NO",
  SEARCH="local.domain",
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  TARGET="hdb",
  TEMPLATE="$TEMPLATE" ]
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
FEATURES=[
  ACPI="yes" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="512"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  IP="192.168.127.1",
  NETWORK="RTVLAN7" ]
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
```

Ahora matamos el router actual, a ver que ocurre:

```
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   18     64M one-node2   41d 09h09
    71 oneadmin oneadmin tty1 2 NICs     runn   10     64M one-node2   41d 09h09
   117 oneadmin oneadmin tty_vlan7_1     runn   13     64M one-node4    0d 07h32
   118 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    0d 01h11
   119 oneadmin oneadmin tty_vlan7_insid runn   14     64M one-node3    0d 01h08
[oneadmin@one-admin template_files]$ onevm delete 118
[oneadmin@one-admin template_files]$ onetemplate instantiate 6 --name "router_vlan7_1"
VM ID: 120
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
```

```
    70 oneadmin oneadmin tty0 2 NICs      runn    8     64M one-node2   41d 09h11
    71 oneadmin oneadmin tty1 2 NICs      runn    6     64M one-node2   41d 09h11
   117 oneadmin oneadmin tty_vlan7_1      runn   12     64M one-node4    0d 07h34
   119 oneadmin oneadmin tty_vlan7_insid  runn    8     64M one-node3    0d 01h10
   120 oneadmin oneadmin router_vlan7_1   runn   99    512M one-node1    0d 00h01
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs      runn   17     64M one-node2   41d 09h21
    71 oneadmin oneadmin tty1 2 NICs      runn   13     64M one-node2   41d 09h21
   117 oneadmin oneadmin tty_vlan7_1      runn   15     64M one-node4    0d 07h44
   119 oneadmin oneadmin tty_vlan7_insid  runn   16     64M one-node3    0d 01h19
   120 oneadmin oneadmin router_vlan7_1   runn    0    512M one-node1    0d 00h11
[oneadmin@one-admin template_files]$ onevm show 120
VIRTUAL MACHINE 120 INFORMATION
ID                  : 120
NAME                : router_vlan7_1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node1
START TIME          : 12/04 01:39:09
END TIME            : -
DEPLOY ID           : one-120

VIRTUAL MACHINE MONITORING
NET_RX              : 20K
NET_TX              : 0K
USED MEMORY         : 512M
USED CPU            : 0

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                               TYPE SAVE SAVE_AS
  0 hda    OpenNebula 4.2 Virtual Router       file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.70  02:00:c0:a8:7d:46
                                           fe80::400:c0ff:fea8:7d46
```

```
  1 RTVLAN7              yes brhm7        192.168.127.1   02:00:c0:a8:7f:01
                                          fe80::400:c0ff:fea8:7f01


VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION          REAS          START        TIME     PROLOG
  0 one-node1       none            none  12/04 01:39:12   0d 00h11m   0h00m17s

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DHCP="NO",
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.70",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  ETH1_IP="192.168.127.1",
  ETH1_MASK="255.255.255.0",
  ETH1_NETWORK="192.168.127.0/24",
  FORWARDING="2222:192.168.127.2:22",
  NETWORK="YES",

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```

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SEARCH="local.domain",

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TARGET="hdb",

TEMPLATE="PFZNPjxJRD4xMjA8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1
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WTT4="]

CPU="0.2"

FEATURES=[

ACPI="yes"]

GRAPHICS=[

LISTEN="0.0.0.0",

PORT="6020",

TYPE="VNC"]

MEMORY="512"

OS=[

ARCH="x86_64",

BOOT="hd"]

TEMPLATE_ID="6"

```
VMID="120"
```

Parece que ahora si que ha cogido bien el parámetro de la clave pública. Vamos a probarlo, sabiendo que se encuentra en el host1:

```
[oneadmin@one-node1 ~]$ ping 192.168.125.70
PING 192.168.125.70 (192.168.125.70) 56(84) bytes of data.
64 bytes from 192.168.125.70: icmp_seq=1 ttl=64 time=9.23 ms
64 bytes from 192.168.125.70: icmp_seq=2 ttl=64 time=0.635 ms
64 bytes from 192.168.125.70: icmp_seq=3 ttl=64 time=0.514 ms
^C
--- 192.168.125.70 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2937ms
rtt min/avg/max/mdev = 0.514/3.460/9.231/4.081 ms
[oneadmin@one-node1 ~]$ ssh root@192.168.125.70
The authenticity of host '192.168.125.70 (192.168.125.70)' can't be established.
RSA key fingerprint is aa:b2:85:2f:9f:17:37:ec:90:3e:12:d7:d0:a8:4c:7d.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.125.70' (RSA) to the list of known hosts.
Welcome to Alpine!

The Alpine Wiki contains a large amount of how-to guides and general
information about administrating Alpine systems.
See <http://wiki.alpinelinux.org>.

You may change this message by editing /etc/motd.

localhost:~#
```

Bien! Ahora si que ha funcionado sin problemas. Ya estamos dentro del router, y podemos ver los procesos, etc...

```
localhost:~# uname -a
Linux localhost 3.6.11-grsec #16-Alpine SMP Fri Apr 12 13:51:59 UTC 2013 i686 Linux
localhost:~# ifconfig
eth0      Link encap:Ethernet  HWaddr 02:00:C0:A8:7D:46
          inet addr:192.168.125.70  Bcast:0.0.0.0  Mask:255.255.255.0
          inet6 addr: fe80::c0ff:fea8:7d46/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:93 errors:0 dropped:0 overruns:0 frame:0
          TX packets:72 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:9153 (8.9 KiB)  TX bytes:9445 (9.2 KiB)

eth1      Link encap:Ethernet  HWaddr 02:00:C0:A8:7F:01
          inet addr:192.168.127.1  Bcast:0.0.0.0  Mask:255.255.255.0
          inet6 addr: fe80::c0ff:fea8:7f01/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:35 errors:0 dropped:0 overruns:0 frame:0
```

```
          TX packets:6 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:1792 (1.7 KiB)  TX bytes:468 (468.0 B)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

localhost:~# iptables-save
# Generated by iptables-save v1.4.16.3 on Wed Dec  4 00:55:34 2013
*filter
:INPUT ACCEPT [41:2948]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [26:2552]
COMMIT
# Completed on Wed Dec  4 00:55:34 2013
# Generated by iptables-save v1.4.16.3 on Wed Dec  4 00:55:34 2013
*nat
:PREROUTING ACCEPT [3:176]
:INPUT ACCEPT [3:176]
:OUTPUT ACCEPT [2:157]
:POSTROUTING ACCEPT [0:0]
-A PREROUTING -p tcp -m tcp --dport 2222 -j DNAT --to-destination 192.168.127.2:22
-A POSTROUTING -o eth0 -j MASQUERADE
COMMIT
# Completed on Wed Dec  4 00:55:34 2013
```

Vemos que tiene configuradas las reglas de forwarding y el NAT. En cuanto a procesos, lo vemos muy ligerito, y necesita menos de 100M de RAM:

```
localhost:~# free
             total         used         free       shared      buffers
Mem:        514616        28292       486324            0         1348
-/+ buffers:              26944       487672
Swap:            0            0            0
localhost:~# netstat -ale
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:ssh             0.0.0.0:*               LISTEN
tcp        0      0 192.168.125.70:ssh      192.168.125.1:57385     ESTABLISHED
tcp        0      0 :::ssh                  :::*                    LISTEN
Active UNIX domain sockets (servers and established)
```

```
Proto RefCnt Flags       Type       State         I-Node Path
unix  4      [ ]         DGRAM                    3232 /dev/log
unix  2      [ ]         DGRAM                    3271
unix  2      [ ]         DGRAM                    3400
```

Quizás fuera por eso que no nos funcionaba la máquina la primera vez (también podría ser el ACPI). En el entorno en producción, tendremos que tener cuidado de activar el módulo virtio sobre los interfaces de red del router. Comprobamos cómo ha configurado los datos de la contextualización:

```
localhost:/etc# more resolv.conf
search local.domain
nameserver 8.8.4.4
nameserver 8.8.8.8
localhost:~/.ssh# ls -l
total 1
-rw-------    1 root     root           607 Dec  4 00:40 authorized_keys
localhost:~/.ssh# more authorized_keys
ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
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Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin
```

Tendremos que seguir probando el tema de meter la password, porque nos hará falta para contextualizar las máquinas virtuales. Ahora vamos a probar a crear otra instancia de router y vamos a asignar un /21 como red privada.

```
[oneadmin@one-admin template_files]$ more router_vlan8.net
NAME = "RTVLAN8"
TYPE = "RANGED"
PHYDEV = "eth2"
VLAN = "YES"
VLAN_ID = 8
BRIDGE  = "brhm8"

NETWORK_ADDRESS = "192.168.128.0/21"
[oneadmin@one-admin template_files]$ more priv_vlan8.net
NAME = "VLAN8"
TYPE = "RANGED"
PHYDEV = "eth2"
VLAN = "YES"
VLAN_ID = 8
BRIDGE  = "brhm8"

NETWORK_ADDRESS = "192.168.128.0/21"
GATEWAY = "192.168.128.1"
DNS = "192.168.128.1"
```

```
IP_START = "192.168.128.1"
IP_END = "192.168.135.254"
[oneadmin@one-admin template_files]$ more router_vlan8.tmpl
CPU="0.2"
DISK=[
  IMAGE_ID="1" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
FEATURES=[
  ACPI="yes" ]

NIC = [ NETWORK="Internet LAN" ]
NIC = [
  NETWORK="RTVLAN8",
  IP="192.168.128.1" ]

CONTEXT=[
  TARGET         = "hdb",
  NETWORK        = "YES",
  SSH_PUBLIC_KEY = "ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  PRIVNET        = "$NETWORK[TEMPLATE, NETWORK=\"RTVLAN8\"]",
  PUBNET         = "$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  TEMPLATE       = "$TEMPLATE",
  DHCP           = "NO",
  RADVD          = "NO",
  DNS            = "8.8.4.4 8.8.8.8",
  SEARCH         = "local.domain",
  FORWARDING     = "2222:192.168.128.2:22" ]
[oneadmin@one-admin template_files]$ more tty_public8.tmpl
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
```

```
FEATURES=[
  ACPI="no" ]
NIC = [ NETWORK="Internet LAN" ]
NIC = [ NETWORK="RTVLAN8" ]
# Ahora vamos provisionando las plantillas.
[oneadmin@one-admin template_files]$ onevnet create router_vlan8.net
ID: 4
[oneadmin@one-admin template_files]$ onevnet create priv_vlan8.net
ID: 5
[oneadmin@one-admin template_files]$ onevnet list
  ID USER         GROUP        NAME            CLUSTER      TYPE BRIDGE   LEASES
   0 oneadmin     oneadmin     Internet LAN    -               R virbr0        4
   1 oneadmin     oneadmin     VLAN6           -               R brhm6         2
   2 oneadmin     oneadmin     VLAN7           -               R brhm7         1
   3 oneadmin     oneadmin     RTVLAN7         -               R brhm7         2
   4 oneadmin     oneadmin     RTVLAN8         -               R brhm8         0
   5 oneadmin     oneadmin     VLAN8           -               R brhm8         0
[oneadmin@one-admin template_files]$ onevnet show 4
VIRTUAL NETWORK 4 INFORMATION
ID             : 4
NAME           : RTVLAN8
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : brhm8
VLAN           : Yes
PHYSICAL DEVICE: eth2
VLAN ID        : 8
USED LEASES    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

VIRTUAL NETWORK TEMPLATE
NETWORK_ADDRESS="192.168.128.0/21"
NETWORK_MASK="255.255.248.0"

RANGE
IP_START       : 192.168.128.1
IP_END         : 192.168.135.254

VIRTUAL MACHINES
```

```
[oneadmin@one-admin template_files]$ onevnet show 5
VIRTUAL NETWORK 5 INFORMATION
ID             : 5
NAME           : VLAN8
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : RANGED
BRIDGE         : brhm8
VLAN           : Yes
PHYSICAL DEVICE: eth2
VLAN ID        : 8
USED LEASES    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

VIRTUAL NETWORK TEMPLATE
DNS="192.168.128.1"
GATEWAY="192.168.128.1"
NETWORK_ADDRESS="192.168.128.0/21"
NETWORK_MASK="255.255.248.0"

RANGE
IP_START       : 192.168.128.1
IP_END         : 192.168.135.254

VIRTUAL MACHINES

[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                 10/20 00:31:36
   1 oneadmin        oneadmin        tty public                   10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                  10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4         10/22 01:10:12
   4 oneadmin        oneadmin        tty public 2 NICs nodes 3 4  10/22 11:27:40
   5 oneadmin        oneadmin        tty 2 NICs                   10/23 17:24:04
   6 oneadmin        oneadmin        routervlan7                  12/02 16:47:34
   8 oneadmin        oneadmin        tty 2 NICs VLAN7             12/03 15:56:57
   9 oneadmin        oneadmin        tty 2NICs VLAN7 inside       12/04 00:22:12
[oneadmin@one-admin template_files]$ onetemplate clone 6 "routervlan8"
ID: 10
```

```
[oneadmin@one-admin template_files]$ onetemplate update 10 router_vlan8.tmpl
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                10/20 00:31:36
   1 oneadmin        oneadmin        tty public                  10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                 10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4        10/22 01:10:12
   4 oneadmin        oneadmin        tty public 2 NICs nodes 3 4 10/22 11:27:40
   5 oneadmin        oneadmin        tty 2 NICs                  10/23 17:24:04
   6 oneadmin        oneadmin        routervlan7                 12/02 16:47:34
   8 oneadmin        oneadmin        tty 2 NICs VLAN7            12/03 15:56:57
   9 oneadmin        oneadmin        tty 2NICs VLAN7 inside      12/04 00:22:12
  10 oneadmin        oneadmin        routervlan8                 12/04 12:39:30
[oneadmin@one-admin template_files]$ onetemplate show 10
TEMPLATE 10 INFORMATION
ID             : 10
NAME           : routervlan8
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/04 12:39:30

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CONTEXT=[
  DHCP="NO",
  DNS="8.8.4.4 8.8.8.8",
  FORWARDING="2222:192.168.128.2:22",
  NETWORK="YES",
  PRIVNET="$NETWORK[TEMPLATE, NETWORK=\"RTVLAN8\"]",
  PUBNET="$NETWORK[TEMPLATE, NETWORK=\"Internet LAN\"]",
  RADVD="NO",
  SEARCH="local.domain",
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  TARGET="hdb",
  TEMPLATE="$TEMPLATE" ]
CPU="0.2"
DISK=[
```

```
  IMAGE_ID="1" ]
FEATURES=[
  ACPI="yes" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="512"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  IP="192.168.128.1",
  NETWORK="RTVLAN8" ]
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
[oneadmin@one-admin template_files]$ onetemplate clone 9 "tty 2NICs VLAN8 inside"
ID: 11
[oneadmin@one-admin template_files]$ onetemplate update 11 tty_public8.tmpl
[oneadmin@one-admin template_files]$ onetemplate show 11
TEMPLATE 11 INFORMATION
ID             : 11
NAME           : tty 2NICs VLAN8 inside
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/04 12:43:06

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  NETWORK="RTVLAN8" ]
```

Actualizamos los permisos en las plantillas para que los usuarios puedan utilizar las máquinas virtuales en esa red:

```
[oneadmin@one-admin ~]$ onetemplate chmod 11 644
[oneadmin@one-admin ~]$ onevnet chmod 5 644
```

Ahora instanciamos el router y una máquina virtual, para ver que tal se comporta todo, especialmente en el lado del router virtual:

```
[oneadmin@one-admin ~]$ onetemplate instantiate 10 --name "router_vlan8_1"
VM ID: 121
[oneadmin@one-admin ~]$ onetemplate instantiate 11 --name "tty_vlan8_inside_1"
VM ID: 122
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node2   42d 00h01
    71 oneadmin oneadmin tty1 2 NICs     runn   11     64M one-node2   42d 00h01
   117 oneadmin oneadmin tty_vlan7_1     runn   43     64M one-node4    0d 22h24
   119 oneadmin oneadmin tty_vlan7_insid runn   18     64M one-node3    0d 16h00
   120 oneadmin oneadmin router_vlan7_1  runn    8    512M one-node1    0d 14h51
   121 oneadmin oneadmin router_vlan8_1  runn    0      0K one-node4    0d 00h00
   122 oneadmin oneadmin tty_vlan8_insid pend    0      0K              0d 00h00
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node2   42d 00h02
    71 oneadmin oneadmin tty1 2 NICs     runn   12     64M one-node2   42d 00h02
   117 oneadmin oneadmin tty_vlan7_1     runn    2     64M one-node4    0d 22h24
   119 oneadmin oneadmin tty_vlan7_insid runn    9     64M one-node3    0d 16h00
   120 oneadmin oneadmin router_vlan7_1  runn   11    512M one-node1    0d 14h51
   121 oneadmin oneadmin router_vlan8_1  runn   96    512M one-node4    0d 00h01
   122 oneadmin oneadmin tty_vlan8_insid runn    0      0K one-node1    0d 00h00
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   16     64M one-node2   42d 00h03
    71 oneadmin oneadmin tty1 2 NICs     runn   12     64M one-node2   42d 00h03
   117 oneadmin oneadmin tty_vlan7_1     runn   13     64M one-node4    0d 22h26
   119 oneadmin oneadmin tty_vlan7_insid runn   16     64M one-node3    0d 16h01
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    0d 14h53
   121 oneadmin oneadmin router_vlan8_1  runn    1    512M one-node4    0d 00h02
   122 oneadmin oneadmin tty_vlan8_insid runn   17     64M one-node1    0d 00h02
[oneadmin@one-admin ~]$ onevm show 121
VIRTUAL MACHINE 121 INFORMATION
ID                  : 121
NAME                : router_vlan8_1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
```

```
RESCHED             : No
HOST                : one-node4
START TIME          : 12/04 16:29:26
END TIME            : -
DEPLOY ID           : one-121

VIRTUAL MACHINE MONITORING
USED CPU            : 0
USED MEMORY         : 512M
NET_RX              : 5K
NET_TX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    OpenNebula 4.2 Virtual Router      file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.71  02:00:c0:a8:7d:47
                                           fe80::400:c0ff:fea8:7d47
  1 RTVLAN8               yes brhm8        192.168.128.1   02:00:c0:a8:80:01
                                           fe80::400:c0ff:fea8:8001

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node4       none             none  12/04 16:29:42   0d 00h02m   0h00m30s

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DHCP="NO",
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.71",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  ETH1_IP="192.168.128.1",
  ETH1_MASK="255.255.248.0",
  ETH1_NETWORK="192.168.128.0/21",
```

```
  FORWARDING="2222:192.168.128.2:22",
  NETWORK="YES",

PRIVNET="PFZORVQ+PElEPjQ8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1F
Pm9uZWFkbWluPC9HTkFNRT48TkFNRT5SVFZMQU44PC9OQU1FPjxQRVJNSVNTSU9OUz48T1dORVJfVT4xPC9PV05FUl9VPjxPV05FU
l9NPjE8L09XTkVSX00+PE9XTkVSX0E+MDwvT1dORVJfQT48R1JPVVBfVT4wPC9HUk9VUF9VPjxHUk9VUF9NPjA8L0dST1VQX00+
dST1VQX0E+MDwvR1JPVVBfQT48T1RIRVJfVT4wPC9PVEhFUl9VPjxPVEhFUl9NPjA8L09USEVSX00+PE9USEVSX0E+MDwvT1RIRVJ
fQT48L1BFUk1JU1NJT05TPjxDTFVTVEVSX0lEPi0xPC9DTFVTVEVSX0lEPjxDTFVTVEVSPjwvQ0xVU1RFUj48VFlQRT4wPC9UWVBF
PjxCUklER0U+YnJobTg8L0JSSURHRT48VkxBTj4xPC9WTEFOPjxQSFlERVY+ZXRoMjwvUEhZREVWPjxWTEFOX0lEPjg8L1ZMQU5fS
UQ+PEdMT0JBTF9QUkVGSVgvPjxTSVRFX1BSRUZJWC8+PFJBTkdFPjxQSFlERVY+ZXRoMjwvUEhZREVWPjxWTEFOX0lEPjg8L1ZMQU5fS
BfRU5EPjE5Mi4xNjguMTM1LjI1NDwvSVBfRU5EPjwvUkFOR0U+PFRPVEFMX0xFQVNFUz4xPC9UT1RBTF9MRUFTRVM+PFRFTVBMQVR
FPjxORVRXT1JLX0FERFJFU1M+PCFbQ0RBVEFbMTkyLjE2OC4xMjguMC8yMV1dPjwvTkVUV09SS19BRERSRVNTPjxORVRXT1JLX01B
U0s+PCFbQ0RBVEFbMjU1LjI1NS4yNDguMF1dPjwvTkVUV09SS19NQVNLPjwvVEVNUExBVEU+PE1BQz4wM
jowMDpjMDphODo4MDowMTwvTUFDPjxJUD4xOTIuMTY4LjEyOC4xPC9JUD48SVA2X0xJTks+ZmU4MDo6NDAwOmMwZmY6ZmVhODo4MD
AxPC9JUDZfTElOSz48VVNFRD4xPC9VU0VEPjxWSUQ+MTIxPC9WSUQ+PC9MRUFTRT48L0xFQVNFUz48L1ZORVQ+",

PUBNET="PFZORVQ+PElEPjA8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1FP
m9uZWFkbWluPC9HTkFNRT48TkFNRT5JbnRlcm5ldCBMQU48L05BTUU+PFBFUk1JU1NJT05TPjxPV05FUl9VPjE8L09XTkVSX1U+PE
9XTkVSX00+MTwvT1dORVJfTT48T1dORVJfQT4wPC9PV05FUl9BPjxHUk9VUF9VPjE8L0dST1VQX1U+PEdST1VQX00+MDwvR1JPVVB
fTT48R1JPVVBfQT4wPC9HUk9VUF9BPjxPVEhFUl9VPjE8L09USEVSX1U+PE9USEVSX00+MDwvT1RIRVJfTT48T1RIRVJfQT4wPC9P
VEhFUl9BPjwvUEVSTUlTU0lPTlM+PENMVVNURVJfSUQ+LTE8L0NMVVNURVJfSUQ+PENMVVNURVI+PC9DTFVTVEVSPjxUWVBFPjA8L
1RZUEU+PEJSSURHRT52aXJicjA8L0JSSURHRT48VkxBTj4wPC9WTEFOPjxQSFlERVYvPjxWTEFOX0lELz48R0xPQkFMX1BSRUZJWC
8+PFNJVEVfUFJFRklYLz48UkFOR0U+PElQX1NUQVJUPjE5Mi4xNjguMTI1LjI8L0lQX1NUQVJUPjxJUF9FTkQ+MTkyLjE2OC4xMjU
uMjU0PC9JUF9FTkQ+PC9SQU5HRT48VE9UQUxfTEVBU0VTPjU8L1RPVEFMX0xFQVNFUz48VEVNUExBVEU+PEROOz48R0xPQkFMX1VT
OTIuMTY4LjEyNS4xXV0+PC9ETlM+PEdBVEVXQVk+PCFbQ0RBVEFbMTkyLjE2OC4xMjUuMV1dPjwvR0FURVdBWT48TkVUV09SS19BR
ERSRVNTPjwhW0NEQVRBWzE5Mi4xNjguMTI1LjAvMjRdXT48L05FVFdPUktfQUREUkVTUz48TkVUV09SS19NQVNLPjwhW0NEQVRBWz
I1NS4yNTUuMjU1LjBdXT48L05FVFdPUktfTUFTSz48L1RFTVBMQVRFPjxMRUFTRVM+PExFQVNFUz48VEVNUExBVEU+PEROOz48R0xQ
6MWQ8L01BQz48SVA+MTkyLjE2OC4xMjUuMjk8L0lQPjxJUDZfTElOSz5mZTgwOjo0MDA6YzBmZjpmZWE4OjdkMWQ8L0lQNl9MSU5L
PjxVU0VEPjE8L1VTRUQ+PFZJRD43MDwvVklEPjwvTEVBU0U+PExFQVNFPjxNQUM+MDI6MDA6YzA6YTg6N2Q6MWU8L01BQz48SVA+M
TkyLjE2OC4xMjUuMzA8L0lQPjxJUDZfTElOSz5mZTgwOjo0MDA6YzBmZjpmZWE4OjdkMWU8L0lQNl9MSU5LPjxVU0VEPjE8L1VTRU
Q+PFZJRD43MTwvVklEPjwvTEVBU0U+PExFQVNFPjxNQUM+MDI6MDA6YzA6YTg6N2Q6NDU8L01BQz48SVA+MTkyLjE2OC4xMjUuNjk
8L0lQPjxJUDZfTElOSz5mZTgwOjo0MDA6YzBmZjpmZWE4OjdkNDU8L0lQNl9MSU5LPjxVU0VEPjE8L1VTRUQ+PFZJRD48L0xFQVNFPjxMRUFTRT48TUFDPjAyOjAwOmMwOmE4OjdkOjQ2PC9NQUM+PElQPjE5Mi4xNjguMTI1LjcwPC9JUD48SVA2X0xJT
ks+ZmU4MDo6NDAwOmMwZmY6ZmVhODo3ZDQ2PC9JUDZfTElOSz48VVNFRD4xPC9VU0VEPjxWSUQ+MTIwPC9WSUQ+PC9MRUFURT48TE
VBU0U+PE1BQz4wMjowMDpjMDphODo3ZDo0NzwvTUFDPjxJUD4xOTIuMTY4LjEyNS43MTwvSVA+PElQNl9MSU5LPmZlODA6OjQwMDp
jMGZmOmZlYTg6N2Q0NzwvSVA2X0xJTks+PFVTRUQ+MTwvVVNFRD48VklEPjEyMTwvVklEPjwvTEVBU0U+PC9MRUFURVM+PC9WTkVU
Pg==",
  RADVD="NO",
  SEARCH="local.domain",
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  TARGET="hdb",

TEMPLATE="PFZNPjxJRD4xMjE8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZG1pbjwvVU5BTUU+PEdOQU1
FPm9uZWFkbWluPC9HTkFNRT48TkFNRT5yb3V0ZXJfdmxhbjhfMTwvTkFNRT48UEVSTUlTU0lPTlM+PE9XTkVSX1U+MTwvT1dORVJf
VT48T1dORVJfTT4xPC9PV05FUl9NPjxPV05FUl9BPjA8L09XTkVSX00+PEdST1VQX1U+MDwvR1JPVVBfTT4wPC9HUk9VUF9NPjxHU
k9VUF9NPjxHUk9VUF9BPjA8L0dST1VQX0E+PE9USEVSX1U+MDwvT1RIRVJfTT4wPC9PVEhFUl9NPjxPVEhFUl9BPjA8L09USEVSX0E+
PC9QRVJNSVNTU9OUz48TEFTVF9QT0xMPjA8L0xBU1RfUE9MTD48TM4NjE3MDk2NjwvU1RJTUU+PEVUSU1FPjA8L0VUSU1FPjxE
RVBMT1lfSUQ+PC9ERVBMT1lfSUQ+PE1FTU9SWT4wPC9NRU1PUlk+PENQVT4wPC9DUFU+PE5FVF9UWD4wPC9ORVRfVFg+PE5FVF9SW
D4wPC9ORVRfUlg+PFRFTVBMQVRFPjxDUFU+PCFbQ0RBVEFbMC4yXV0+PC9DUFU+PERJU0s+PENMT05FPjwhW0NEQVRBW1lfU11dPj
wvQ0xPTkU+PERBVEFTVE9SRT48IVtDREFUQVtkZWZhdWx0XV0+PC9EQVRBU1RPUkU+PERBVEFTVE9SRV9JRD48IVtDREFUQVsxXV0
+PC9EQVRBU1RPUkVfSUQ+PERFVl9QUkVGSVg+PCFbQ0RBVEFbaGRdXT48L0RFVl9QUkVGSVg+PERJU0tfSUQ+PCFbQ0RBVEFbMF1d
PjwvRElTS19JRD48RFJJVkVSPjwhW0NEQVRBW3Jhd11dPjwvRFJJVkVSPjxJTUFHRT48IVtDREFUQVtPcGVuTmVidWxhIDQuMiBWa
XJ0dWFsIFJvdXRlcl1dPjwvSU1BR0U+PElNQUdFX0lEPjwhW0NEQVRBWzFdXT48L0lNQUdFX0lEPjxSRUFET05MWT48IVtDREFUQV
```

tOT11dPjwvUkVBRE9OTFk+PFNBVkU+PCFbQ0RBVEFbTk9dXT48L1NBVkU+PFNPVVJDRT48IVtDREFUQVsvdmFyL2xpYi9vbmUvZGF
0YXN0b3Jlcy8xLzAyZWY0MWM2Zjg0Y2VhMTdhYjI4OTAyMjUxZTcyNjM0XV0+PC9TT1VSQ0U+PFRBUkdFVD48IVtDREFUQVtoZGFd
XT48L1RBUkdFVD48VE1fTUFEPjwhW0NEQVRBW3NoYXJlZF1dPjwvVE1fTUFEPjxUWVBFPjwhW0NEQVRBW0ZJTEVdXT48L1RZUEU+P
C9ESVNLPjxNRU1PUlk+PCFbQ0RBVEFbNTEyXV0+PC9NRU1PUlk+PE5JQz48QlJJREdFPjwhW0NEQVRBW3ZpcmJyMF1dPjwvQlJJRE
dFPjxJUD48IVtDREFUQVsxOTIuMTY4LjEyNS43MV1dPjwvSVA+PElQNl9MSU5LPjwhW0NEQVRBW2ZlODA6OjQwMDpjMGZmOmZlYTg
6N2Q0N11dPjwvSVA2X0xJTks+PE1BQz48IVtDREFUQVswMjowMDpjMDphODo3ZDo0N11dPjwvTUFDPjxORVRXT1JLPjwhW0NEQVRB
W0ludGVybmV0IExBTl1dPjwvTkVUV09SSz48TkVUV09SS19JRD48IVtDREFUQVswXV0+PC9ORVRXT1JLX0lEPjxOSUNfSUQ+PCFbQ
0RBVEFbMF1dPjwvTklDX0lEPjxWTEFOPjwhW0NEQVRBW05PXV0+PC9WTEFOPjwvTklDPjxOSUM+PEJSSURHRT48IVtDREFUQVticm
htOF1dPjwvQlJJREdFPjxJUD48IVtDREFUQVsxOTIuMTY4LjEyOC4xXV0+PC9JUD48SVA2X0xJTks+PCFbQ0RBVEFbZmU4MDo6NDA
wOmMwZmY6ZmVhODo4MDAxXV0+PC9JUDZfTElOSz48TUFDPjwhW0NEQVRBWzAyOjAwOmMwOmE4OjgwOjAxXV0+PC9NQUM+PE5FVFdP
Uks+PCFbQ0RBVEFbUlRWTEFOOF1dPjwvTkVUV09SSz48TkVUV09SS19JRD48IVtDREFUQVs0XV0+PC9ORVRXT1JLX0lEPjxOSUNfS
UQ+PCFbQ0RBVEFbMV1dPjwvTklDX0lEPjxQSFlERVY+PCFbQ0RBVEFbZXRoMl1dPjwvUEhZREVWPjxWTEFOPjwhW0NEQVRBW1lFU1
1dPjwvVkxBTj48VkxBTl9JRD48IVtDREFUQVs4XV0+PC9WTEFOX0lEPjwvTklDPjxUWU0VJDSD48IVtDREFUQVt4ODZfNjRdXT4
8L0FSQ0g+PEJPT1Q+PCFbQ0RBVEFbaGRdXT48L0JPT1Q+PC9PUz48VEVNUExBVEVfSUQ+PCFbQ0RBVEFbMTBdXT48L1RFTVBMQVRF
X0lEPjxWTUlEPjwhW0NEQVRBWzEyMV1dPjwvVk1JRD48L1RFTVBMQVRFPjxVU0VSX1RFTVBMQVRFPjxGRUFUVVJFUz48QUNQST48I
VtDREFUQVt5ZXNdXT48L0FDUEk+PC9GRUFUVVJFUz48R1JBUEhJQ1M+PExJU1RFTj48IVtDREFUQVswLjAuMC4wXV0+PC9MSVNURU
4+PFRZUEU+PCFbQ0RBVEFbVk5DXV0+PC9UWVBFPjwvR1JBUEhJQ1M+PC9VU0VSX1RFTVBMQVRFPjxISVNUT1JZX1JFQ09SRFMvPjw
vVk0+"]
CPU="0.2"
FEATURES=[
  ACPI="yes"]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6021",
  TYPE="VNC"]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd"]
TEMPLATE_ID="10"
VMID="121"
[oneadmin@one-admin ~]$ onevm show 122
VIRTUAL MACHINE 122 INFORMATION
ID   : 122
NAME   : tty_vlan8_inside_1
USER   : oneadmin
GROUP   : oneadmin
STATE   : ACTIVE
LCM_STATE   : RUNNING
RESCHED   : No
HOST   : one-node1
START TIME   : 12/04 16:30:13
END TIME   : -
DEPLOY ID   : one-122

VIRTUAL MACHINE MONITORING
NET_TX   : 0K
USED MEMORY   : 64M
NET_RX   : 5K
USED CPU   : 18

```
PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    ttylinux - kvm                     file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.72  02:00:c0:a8:7d:48
                                           fe80::400:c0ff:fea8:7d48
  1 RTVLAN8               yes brhm8        192.168.128.2   02:00:c0:a8:80:02
                                           fe80::400:c0ff:fea8:8002

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node1       none             none   12/04 16:30:42   0d 00h02m   0h00m10s

VIRTUAL MACHINE TEMPLATE
CPU="0.1"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6022",
  TYPE="VNC" ]
MEMORY="64"
TEMPLATE_ID="11"
VMID="122"
```

Bien, parece que la red interna del router recoge bien el /21 que le hemos configurado, y en teoría deberíamos de poder acceder por SSH a la máquina virtual si esta tuviese la salida por defecto a través del interfaz conectado con la VLAN privada, cosa que en condiciones normales sería lo habitual. Vamos a entrar en el router, y confirmar que la máscara de red en la red interna es la correcta:

```
[root@Testit ~]# ssh one-node4
Last login: Wed Oct 23 17:45:15 2013 from 192.168.123.1
[root@one-node4 ~]# su - oneadmin
[oneadmin@one-node4 ~]$ ssh root@192.168.125.71
The authenticity of host '192.168.125.71 (192.168.125.71)' can't be established.
RSA key fingerprint is aa:b2:85:2f:9f:17:37:ec:90:3e:12:d7:d0:a8:4c:7d.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.125.71' (RSA) to the list of known hosts.
```

```
Welcome to Alpine!

The Alpine Wiki contains a large amount of how-to guides and general
information about administrating Alpine systems.
See <http://wiki.alpinelinux.org>.

You may change this message by editing /etc/motd.

localhost:~# ifconfig
eth0      Link encap:Ethernet  HWaddr 02:00:C0:A8:7D:47
          inet addr:192.168.125.71  Bcast:0.0.0.0  Mask:255.255.255.0
          inet6 addr: fe80::c0ff:fea8:7d47/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:295 errors:0 dropped:0 overruns:0 frame:0
          TX packets:259 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:20487 (20.0 KiB)  TX bytes:39854 (38.9 KiB)

eth1      Link encap:Ethernet  HWaddr 02:00:C0:A8:80:01
          inet addr:192.168.128.1  Bcast:0.0.0.0  Mask:255.255.248.0
          inet6 addr: fe80::c0ff:fea8:8001/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:17 errors:0 dropped:0 overruns:0 frame:0
          TX packets:6 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:938 (938.0 B)  TX bytes:468 (468.0 B)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

localhost:~# netstat -nr
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
0.0.0.0         192.168.125.1   0.0.0.0         UG        0 0          0 eth0
192.168.125.0   0.0.0.0         255.255.255.0   U         0 0          0 eth0
192.168.128.0   0.0.0.0         255.255.248.0   U         0 0          0 eth1
# Generated by iptables-save v1.4.16.3 on Wed Dec  4 15:43:56 2013
*nat
:PREROUTING ACCEPT [2:92]
```

```
:INPUT ACCEPT [2:92]
:OUTPUT ACCEPT [6:432]
:POSTROUTING ACCEPT [0:0]
-A PREROUTING -p tcp -m tcp --dport 2222 -j DNAT --to-destination 192.168.128.2:22
-A POSTROUTING -o eth0 -j MASQUERADE
COMMIT
# Completed on Wed Dec  4 15:43:56 2013
```

Esto tiene buena pinta. Vamos a hacer un ping desde el router a la máquina virtual que se encuentra en el host1:

```
localhost:~# ping 192.168.128.2
PING 192.168.128.2 (192.168.128.2): 56 data bytes
64 bytes from 192.168.128.2: seq=0 ttl=64 time=12.732 ms
64 bytes from 192.168.128.2: seq=1 ttl=64 time=2.341 ms
64 bytes from 192.168.128.2: seq=2 ttl=64 time=2.101 ms
64 bytes from 192.168.128.2: seq=3 ttl=64 time=2.252 ms
64 bytes from 192.168.128.2: seq=4 ttl=64 time=1.478 ms
64 bytes from 192.168.128.2: seq=5 ttl=64 time=1.896 ms
64 bytes from 192.168.128.2: seq=6 ttl=64 time=1.884 ms
64 bytes from 192.168.128.2: seq=7 ttl=64 time=2.069 ms
^C
--- 192.168.128.2 ping statistics ---
8 packets transmitted, 8 packets received, 0% packet loss
round-trip min/avg/max = 1.478/3.344/12.732 ms
```

Recordemos que la latencia en los interfaces de red viene como consecuencia de que todas las máquinas virtuales que corren sobre la maqueta utilizan la emulación por software, por tratarse de virtualización anidada bajo QEMU.

Ahora vamos a trabajar sobre el tema de preparar una imagen desde cero para contextualizarla. Cuando empezamos a montar la maqueta, habíamos preparado varias imágenes "planas" con CentOS 6.4 a 64 bits. Esas imágenes quedaron en formato qcow, y a partir de una de ellas, empezamos a montar todos los servidores virtualizados que componen la nube en la maqueta. Lo podemos ver aquí, en la máquina física de la maqueta:

```
[root@Testit ~]# virsh list --all
 Id    Name                           State
----------------------------------------------------
 7     one-node3                      running
 8     one-node4                      running
 9     one-admin                      running
 12    one-node1                      running
 13    one-node2                      running
 -     centos64_x86_64                shut off
 -     one-admin-clone                shut off
 -     opennebula_frontend            shut off
```

Mientras que las imágenes las tenemos en el directorio /home/libvirtimages/

```
[root@Testit ~]# ll /home/libvirtimages/
total 32433780
```

```
-rwxr-xr-x. 1 root root 42949672960 Oct  5 04:27 centos64_x86_64.img
-rw-r--r--. 1 root root  2967339008 Oct  5 04:54 centos64_x86_64.qcow2
-rwxr-xr-x. 1 root root  3753509376 Oct 20 22:35 one-admin-clone.qcow2
-rwxr-xr-x. 1 qemu qemu  5018222592 Dec  4 18:27 one-admin.qcow2
-rwxr-xr-x. 1 qemu qemu  3839819776 Dec  4 18:27 one-node1.qcow2
-rwxr-xr-x. 1 qemu qemu  3767664640 Dec  4 18:27 one-node2.qcow2
-rwxr-xr-x. 1 qemu qemu  3689611264 Dec  4 18:27 one-node3.qcow2
-rwxr-xr-x. 1 qemu qemu  3745054720 Dec  4 18:27 one-node4.qcow2
-rwxr-xr-x. 1 root root  2967732224 Oct  6 02:14 opennebula_frontend.qcow2
```

La imagen centos64_x86_64.qcow2 es un volcado en formato qcow de la imagen raw contenida en el fichero centos64_x86_64.img. Esta será la imagen que utilizaremos para nuestras máquinas virtuales bajo OpenNebula, una vez sea preparada convenientemente para la contextualización. Como no tenemos más recursos disponibles en la máquina física para poder levantar una máquina más, vamos a apagar uno de los host de OpenNebula:

```
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node2   42d 02h03
    71 oneadmin oneadmin tty1 2 NICs     runn   15     64M one-node2   42d 02h03
   117 oneadmin oneadmin tty_vlan7_1     runn   14     64M one-node4    1d 00h26
   119 oneadmin oneadmin tty_vlan7_insid runn   14     64M one-node3    0d 18h02
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    0d 16h53
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    0d 02h03
   122 oneadmin oneadmin tty_vlan8_insid runn   14     64M one-node1    0d 02h02
```

Decidimos apagar el host one-node3. Antes de ello, migraremos la máquina virtual que tiene en ejecución:

```
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
   8 one-node3       -           1     10 / 100 (10%)  64M / 996.7M (6%) update
   9 one-node4       -           2     30 / 100 (30%) 576M / 996.7M (57% on
  10 one-node1       -           2     30 / 100 (30%) 576M / 996.7M (57% on
  11 one-node2       -           2     20 / 100 (20%) 128M / 996.7M (12% on
[oneadmin@one-admin ~]$ onevm migrate  119 11 --live -v
VM 119: migrating to 11
[oneadmin@one-admin ~]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   19     64M one-node2   42d 02h08
    71 oneadmin oneadmin tty1 2 NICs     runn   13     64M one-node2   42d 02h08
   117 oneadmin oneadmin tty_vlan7_1     runn   14     64M one-node4    1d 00h30
   119 oneadmin oneadmin tty_vlan7_insid runn   15     64M one-node2    0d 18h06
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    0d 16h57
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    0d 02h07
   122 oneadmin oneadmin tty_vlan8_insid runn   18     64M one-node1    0d 02h06
```

Ya está, ahora entramos en el host y lo apagamos.

```
[oneadmin@one-admin ~]$ onehost list
  ID NAME            CLUSTER   RVM      ALLOCATED_CPU      ALLOCATED_MEM STAT
```

```
   8 one-node3       -           0       0 / 100 (0%)    0K / 996.7M (0%) on
   9 one-node4       -           2     30 / 100 (30%) 576M / 996.7M (57% update
  10 one-node1       -           2     30 / 100 (30%) 576M / 996.7M (57% on
  11 one-node2       -           3     30 / 100 (30%) 192M / 996.7M (19% on
[root@Testit ~]# ssh one-node3
Last login: Wed Dec  4 00:36:24 2013 from 192.168.123.1
[root@one-node3 ~]# init 0
[root@one-node3 ~]# Connection to one-node3 closed by remote host.
Connection to one-node3 closed.
```

Y con eso tenemos CPU y memoria suficiente para levantar la máquina que nos interesa. Antes de trabajar con la imagen, vamos a hacer una copia para conservar una imagen base, ya que después de manipularla quedará contextualizada con los paquetes de OpenNebula. Copiamos el fichero /home/libvirtimages/centos64_x86_64.qcow2 en centos64_x86_64.qcow2.backup

```
[root@Testit libvirtimages]# cp centos64_x86_64.qcow2 centos64_x86_64.qcow2.backup
[root@Testit libvirtimages]# ll
total 35384216
-rwxr-xr-x. 1 root root 42949672960 Oct  5 04:27 centos64_x86_64.img
-rw-r--r--. 1 root root  2967339008 Oct  5 04:54 centos64_x86_64.qcow2
-rw-r--r--. 1 root root  2967339008 Dec  5 12:10 centos64_x86_64.qcow2.backup
-rwxr-xr-x. 1 root root  3753509376 Oct 20 22:35 one-admin-clone.qcow2
-rwxr-xr-x. 1 qemu qemu  5065146368 Dec  5 12:10 one-admin.qcow2
-rwxr-xr-x. 1 qemu qemu  3851485184 Dec  5 12:10 one-node1.qcow2
-rwxr-xr-x. 1 qemu qemu  3768057856 Dec  5 12:10 one-node2.qcow2
-rwxr-xr-x. 1 root root  3689742336 Dec  4 18:38 one-node3.qcow2
-rwxr-xr-x. 1 qemu qemu  3745251328 Dec  5 12:10 one-node4.qcow2
-rwxr-xr-x. 1 root root  2967732224 Oct  6 02:14 opennebula_frontend.qcow2
```

Arrancamos la instancia:

```
[root@Testit libvirtimages]# virsh list --all
 Id    Name                           State
----------------------------------------------------
 8     one-node4                      running
 9     one-admin                      running
 12    one-node1                      running
 13    one-node2                      running
 -     centos64_x86_64                shut off
 -     one-admin-clone                shut off
 -     one-node3                      shut off
 -     opennebula_frontend            shut off

[root@Testit libvirtimages]# virsh start centos64_x86_64
Domain centos64_x86_64 started

[root@Testit libvirtimages]# virsh list --all
 Id    Name                           State
```

```
-----------------------------------------------------
 8     one-node4                      running
 9     one-admin                      running
 12    one-node1                      running
 13    one-node2                      running
 14    centos64_x86_64                running
 -     one-admin-clone                shut off
 -     one-node3                      shut off
 -     opennebula_frontend            shut off

[root@Testit libvirtimages]# tail -10 /var/log/messages | grep dnsmasq
Dec  5 12:17:51 localhost dnsmasq-dhcp[2176]: DHCPDISCOVER(virbr0) 192.168.122.55 52:54:00:3e:93:ae
Dec  5 12:17:51 localhost dnsmasq-dhcp[2176]: DHCPOFFER(virbr0) 192.168.122.55 52:54:00:3e:93:ae
Dec  5 12:17:51 localhost dnsmasq-dhcp[2176]: DHCPREQUEST(virbr0) 192.168.122.55 52:54:00:3e:93:ae
Dec  5 12:17:51 localhost dnsmasq-dhcp[2176]: DHCPACK(virbr0) 192.168.122.55 52:54:00:3e:93:ae
```

Como la instalación que hicimos en su día tenía configurado el interfaz eth0 por DHCP, ya conocemos cómo acceder.

```
[root@Testit libvirtimages]# ssh root@192.168.122.55
The authenticity of host '192.168.122.55 (192.168.122.55)' can't be established.
RSA key fingerprint is 3f:d6:b0:75:21:0a:3e:93:53:5a:ee:8e:b9:8a:9e:17.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.122.55' (RSA) to the list of known hosts.
root@192.168.122.55's password:
Last login: Thu Dec  5 12:19:45 2013
/usr/bin/xauth:  creating new authority file /root/.Xauthority
[root@localhost ~]# ifconfig
eth0      Link encap:Ethernet  HWaddr 52:54:00:3E:93:AE
          inet addr:192.168.122.55  Bcast:192.168.122.255  Mask:255.255.255.0
          inet6 addr: fe80::5054:ff:fe3e:93ae/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:3860 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2424 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:4953633 (4.7 MiB)  TX bytes:174691 (170.5 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)
```

Ahora creamos el fichero del repositorio de OpenNebula para instalar el paquete de contextualización.

```
[root@localhost yum.repos.d]# more opennebula.repo
[opennebula]
name=opennebula
baseurl=http://opennebula.org/repo/CentOS/6/stable/x86_64
enabled=1
gpgcheck=0
[root@localhost yum.repos.d]# yum search opennebula
opennebula
| 2.9 kB     00:00
opennebula/primary_db
|  16 kB     00:00
============================================================================== N/S Matched:
opennebula ===============================================================================
opennebula-common.x86_64 : Provides the OpenNebula user
opennebula-context.x86_64 : Configures a Virtual Machine for OpenNebula
opennebula-flow.x86_64 : Manage OpenNebula Services
opennebula-gate.x86_64 : Transfer information from Virtual Machines to OpenNebula
opennebula-java.x86_64 : Java interface to OpenNebula Cloud API
opennebula-node-kvm.x86_64 : Configures an OpenNebula node providing kvm
opennebula-ruby.x86_64 : Provides the OpenNebula Ruby libraries
opennebula-server.x86_64 : Provides the OpenNebula servers
opennebula.x86_64 : Cloud computing solution for Data Center Virtualization
opennebula-ozones.x86_64 : Tool for administering
opennebula-sunstone.x86_64 : Browser based UI and public cloud interfaces.

  Name and summary matches only, use "search all" for everything.
[root@localhost yum.repos.d]# yum info opennebula-context
Available Packages
Name        : opennebula-context
Arch        : x86_64
Version     : 4.2.0
Release     : 1
Size        : 9.4 k
Repo        : opennebula
Summary     : Configures a Virtual Machine for OpenNebula
URL         : http://opennebula.org
License     : Apache
Description : Configures a Virtual Machine for OpenNebula. In particular it configures the
            : udev rules, the network, and runs any scripts provided throught the CONTEXT
            : mechanism.

[root@localhost yum.repos.d]# yum install opennebula-context
Setting up Install Process
Resolving Dependencies
--> Running transaction check
---> Package opennebula-context.x86_64 0:4.2.0-1 will be installed
```

```
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================
================================================================================
 Package                                 Arch                                 Version
Repository                              Size
================================================================================
================================================================================
Installing:
 opennebula-context                      x86_64                               4.2.0-1
opennebula                             9.4 k

Transaction Summary
================================================================================
================================================================================
Install       1 Package(s)

Total download size: 9.4 k
Installed size: 8.9 k
Is this ok [y/N]: y
Downloading Packages:
opennebula-context-4.2.0-1.x86_64.rpm
| 9.4 kB     00:00
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : opennebula-context-4.2.0-1.x86_64
1/1
  Verifying  : opennebula-context-4.2.0-1.x86_64
1/1

Installed:
  opennebula-context.x86_64 0:4.2.0-1

Complete!
[root@localhost yum.repos.d]# rpm -ql opennebula-context
/etc/init.d/vmcontext
/etc/one-context.d/00-network
/etc/one-context.d/01-dns
/etc/one-context.d/02-ssh_public_key
/etc/one-context.d/03-selinux-ssh
/etc/one-context.d/04-mount-swap
/etc/udev/rules.d/75-cd-aliases-generator.rules
/etc/udev/rules.d/75-persistent-net-generator.rules
```

Bien, ahora que ya tenemos la imagen preparada para la contextualización, podemos eliminar el fichero del repositorio.

```
[root@localhost yum.repos.d]# rm opennebula.repo
rm: remove regular file `opennebula.repo'? y
```

Aprovechamos para actualizar la imagen, y con eso ahorramos a los usuarios que tengan que hacerlo cada vez que instancian una nueva máquina.

```
[root@localhost yum.repos.d]# yum update


Transaction Summary
================================================================================================================
================================================================================

Install      13 Package(s)
Upgrade     215 Package(s)

Total download size: 264 M
Is this ok [y/N]: y
```

Comprobamos que el servicio vmcontext quedará activado en el arranque:

```
[root@localhost one-context.d]# chkconfig --list vmcontext
vmcontext       0:off   1:off   2:on    3:on    4:on    5:on    6:off
```

Con esto ya tenemos la imagen preparada para darla de alta en OpenNebula. Reiniciamos la máquina virtual, para confirmar que todo arranca correctamente, incluso fuera del entorno de OpenNebula.

```
[root@localhost one-context.d]# reboot


Broadcast message from root@localhost.localdomain
        (/dev/pts/0) at 13:01 ...


The system is going down for reboot NOW!
[root@localhost one-context.d]# Connection to 192.168.122.55 closed by remote host.
Connection to 192.168.122.55 closed.
```

Al reiniciar la máquina ya no coge la IP por DHCP. Tenemos que entrar por consola para averiguar lo que ha pasado:

```
[root@Testit libvirtimages]# virt-viewer centos64_x86_64
```

Vemos que el fichero /etc/sysconfig/network-scripts/ifcfg-eth0 tiene configuradas unas IPs fijas que no son válidas. Debe de ser porque toma la IP de la MAC, al entrar en funcionamiento el script de contextualización. Para que pueda funcionar fuera de OpenNebula, será necesario desactivar el servicio vmcontext y modificar el fichero de configuración del puerto para que utilice DHCP.

Además, al hacer la actualización, la versión de CentOS ha pasado de 6.4 a 6.5, así que salvaremos la nueva máquina bajo esa etiqueta. Vamos a instalarla como imagen disponible. Para ello tenemos que mover la imagen a un directorio accesible por el servidor oneadmin. Como es una imagen muy grande, usaremos temporalmente el directorio montado con NFS.

```
[root@Testit libvirtimages]# exportfs -v
/home/one/datastores
```

```
               192.168.123.0/24(rw,wdelay,root_squash,no_subtree_check,anonuid=9869,anongid=9869)
[root@Testit libvirtimages]# ll
total 35835036
-rwxr-xr-x. 1 root root 42949672960 Oct  5 04:27 centos64_x86_64.img
-rw-r--r--. 1 root root  3426680832 Dec  5 13:42 centos64_x86_64.qcow2
-rw-r--r--. 1 root root  2967339008 Dec  5 12:10 centos64_x86_64.qcow2.backup
-rwxr-xr-x. 1 root root  3753509376 Oct 20 22:35 one-admin-clone.qcow2
-rwxr-xr-x. 1 qemu qemu  5065932800 Dec  5 15:02 one-admin.qcow2
-rwxr-xr-x. 1 qemu qemu  3852992512 Dec  5 15:01 one-node1.qcow2
-rwxr-xr-x. 1 qemu qemu  3768057856 Dec  5 15:02 one-node2.qcow2
-rwxr-xr-x. 1 root root  3689742336 Dec  4 18:38 one-node3.qcow2
-rwxr-xr-x. 1 qemu qemu  3745251328 Dec  5 15:01 one-node4.qcow2
-rwxr-xr-x. 1 root root  2967732224 Oct  6 02:14 opennebula_frontend.qcow2
```

Vemos que después de haber actualizado el sistema, la imagen resultante ocupa más espacio. Como esta nueva imagen va a ser utilizada como imagen base para el resto de instancias, vamos a recrearla usando el comando qemu-img, el cual eliminará los bloques de disco no utilizados en la copia destino.

```
[root@Testit libvirtimages]# qemu-img info centos64_x86_64.qcow2
image: centos64_x86_64.qcow2
file format: qcow2
virtual size: 40G (42949672960 bytes)
disk size: 3.2G
cluster_size: 65536
[root@Testit libvirtimages]# qemu-img convert -O qcow2 centos64_x86_64.qcow2
/home/one/datastores/centos65_x86_64.qcow2
[root@Testit libvirtimages]# qemu-img info /home/one/datastores/centos65_x86_64.qcow2
image: /home/one/datastores/centos65_x86_64.qcow2
file format: qcow2
virtual size: 40G (42949672960 bytes)
disk size: 3.2G
cluster_size: 65536
[root@Testit libvirtimages]# ll /home/one/datastores/
total 3345624
drwxr-x---. 9 oneadmin oneadmin       4096 Dec  4 16:30 0
drwxr-x---. 2 oneadmin oneadmin       4096 Oct 19 23:58 1
drwxr-xr-x. 2 oneadmin oneadmin       4096 Oct 19 20:18 2
-rw-r--r--. 1 root     root     3426025472 Dec  5 15:23 centos65_x86_64.qcow2
```

Bien, ahora vamos a importar la imagen para ser utilizada por OpenNebula. Los comandos los tenemos que ejecutar desde el servidor one-admin con el usuario oneadmin. Como el directorio datastores está montado sobre NFS, podemos acceder directamente a la imagen recién creada en la máquina física de la maqueta:

```
[oneadmin@one-admin ~]$ ll datastores/
total 3345624
drwxr-x--- 9 oneadmin oneadmin       4096 Dec  4 16:30 0
drwxr-x--- 2 oneadmin oneadmin       4096 Oct 19 23:58 1
drwxr-xr-x 2 oneadmin oneadmin       4096 Oct 19 20:18 2
```

```
-rw-r--r-- 1 root     root     3426025472 Dec  5 15:23 centos65_x86_64.qcow2
```

Vamos a crear una plantilla para importar la imagen. Primero vemos las imágenes disponibles:

```
[oneadmin@one-admin ~]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    5
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
[oneadmin@one-admin ~]$ oneimage show 0
IMAGE 0 INFORMATION
ID             : 0
NAME           : ttylinux - kvm
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : default
TYPE           : OS
REGISTER TIME  : 10/19 23:57:44
PERSISTENT     : No
SOURCE         : /var/lib/one/datastores/1/b09f38dfc1c040db8233fa0f09eb02e6
PATH           : http://marketplace.c12g.com/appliance/4fc76a938fb81d3517000003/download
SIZE           : 40M
STATE          : used
RUNNING_VMS    : 5

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="small image for testing"
DEV_PREFIX="hd"
DRIVER="raw"
MD5="04c7d00e88fa66d9aaa34d9cf8ad6aaa"

VIRTUAL MACHINES

    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node2   42d 23h37
    71 oneadmin oneadmin tty1 2 NICs     runn   11     64M one-node2   42d 23h37
   117 oneadmin oneadmin tty_vlan7_1     runn   16     64M one-node4    1d 22h00
   119 oneadmin oneadmin tty_vlan7_insid runn   13     64M one-node2    1d 15h36
   122 oneadmin oneadmin tty_vlan8_insid runn   12     64M one-node1    0d 23h36
[oneadmin@one-admin ~]$ oneimage show 1
IMAGE 1 INFORMATION
ID             : 1
```

```
NAME           : OpenNebula 4.2 Virtual Router
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : default
TYPE           : OS
REGISTER TIME  : 10/19 23:58:57
PERSISTENT     : No
SOURCE         : /var/lib/one/datastores/1/02ef41c6f84cea17ab28902251e72634
PATH           : http://marketplace.c12g.com/appliance/51f2a09f8fb81d4d19000004/download
SIZE           : 83M
STATE          : used
RUNNING_VMS    : 2

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="Virtual Router"
DEV_PREFIX="hd"
DRIVER="raw"
MD5="78d46f5516c08e0d96a8dc92aa26c838"
SHA1="a2a538027d5f9f9fcbbad6c8adad3f67d2de5242"

VIRTUAL MACHINES

    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    1d 14h27
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    0d 23h37
```

Creamos nuestra plantilla para la importar la imagen qcow2 en el directorio template_files:

```
[oneadmin@one-admin template_files]$ more centos65_x86_64_img.tmpl
NAME          = "CentOS 6.5 qcow2 non per."
PATH          = /var/lib/one/datastores/centos65_x86_64.qcow2
TYPE          = OS
DRIVER        = qcow2
DESCRIPTION   = "CentOS 6.5 64 bits with qcow2 non persistent"
```

Ahora probamos a crear la imagen:

```
[oneadmin@one-admin template_files]$ oneimage create centos65_x86_64_img.tmpl -d "default"
ID: 2
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    5
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   2 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No err     0
```

Nos ha devuelto un error. Vemos lo que ha pasado:

```
[oneadmin@one-admin template_files]$ oneimage show 2
IMAGE 2 INFORMATION
ID             : 2
NAME           : CentOS 6.5 qcow2 non per.
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : default
TYPE           : OS
REGISTER TIME  : 12/05 16:56:32
PERSISTENT     : No
SOURCE         :
PATH           : /var/lib/one/datastores/centos65_x86_64.qcow2
SIZE           : 3.2G
STATE          : err
RUNNING_VMS    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="CentOS 6.5 64 bits with qcow2 non persistent"
DEV_PREFIX="hd"
DRIVER="qcow2"
ERROR="Thu Dec  5 16:56:33 2013 : Error copying image in the datastore: Not allowed to copy image
file /var/lib/one/datastores/centos65_x86_64.qcow2"

VIRTUAL MACHINES
```

Bien, vamos a cambiarle los permisos a la imagen en el host físico donde se encuentra:

```
[root@Testit datastores]# chown oneadmin.oneadmin centos65_x86_64.qcow2
[root@Testit datastores]# ll
total 3345624
drwxr-x---. 9 oneadmin oneadmin       4096 Dec  4 16:30 0
drwxr-x---. 2 oneadmin oneadmin       4096 Oct 19 23:58 1
drwxr-xr-x. 2 oneadmin oneadmin       4096 Oct 19 20:18 2
-rw-r--r--. 1 oneadmin oneadmin 3426025472 Dec  5 15:23 centos65_x86_64.qcow2
```

Volvemos a probar:

```
[oneadmin@one-admin template_files]$ oneimage delete 2
[oneadmin@one-admin template_files]$ oneimage create centos65_x86_64_img.tmpl -d "default"
ID: 3
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
```

```
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    5
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   3 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No err     0
[oneadmin@one-admin template_files]$ oneimage show 3
IMAGE 3 INFORMATION
ID             : 3
NAME           : CentOS 6.5 qcow2 non per.
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : default
TYPE           : OS
REGISTER TIME  : 12/05 17:05:06
PERSISTENT     : No
SOURCE         :
PATH           : /var/lib/one/datastores/centos65_x86_64.qcow2
SIZE           : 3.2G
STATE          : err
RUNNING_VMS    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="CentOS 6.5 64 bits with qcow2 non persistent"
DEV_PREFIX="hd"
DRIVER="qcow2"
ERROR="Thu Dec  5 17:05:06 2013 : Error copying image in the datastore: Not allowed to copy image
file /var/lib/one/datastores/centos65_x86_64.qcow2"

VIRTUAL MACHINES
```

Lo mismo: no se deja. Pero nosotros comprobamos que no hay problemas de permisos para copiar la imagen:

```
[oneadmin@one-admin ~]$ cd datastores/
[oneadmin@one-admin datastores]$ ll
total 3345624
drwxr-x--- 9 oneadmin oneadmin       4096 Dec  4 16:30 0
drwxr-x--- 2 oneadmin oneadmin       4096 Oct 19 23:58 1
drwxr-xr-x 2 oneadmin oneadmin       4096 Oct 19 20:18 2
-rw-r--r-- 1 oneadmin oneadmin 3426025472 Dec  5 15:23 centos65_x86_64.qcow2
[oneadmin@one-admin datastores]$ cp centos65_x86_64.qcow2 centos65_x86_64.qcow2.backup
[oneadmin@one-admin datastores]$ ll
total 6686012
```

```
drwxr-x--- 9 oneadmin oneadmin       4096 Dec  4 16:30 0
drwxr-x--- 2 oneadmin oneadmin       4096 Oct 19 23:58 1
drwxr-xr-x 2 oneadmin oneadmin       4096 Oct 19 20:18 2
-rw-r--r-- 1 oneadmin oneadmin 3426025472 Dec  5 15:23 centos65_x86_64.qcow2
-rw-r--r-- 1 oneadmin oneadmin 3426025472 Dec  5 17:13 centos65_x86_64.qcow2.backup
```

Vemos cómo están los datastores definidos:

```
[oneadmin@one-admin template_files]$ onedatastore list
  ID NAME                SIZE AVAIL CLUSTER      IMAGES TYPE DS       TM
   0 system                 - -     -                 0 sys  -        shared
   1 default           404.9G 85%   -                 2 img  fs       shared
   2 files             404.9G 85%   -                 0 fil  fs       ssh
```

Miramos los logs (fichero /var/log/oned.log) , y encontramos la respuesta:

```
Thu Dec  5 17:18:07 2013 [ReM][D]: Req:3760 UID:0 DatastorePoolInfo invoked
Thu Dec  5 17:18:07 2013 [ReM][D]: Req:3760 UID:0 DatastorePoolInfo result SUCCESS,
"<DATASTORE_POOL><DAT..."
Thu Dec  5 17:18:07 2013 [ReM][D]: Req:4400 UID:0 ImageAllocate invoked, "NAME          = "Cen...", 1
Thu Dec  5 17:18:07 2013 [ImM][I]: Copying /var/lib/one/datastores/centos65_x86_64.qcow2 to
repository for image 4
Thu Dec  5 17:18:07 2013 [ReM][D]: Req:4400 UID:0 ImageAllocate result SUCCESS, 4
Thu Dec  5 17:18:07 2013 [ImM][I]: Command execution fail: /var/lib/one/remotes/datastore/fs/cp
PERTX0RSSVZFUl9BQ1RJT05fREFUQT48SU1BR0U+PElEPjQ8L0lEPjxVSUQ+MDwvVUlEPjxHSUQ+MDwvR0lEPjxVTkFNRT5vbmVhZ
G1pbjwvVU5BTUU+PEdOQU1FPm9uZWFkbWluPC9HTkFNRT48TkFNRT5DZW50T1MgNi41IHFjb3cyIG5vbiBwZXIuPC9OQU1FPjxQRV
JNSVNTSU9OUz48T1dORVJfVT4xPC9PV05FUl9VPjxPV05FUl9NPjE8L09XTkVSX00+PE9XTkVSX0E+MDwvT1dORVJfQT48R1JPVVB
fVT4wPC9HUk9VUF9VPjxHUk9VUF9NPjA8L0dST1VQX00+PEdST1VQX0E+MDwvR1JPVVBfQT48T1RIRVJfVT4wPC9PVEhFUl9VPjxP
VEhFUl9NPjA8L09USEVSX00+PE9USEVSX0E+MDwvT1RIRVJfQT48L1BFUk1JU1NJT05TPjxUWVBFPjA8L1RZUEU+PERJU0tfVFlQR
T4wPC9ESVNLX1RZUEU+PFBFUlNJU1RFTlQ+MDwvUEVSU0lTVEVOVD48UkVHVElNRT4xMzg2MjYwMjg3PC9SRUdUSU1FPjxTT1VSQ0
U+PC9TT1VSQ0U+PFBBVEg+L3Zhci9saWIvb25lL2RhdGFzdG9yZXMvY2VudG9zNjVfeDg2XzY0LnFjb3cyPC9QQVRIPjxGU1RZUEU
+PC9GU1RZUEU+PFNJWkU+MzI2ODwvU0laRT48U1RBVEU+NDwvU1RBVEU+PFJVTk5JTkdfVk1TPjA8L1JVTk5JTkdfVk1TPjxDTE9O
SU5HX09QUz4wPC9DTE9OSU5HX09QUz48Q0xPTklOR19JRD4tMTwvQ0xPTklOR19JRD48REFUQVNUT1JFX0lEPjE8L0RBVEFTVE9SR
V9JRD48REFUQVNUT1JFPmRlZmF1bHQ8L0RBVEFTVE9SRT48Vk1TPjwvVk1TPjxDTE9ORVM+PC9DTE9ORVM+PFRFTVBMQVRFPjxERV
NDUklQVElPTj48IVtDREFUQVtDZW50T1MgNi41IDY0IGJpdHMgd2l0aCBxY293MiBub24gcGVyc2lzdGVudF1dPjwvREVTQ1JJUFR
JT04+PERFVl9QUkVGSVg+PCFbQ0RBVEFbaGRdXT48L0RFVl9QUkVGSVg+PERSSVZFUj48IVtDREFUQVtxY293Ml1dPjwvRFJJVkVS
PjwvVEVNUExBVEU+PC9JTUFHRT48REFUQVNUT1JFPjxJRD4xPC9JRD48VUlEPjA8L1VJRD48R0lEPjA8L0dJRD48VU5BTUU+b25lY
WRtaW48L1VOQU1FPjxHTkFNRT5vbmVhZG1pbjwvR05BTUU+PE5BTUU+ZGVmYXVsdDwvTkFNRT48UEVSTUlTU0lPTlM+PE9XTkVSX1
U+MTwvT1dORVJfVT48T1dORVJfTT4xPC9PV05FUl9NPjxPV05FUl9BPjA8L09XTkVSX0E+PEdST1VQX1U+MTwvR1JPVVBfVT48R1J
PVVBfTT4wPC9HUk9VUF9NPjxHUk9VUF9BPjA8L0dST1VQX0E+PE9USEVSX1U+MTwvT1RIRVJfVT48T1RIRVJfTT4wPC9PVEhFUl9N
PjxPVEhFUl9BPjA8L09USEVSX0E+PC9QRVJNSVNTSU9OUz48RFNfTUFEPmZzPC9EU19NQUQ+PFRNX01BRD5zaGFyZWQ8L1RNX01BR
D48QkFTRV9QQVRIPi92YXIvbGliL29uZS9kYXRhc3RvcmVzLzE8L0JBU0VfUEFUSD48VFlQRT4wPC9UWVBFPjxESVNLX1RZUEU+MD
wvRElTS19UWVBFPjxDTFVTVEVSX0lEPi0xPC9DTFVTVEVSX0lEPjxDTFVTVEVSPjwvQ0xVU1RFUj48VE9UQUxfTUI+NDE0NTcxPC9
UT1RBTF9NQj48RlJFRV9NQj4zNTA5NDQ8L0ZSRUVfTUI+PFVTRURfTUI+MjQxPC9VU0VEX01CPjxJTUFHRVM+PElEPjA8L0lEPjxJ
RD4xPC9JRD48L0lNQUdFUz48VEVNUExBVEU+PERTX01BRD48IVtDREFUQVtmc11dPjwvRFNfTUFEPjxUTV9NQUQ+PCFbQ0RBVEFbc
2hhcmVkXV0+PC9UTV9NQUQ+PFRZUEU+PCFbQ0RBVEFbSU1BR0VfRFNdXT48L1RZUEU+PC9URU1QTEFURT48L0RBVEFTVE9SRT48L0
RTX0RSSVZFUl9BQ1RJT05fREFUQT4= 4
Thu Dec  5 17:18:07 2013 [ImM][E]: cp: Not allowed to copy images from /var/lib/one/ /etc/one/
/var/lib/one/
Thu Dec  5 17:18:07 2013 [ImM][E]: Not allowed to copy image file
/var/lib/one/datastores/centos65_x86_64.qcow2
Thu Dec  5 17:18:07 2013 [ImM][I]: ExitCode: 255
Thu Dec  5 17:18:07 2013 [ImM][E]: Error copying image in the datastore: Not allowed to copy image
file /var/lib/one/datastores/centos65_x86_64.qcow2
```

También es casualidad. Vamos a crear un softlink dentro de /tmp, a ver si así no se queja:

```
[oneadmin@one-admin one]$ cd /tmp
[oneadmin@one-admin tmp]$ ln -s /var/lib/one/datastores image_sources
```

```
[oneadmin@one-admin tmp]$ ll
total 0
lrwxrwxrwx 1 oneadmin oneadmin 23 Dec  5 17:25 image_sources -> /var/lib/one/datastores
[oneadmin@one-admin tmp]$ cd /var/lib/one/template_files/
[oneadmin@one-admin template_files]$ more centos65_x86_64_img.tmpl
NAME          = "CentOS 6.5 qcow2 non per."
PATH          = /tmp/image_sources/centos65_x86_64.qcow2
TYPE          = OS
DRIVER        = qcow2
DESCRIPTION   = "CentOS 6.5 64 bits with qcow2 non persistent"
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    5
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   4 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No err     0
[oneadmin@one-admin template_files]$ oneimage delete 4
[oneadmin@one-admin template_files]$ oneimage create -d default centos65_x86_64_img.tmpl
ID: 5
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    5
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   5 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No err     0
[oneadmin@one-admin template_files]$ oneimage show 5
IMAGE 5 INFORMATION
ID             : 5
NAME           : CentOS 6.5 qcow2 non per.
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : default
TYPE           : OS
REGISTER TIME  : 12/05 17:27:43
PERSISTENT     : No
SOURCE         :
PATH           : /tmp/image_sources/centos65_x86_64.qcow2
SIZE           : 3.2G
STATE          : err
RUNNING_VMS    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
```

```
DESCRIPTION="CentOS 6.5 64 bits with qcow2 non persistent"
DEV_PREFIX="hd"
DRIVER="qcow2"
ERROR="Thu Dec  5 17:27:43 2013 : Error copying image in the datastore: Not allowed to copy image
file /tmp/image_sources/centos65_x86_64.qcow2"

VIRTUAL MACHINES
```

Seguimos igual, vamos a ver los logs:

```
Thu Dec  5 17:27:43 2013 [ImM][E]: cp: Not allowed to copy images from /var/lib/one/ /etc/one/
/var/lib/one/
Thu Dec  5 17:27:43 2013 [ImM][E]: Not allowed to copy image file
/tmp/image_sources/centos65_x86_64.qcow2
```

Bueno, tendremos que mover la imagen a otra ubicación. Lo del soft link no se lo ha tragado tan fácilmente. Analizando el script /var/lib/one/remotes/datastore/fs/cp vemos que efectivamente hay una restricción sobre esos directorios como medida de seguridad. Para comprobarlo, vamos a copiar la imagen en local, sobre el servidor one-admin (no es eficiente, pero salimos de dudas):

```
[oneadmin@one-admin datastores]$ ll
total 6686012
drwxr-x--- 9 oneadmin oneadmin       4096 Dec  4 16:30 0
drwxr-x--- 2 oneadmin oneadmin       4096 Oct 19 23:58 1
drwxr-xr-x 2 oneadmin oneadmin       4096 Oct 19 20:18 2
-rw-rw-rw- 1 oneadmin oneadmin 3426025472 Dec  5 15:23 centos65_x86_64.qcow2
-rw-r--r-- 1 oneadmin oneadmin 3426025472 Dec  5 17:13 centos65_x86_64.qcow2.backup
[oneadmin@one-admin datastores]$ rm centos65_x86_64.qcow2.backup
[oneadmin@one-admin datastores]$ cd /tmp
[oneadmin@one-admin tmp]$ ll
total 3340388
-rw-rw-r-- 1 oneadmin oneadmin 3426025472 Dec  5 17:48 centos65_x86_64.qcow2
lrwxrwxrwx 1 oneadmin oneadmin         23 Dec  5 17:25 image_sources -> /var/lib/one/datastores
[oneadmin@one-admin tmp]$ rm image_sources
[oneadmin@one-admin tmp]$ cd /var/lib/one/template_files/
[oneadmin@one-admin template_files]$ more centos65_x86_64_img.tmpl
NAME          = "CentOS 6.5 qcow2 non per."
PATH          = /tmp/centos65_x86_64.qcow2
TYPE          = OS
DRIVER        = qcow2
DESCRIPTION   = "CentOS 6.5 64 bits with qcow2 non persistent"
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    5
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   5 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No err     0
[oneadmin@one-admin template_files]$ oneimage delete 5
[oneadmin@one-admin template_files]$ oneimage create -d default centos65_x86_64_img.tmpl
```

```
ID: 6
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    5
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   6 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No lock    0
```

Eso está mucho mejor. Se está transfiriendo de nuevo desde el servidor one-admin hasta el datastore montado por NFS.

```
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    5
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   6 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No rdy     0
[oneadmin@one-admin template_files]$ oneimage show 6
IMAGE 6 INFORMATION
ID             : 6
NAME           : CentOS 6.5 qcow2 non per.
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : default
TYPE           : OS
REGISTER TIME  : 12/05 17:50:43
PERSISTENT     : No
SOURCE         : /var/lib/one/datastores/1/20341f2662f263f578e16a4536c42277
PATH           : /tmp/centos65_x86_64.qcow2
SIZE           : 3.2G
STATE          : rdy
RUNNING_VMS    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="CentOS 6.5 64 bits with qcow2 non persistent"
DEV_PREFIX="hd"
DRIVER="qcow2"

VIRTUAL MACHINES
```

Ya tenemos la imagen instalada. Ahora vamos a ver si podemos instanciarla. Vamos a crear una plantilla:

```
[oneadmin@one-admin template_files]$ more centos65_1NIC.tmpl
NAME="CentOS 6.5 1NIC"
```

```
CPU="0.5"
DISK=[
  IMAGE_ID="6" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
FEATURES=[
  ACPI="yes" ]
NIC = [ NETWORK="Internet LAN" ]
[oneadmin@one-admin template_files]$ onetemplate create centos65_1NIC.tmpl
ID: 12
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                 10/20 00:31:36
   1 oneadmin        oneadmin        tty public                   10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                  10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4         10/22 01:10:12
   4 oneadmin        oneadmin        tty public 2 NICs nodes 3 4  10/22 11:27:40
   5 oneadmin        oneadmin        tty 2 NICs                   10/23 17:24:04
   6 oneadmin        oneadmin        routervlan7                  12/02 16:47:34
   8 oneadmin        oneadmin        tty 2 NICs VLAN7             12/03 15:56:57
   9 oneadmin        oneadmin        tty 2NICs VLAN7 inside       12/04 00:22:12
  10 oneadmin        oneadmin        routervlan8                  12/04 12:39:30
  11 oneadmin        oneadmin        tty 2NICs VLAN8 inside       12/04 12:43:06
  12 oneadmin        oneadmin        CentOS 6.5 1NIC              12/05 18:07:15
[oneadmin@one-admin template_files]$ onetemplate show 12
TEMPLATE 12 INFORMATION
ID             : 12
NAME           : CentOS 6.5 1NIC
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/05 18:07:15

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CPU="0.5"
DISK=[
```

```
  IMAGE_ID="6" ]
FEATURES=[
  ACPI="yes" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="512"
NIC=[
  NETWORK="Internet LAN" ]
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
```

Vamos a instanciarla, a ver que ocurre:

```
[oneadmin@one-admin template_files]$ onetemplate instantiate 12 --name "CentOS 6.5 1"
VM ID: 123
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   16     64M one-node2   43d 01h40
    71 oneadmin oneadmin tty1 2 NICs     runn   16     64M one-node2   43d 01h40
   117 oneadmin oneadmin tty_vlan7_1     runn   23     64M one-node4    2d 00h03
   119 oneadmin oneadmin tty_vlan7_insid runn   15     64M one-node2    1d 17h39
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    1d 16h30
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    1d 01h40
   122 oneadmin oneadmin tty_vlan8_insid runn   16     64M one-node1    1d 01h39
   123 oneadmin oneadmin CentOS 6.5 1    prol    0      0K one-node2    0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn    2     64M one-node2   43d 01h47
    71 oneadmin oneadmin tty1 2 NICs     runn    2     64M one-node2   43d 01h47
   117 oneadmin oneadmin tty_vlan7_1     runn    8     64M one-node4    2d 00h09
   119 oneadmin oneadmin tty_vlan7_insid runn    2     64M one-node2    1d 17h45
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    1d 16h36
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    1d 01h46
   122 oneadmin oneadmin tty_vlan8_insid runn   14     64M one-node1    1d 01h45
   123 oneadmin oneadmin CentOS 6.5 1    runn   84    512M one-node2    0d 00h06
[oneadmin@one-admin template_files]$ onevm show 123
VIRTUAL MACHINE 123 INFORMATION
ID                  : 123
NAME                : CentOS 6.5 1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
```

```
START TIME          : 12/05 18:09:34
END TIME            : -
DEPLOY ID           : one-123

VIRTUAL MACHINE MONITORING
NET_TX              : 0K
USED MEMORY         : 512M
USED CPU            : 84
NET_RX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    CentOS 6.5 qcow2 non per.          file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.73  02:00:c0:a8:7d:49
                                           fe80::400:c0ff:fea8:7d49

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION          REAS           START        TIME     PROLOG
  0 one-node2       none            none  12/05 18:09:46   0d 00h06m   0h05m48s

VIRTUAL MACHINE TEMPLATE
CPU="0.5"
FEATURES=[
  ACPI="yes" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6023",
  TYPE="VNC" ]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
TEMPLATE_ID="12"
VMID="123"
```

Vamos a probarlo. Se encuentra corriendo sobre el host2:

```
[root@one-node2 ~]# ping 192.168.125.73
PING 192.168.125.73 (192.168.125.73) 56(84) bytes of data.
```

```
64 bytes from 192.168.125.73: icmp_seq=1 ttl=64 time=47.6 ms
64 bytes from 192.168.125.73: icmp_seq=2 ttl=64 time=6.20 ms
64 bytes from 192.168.125.73: icmp_seq=3 ttl=64 time=1.58 ms
64 bytes from 192.168.125.73: icmp_seq=4 ttl=64 time=0.855 ms
64 bytes from 192.168.125.73: icmp_seq=5 ttl=64 time=0.809 ms
64 bytes from 192.168.125.73: icmp_seq=6 ttl=64 time=0.520 ms
64 bytes from 192.168.125.73: icmp_seq=7 ttl=64 time=0.424 ms
64 bytes from 192.168.125.73: icmp_seq=8 ttl=64 time=1.12 ms
64 bytes from 192.168.125.73: icmp_seq=9 ttl=64 time=1.15 ms
64 bytes from 192.168.125.73: icmp_seq=10 ttl=64 time=0.979 ms
64 bytes from 192.168.125.73: icmp_seq=11 ttl=64 time=3.89 ms
64 bytes from 192.168.125.73: icmp_seq=12 ttl=64 time=10.1 ms
64 bytes from 192.168.125.73: icmp_seq=13 ttl=64 time=0.626 ms
64 bytes from 192.168.125.73: icmp_seq=14 ttl=64 time=0.903 ms
64 bytes from 192.168.125.73: icmp_seq=15 ttl=64 time=0.450 ms
64 bytes from 192.168.125.73: icmp_seq=16 ttl=64 time=1.03 ms
64 bytes from 192.168.125.73: icmp_seq=17 ttl=64 time=1.16 ms
```

Vamos a entrar en la máquina instanciada:

```
[root@one-node2 ~]# ssh root@192.168.125.73
The authenticity of host '192.168.125.73 (192.168.125.73)' can't be established.
RSA key fingerprint is 3f:d6:b0:75:21:0a:3e:93:53:5a:ee:8e:b9:8a:9e:17.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.125.73' (RSA) to the list of known hosts.
root@192.168.125.73's password:
Last login: Thu Dec  5 13:03:35 2013
[root@localhost ~]# ifconfig
eth0      Link encap:Ethernet  HWaddr 02:00:C0:A8:7D:49
          inet addr:192.168.125.73  Bcast:192.168.125.255  Mask:255.255.255.0
          inet6 addr: fe80::c0ff:fea8:7d49/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:85 errors:0 dropped:0 overruns:0 frame:0
          TX packets:94 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:8499 (8.2 KiB)  TX bytes:10178 (9.9 KiB)
          Interrupt:10

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)  TX bytes:0 (0.0 b)
[root@localhost ~]# cat /etc/redhat-release
```

```
CentOS release 6.5 (Final)
[root@localhost ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda1        36G  2.2G   32G   7% /
tmpfs           246M     0  246M   0% /dev/shm
[root@localhost ~]# free
             total       used       free     shared    buffers     cached
Mem:        502272     144052     358220          0      10452      46448
-/+ buffers/cache:      87152     415120
Swap:      4194296          0    4194296
```

Vemos que como no está contextualizado, no ha reconfigurado el resolv.conf, manteniendo el que teníamos antes:

```
[root@localhost ~]# cat /etc/resolv.conf
; generated by /sbin/dhclient-script
nameserver 192.168.122.1
```

Lo bueno es que podemos configurar por contexto los DNSs, el nombre de la máquina, y la clave pública de root para ponerla en el authorized_keys. Ahora vamos a probar a contextualizar la instancia tty para que tenga configurada la máscara de red correcta, los DNSs, el public key, y el hostame.

Como viene directamente importada del market no sabemos si permite la contextualización completa como la imagen que acabamos de preparar. Vamos a salir de dudas. Vemos las plantillas:

```
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                10/20 00:31:36
   1 oneadmin        oneadmin        tty public                  10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                 10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4        10/22 01:10:12
   4 oneadmin        oneadmin        tty public 2 NICs nodes 3 4 10/22 11:27:40
   5 oneadmin        oneadmin        tty 2 NICs                  10/23 17:24:04
   6 oneadmin        oneadmin        routervlan7                 12/02 16:47:34
   8 oneadmin        oneadmin        tty 2 NICs VLAN7            12/03 15:56:57
   9 oneadmin        oneadmin        tty 2NICs VLAN7 inside      12/04 00:22:12
  10 oneadmin        oneadmin        routervlan8                 12/04 12:39:30
  11 oneadmin        oneadmin        tty 2NICs VLAN8 inside      12/04 12:43:06
  12 oneadmin        oneadmin        CentOS 6.5 1NIC             12/05 18:07:15
```

Clonamos la plantilla 5 para modificarla y contextualizarla:

```
[oneadmin@one-admin template_files]$ onetemplate show 5
TEMPLATE 5 INFORMATION
ID             : 5
NAME           : tty 2 NICs
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 10/23 17:24:04
```

```
PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

TEMPLATE CONTENTS
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  NETWORK="VLAN6" ]
[oneadmin@one-admin template_files]$ onetemplate clone 5 "tty 2 NICs context"
ID: 13
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                 10/20 00:31:36
   1 oneadmin        oneadmin        tty public                   10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                  10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4         10/22 01:10:12
   4 oneadmin        oneadmin        tty public 2 NICs nodes 3 4  10/22 11:27:40
   5 oneadmin        oneadmin        tty 2 NICs                   10/23 17:24:04
   6 oneadmin        oneadmin        routervlan7                  12/02 16:47:34
   8 oneadmin        oneadmin        tty 2 NICs VLAN7             12/03 15:56:57
   9 oneadmin        oneadmin        tty 2NICs VLAN7 inside       12/04 00:22:12
  10 oneadmin        oneadmin        routervlan8                  12/04 12:39:30
  11 oneadmin        oneadmin        tty 2NICs VLAN8 inside       12/04 12:43:06
  12 oneadmin        oneadmin        CentOS 6.5 1NIC              12/05 18:07:15
  13 oneadmin        oneadmin        tty 2 NICs context           12/09 11:36:10
```

Preparamos la plantilla:

```
[oneadmin@one-admin template_files]$ more tty_public13.tmpl
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
```

```
FEATURES=[
  ACPI="no" ]
NIC = [ NETWORK="Internet LAN" ]
NIC = [ NETWORK="RTVLAN8" ]

CONTEXT=[
  NETWORK        = "YES",
  SSH_PUBLIC_KEY = "ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  DNS            = "8.8.4.4 8.8.8.8" ]
[oneadmin@one-admin template_files]$ onetemplate update 13 tty_public13.tmpl
[oneadmin@one-admin template_files]$ onetemplate chmod 13 644
[oneadmin@one-admin template_files]$ onetemplate show 13
TEMPLATE 13 INFORMATION
ID             : 13
NAME           : tty 2 NICs context
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/09 11:36:10

PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : u--

TEMPLATE CONTENTS
CONTEXT=[
  DNS="8.8.4.4 8.8.8.8",
  NETWORK="YES",
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin" ]
CPU="0.1"
DISK=[
  IMAGE_ID="0" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
```

```
MEMORY="64"
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  NETWORK="RTVLAN8" ]
[oneadmin@one-admin template_files]$ onetemplate instantiate 13 --name "tty3 2NICs Context"
VM ID: 124
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node2   46d 19h31
    71 oneadmin oneadmin tty1 2 NICs     runn   12     64M one-node2   46d 19h31
   117 oneadmin oneadmin tty_vlan7_1     runn   17     64M one-node4    5d 17h54
   119 oneadmin oneadmin tty_vlan7_insid runn   12     64M one-node2    5d 11h30
   120 oneadmin oneadmin router_vlan7_1  runn   40    512M one-node1    5d 10h21
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    4d 19h31
   122 oneadmin oneadmin tty_vlan8_insid runn    8     64M one-node1    4d 19h30
   123 oneadmin oneadmin CentOS 6.5 1    runn    0  515.6M one-node2    3d 17h51
   124 oneadmin oneadmin tty3 2NICs Cont runn   10     64M one-node1    0d 00h01
[oneadmin@one-admin template_files]$ onevm show 124
VIRTUAL MACHINE 124 INFORMATION
ID                  : 124
NAME                : tty3 2NICs Context
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node1
START TIME          : 12/09 11:59:06
END TIME            : -
DEPLOY ID           : one-124

VIRTUAL MACHINE MONITORING
USED CPU            : 15
NET_RX              : 3K
NET_TX              : 0K
USED MEMORY         : 64M

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
```

```
  0 hda     ttylinux - kvm                      file    NO        -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.74  02:00:c0:a8:7d:4a
                                           fe80::400:c0ff:fea8:7d4a
  1 RTVLAN8               yes brhm8        192.168.128.3   02:00:c0:a8:80:03
                                           fe80::400:c0ff:fea8:8003

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node1       none             none  12/09 11:59:10   0d 00h01m   0h00m24s

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.74",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  ETH1_IP="192.168.128.3",
  ETH1_MASK="255.255.248.0",
  ETH1_NETWORK="192.168.128.0/21",
  NETWORK="YES",
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  TARGET="hdb" ]
CPU="0.1"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6024",
  TYPE="VNC" ]
MEMORY="64"
TEMPLATE_ID="13"
VMID="124"
```

Entramos desde el host1:

```
[root@one-node1 ~]# ping  192.168.125.74
PING 192.168.125.74 (192.168.125.74) 56(84) bytes of data.
```

```
64 bytes from 192.168.125.74: icmp_seq=1 ttl=64 time=49.7 ms
64 bytes from 192.168.125.74: icmp_seq=2 ttl=64 time=0.915 ms
64 bytes from 192.168.125.74: icmp_seq=3 ttl=64 time=0.336 ms
64 bytes from 192.168.125.74: icmp_seq=4 ttl=64 time=0.510 ms
^C
--- 192.168.125.74 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3489ms
rtt min/avg/max/mdev = 0.336/12.870/49.719/21.275 ms
[root@one-node1 ~]# ssh root@192.168.125.74
The authenticity of host '192.168.125.74 (192.168.125.74)' can't be established.
RSA key fingerprint is 5b:d6:3a:a9:8a:53:21:66:70:0c:b7:26:34:45:b1:27.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.125.74' (RSA) to the list of known hosts.
root@192.168.125.74's password:
Permission denied, please try again.
root@192.168.125.74's password:

Chop wood, carry water.

# ifconfig
eth0      Link encap:Ethernet  HWaddr 02:00:C0:A8:7D:4A
          inet addr:192.168.125.74  Bcast:192.168.125.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:62 errors:0 dropped:0 overruns:0 frame:0
          TX packets:37 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:6987 (6.8 KiB)  TX bytes:4301 (4.2 KiB)
          Interrupt:11 Base address:0xc100

eth1      Link encap:Ethernet  HWaddr 02:00:C0:A8:80:03
          inet addr:192.168.128.3  Bcast:192.168.128.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:29 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:1740 (1.6 KiB)  TX bytes:0 (0.0 B)
          Interrupt:11 Base address:0xc200

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

```
# cat /etc/resolv.conf
cat: can't open '/etc/resolv.conf': No such file or directory
```

No se puede contextualizar. Sólo toma la IP de las MACs de cada interfaz y asigna una clase C como máscara de red.

Ahora vamos a trabajar con la creación de imágenes qcow2 "instantáneas". Primero lo hacemos por línea de comando, usando el comando qemu-img, para ver como funciona el tema. Esto es lo que tenemos en el directorio /home/libvirtimages:

```
[root@Testit libvirtimages]# ll
total 39571172
-rwxr-xr-x. 1 root root 42949672960 Oct  5 04:27 centos64_x86_64.img
-rw-r--r--. 1 root root  3426680832 Dec  5 13:42 centos64_x86_64.qcow2
-rw-r--r--. 1 root root  2967339008 Dec  5 12:10 centos64_x86_64.qcow2.backup
-rwxr-xr-x. 1 root root  3753509376 Oct 20 22:35 one-admin-clone.qcow2
-rwxr-xr-x. 1 qemu qemu  8530558976 Dec 10 12:54 one-admin.qcow2
-rwxr-xr-x. 1 qemu qemu  3879075840 Dec 10 12:54 one-node1.qcow2
-rwxr-xr-x. 1 qemu qemu  4100259840 Dec 10 12:54 one-node2.qcow2
-rwxr-xr-x. 1 root root  3689742336 Dec  4 18:38 one-node3.qcow2
-rwxr-xr-x. 1 qemu qemu  3748069376 Dec 10 12:54 one-node4.qcow2
-rwxr-xr-x. 1 root root  2967732224 Oct  6 02:14 opennebula_frontend.qcow2
[root@Testit libvirtimages]# qemu-img info centos64_x86_64.qcow2
image: centos64_x86_64.qcow2
file format: qcow2
virtual size: 40G (42949672960 bytes)
disk size: 3.2G
cluster_size: 65536
[root@Testit libvirtimages]# qemu-img create -f qcow2 -o backing_file=./centos64_x86_64.qcow2
centos65_x86_64.qcow2
Formatting 'centos65_x86_64.qcow2', fmt=qcow2 size=42949672960 backing_file='./centos64_x86_64.qcow2'
encryption=off cluster_size=65536
[root@Testit libvirtimages]# ll
total 39571308
-rwxr-xr-x. 1 root root 42949672960 Oct  5 04:27 centos64_x86_64.img
-rw-r--r--. 1 root root  3426680832 Dec  5 13:42 centos64_x86_64.qcow2
-rw-r--r--. 1 root root  2967339008 Dec  5 12:10 centos64_x86_64.qcow2.backup
-rw-r--r--. 1 root root      262144 Dec 10 13:01 centos65_x86_64.qcow2
-rwxr-xr-x. 1 root root  3753509376 Oct 20 22:35 one-admin-clone.qcow2
-rwxr-xr-x. 1 qemu qemu  8530558976 Dec 10 13:01 one-admin.qcow2
-rwxr-xr-x. 1 qemu qemu  3879075840 Dec 10 13:01 one-node1.qcow2
-rwxr-xr-x. 1 qemu qemu  4100259840 Dec 10 13:01 one-node2.qcow2
-rwxr-xr-x. 1 root root  3689742336 Dec  4 18:38 one-node3.qcow2
-rwxr-xr-x. 1 qemu qemu  3748069376 Dec 10 13:01 one-node4.qcow2
-rwxr-xr-x. 1 root root  2967732224 Oct  6 02:14 opennebula_frontend.qcow2
[root@Testit libvirtimages]# qemu-img info centos65_x86_64.qcow2
image: centos65_x86_64.qcow2
file format: qcow2
```

```
virtual size: 40G (42949672960 bytes)
disk size: 136K
cluster_size: 65536
backing file: ./centos64_x86_64.qcow2
```

Bien, vemos que esto funciona sin problemas, y referencia a la imagen original. Además la imagen se crea inmediatamente. Ahora vamos a trabajar con el tema de crear la imagen anterior de centos65 de forma persistente, para ver si conseguimos que OpenNebula haga lo mismo. Ahora mismo con la imagen instanciada, no ha utilizado la otra como fichero base, sino que ha copiado la imagen completa. Esto es lo que tenemos en el datastore correspondiente a la instancia 123 (la del centos65):

```
[root@Testit 123]# ll
total 3374472
-rw-rw-r--. 1 oneadmin oneadmin        690 Dec  5 18:15 deployment.0
-rw-r--r--. 1 oneadmin oneadmin 3455451136 Dec 10 12:52 disk.0
[root@Testit 123]# more deployment.0
<domain type='qemu' xmlns:qemu='http://libvirt.org/schemas/domain/qemu/1.0'>
        <name>one-123</name>
        <cputune>
                <shares>512</shares>
        </cputune>
        <memory>524288</memory>
        <os>
                <type arch='x86_64'>hvm</type>
                <boot dev='hd'/>
        </os>
        <devices>
                <emulator>/usr/libexec/qemu-kvm</emulator>
                <disk type='file' device='disk'>
                        <source file='/var/lib/one//datastores/0/123/disk.0'/>
                        <target dev='hda'/>
                        <driver name='qemu' type='qcow2' cache='none'/>
                </disk>
                <interface type='bridge'>
                        <source bridge='virbr0'/>
                        <mac address='02:00:c0:a8:7d:49'/>
                </interface>
                <graphics type='vnc' listen='0.0.0.0' port='6023'/>
        </devices>
        <features>
                <acpi/>
        </features>
</domain>

[root@Testit 123]# qemu-img info  disk.0
image: disk.0
```

```
file format: qcow2
virtual size: 40G (42949672960 bytes)
disk size: 3.2G
cluster_size: 65536
[root@Testit 123]# pwd
/home/one/datastores/0/123
```

Tenemos que asegurarnos que utiliza el fichero fuente para no copiar la imagen completa, sino trabajar con el delta. Vamos a probar una cosa diferente: vamos a crear un datastore para almacenar las imágenes qcow2. Creamos la plantilla para el datastore:

```
[oneadmin@one-admin template_files]$ more datastore_qcow.tmpl
NAME = qcow2_images
DS_MAD = fs
TM_MAD = qcow2
[oneadmin@one-admin template_files]$ onedatastore create datastore_qcow.tmpl
ID: 100
[oneadmin@one-admin template_files]$ onedatastore list
  ID NAME                SIZE AVAIL CLUSTER      IMAGES TYPE DS       TM
   0 system                - -     -                 0 sys  -        shared
   1 default           404.9G 83%   -                 3 img  fs       shared
   2 files             404.9G 83%   -                 0 fil  fs       ssh
 100 qcow2_images      404.9G 83%   -                 0 img  fs       qcow2
[oneadmin@one-admin template_files]$ onedatastore show 100
DATASTORE 100 INFORMATION
ID             : 100
NAME           : qcow2_images
USER           : oneadmin
GROUP          : oneadmin
CLUSTER        : -
TYPE           : IMAGE
DS_MAD         : fs
TM_MAD         : qcow2
BASE PATH      : /var/lib/one/datastores/100
DISK_TYPE      : FILE

DATASTORE CAPACITY
TOTAL:         : 404.9G
USED:          : 1M
FREE:          : 335.9G

PERMISSIONS
OWNER          : um-
GROUP          : u--
OTHER          : ---

DATASTORE TEMPLATE
```

```
DS_MAD="fs"
TM_MAD="qcow2"

IMAGES
```

Ahora creamos de nuevo la imagen con el CentOS 6.5 sobre el nuevo datastore:

```
[oneadmin@one-admin template_files]$ more centos65_x86_64_qcow2.tmpl
NAME          = "CentOS 6.5 qcow2 driver non per."
PATH          = /tmp/centos65_x86_64.qcow2
TYPE          = OS
DRIVER        = qcow2
DESCRIPTION   = "CentOS 6.5 64 bits with qcow2 driver non persistent"
[oneadmin@one-admin template_files]$ oneimage create -d qcow2_images centos65_x86_64_qcow2.tmpl
ID: 7
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    6
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   6 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No used    1
   7 oneadmin   oneadmin   CentOS 6.5 qcow qcow2_imag    3.2G OS    No lock    0
```

Tenemos que esperar a que copie los 3.2G de la imagen al nuevo datastore.

```
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    6
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   6 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No used    1
   7 oneadmin   oneadmin   CentOS 6.5 qcow qcow2_imag    3.2G OS    No rdy     0
[oneadmin@one-admin template_files]$ oneimage show 7
IMAGE 7 INFORMATION
ID             : 7
NAME           : CentOS 6.5 qcow2 driver non per.
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : qcow2_images
TYPE           : OS
REGISTER TIME  : 12/10 15:50:45
PERSISTENT     : No
SOURCE         : /var/lib/one/datastores/100/0614c46c17394903e83d1d8816ec665c
PATH           : /tmp/centos65_x86_64.qcow2
SIZE           : 3.2G
STATE          : rdy
RUNNING_VMS    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
```

```
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="CentOS 6.5 64 bits with qcow2 driver non persistent"
DEV_PREFIX="hd"
DRIVER="qcow2"

VIRTUAL MACHINES
```

Vamos a probarlo. Creamos una plantilla similar a la anterior pero haciendo referencia a esta imagen.

```
[oneadmin@one-admin template_files]$ more centos65_1NIC_qcow.tmpl
NAME="CentOS 6.5 1NIC qco2"
CPU="0.5"
DISK=[
  IMAGE_ID="7" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
FEATURES=[
  ACPI="yes" ]
NIC = [ NETWORK="Internet LAN" ]

CONTEXT=[
  NETWORK        = "YES",
  SSH_PUBLIC_KEY = "ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  DNS            = "8.8.4.4 8.8.8.8" ]
[oneadmin@one-admin template_files]$ onetemplate create centos65_1NIC_qcow.tmpl
ID: 14
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                 10/20 00:31:36
   1 oneadmin        oneadmin        tty public                   10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                  10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4         10/22 01:10:12
   4 oneadmin        oneadmin        tty public 2 NICs nodes 3 4  10/22 11:27:40
   5 oneadmin        oneadmin        tty 2 NICs                   10/23 17:24:04
```

```
   6 oneadmin        oneadmin        routervlan7                 12/02 16:47:34
   8 oneadmin        oneadmin        tty 2 NICs VLAN7            12/03 15:56:57
   9 oneadmin        oneadmin        tty 2NICs VLAN7 inside      12/04 00:22:12
  10 oneadmin        oneadmin        routervlan8                 12/04 12:39:30
  11 oneadmin        oneadmin        tty 2NICs VLAN8 inside      12/04 12:43:06
  12 oneadmin        oneadmin        CentOS 6.5 1NIC             12/05 18:07:15
  13 oneadmin        oneadmin        tty 2 NICs context          12/09 11:36:10
  14 oneadmin        oneadmin        CentOS 6.5 1NIC qco2        12/10 16:17:45
[oneadmin@one-admin template_files]$ onetemplate show 14
TEMPLATE 14 INFORMATION
ID             : 14
NAME           : CentOS 6.5 1NIC qco2
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/10 16:17:45

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CONTEXT=[
  DNS="8.8.4.4 8.8.8.8",
  NETWORK="YES",
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin" ]
CPU="0.5"
DISK=[
  IMAGE_ID="7" ]
FEATURES=[
  ACPI="yes" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="512"
NIC=[
  NETWORK="Internet LAN" ]
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
```

Vamos a eliminar la instancia en ejecución, porque la maqueta tiene recursos limitados.

```
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   16     64M one-node2   47d 23h58
    71 oneadmin oneadmin tty1 2 NICs     runn   13     64M one-node2   47d 23h58
   117 oneadmin oneadmin tty_vlan7_1     runn   17     64M one-node4    6d 22h20
   119 oneadmin oneadmin tty_vlan7_insid runn   13     64M one-node2    6d 15h56
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    6d 14h47
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    5d 23h57
   122 oneadmin oneadmin tty_vlan8_insid runn   21     64M one-node1    5d 23h56
   123 oneadmin oneadmin CentOS 6.5 1    runn    2  523.6M one-node2    4d 22h17
   124 oneadmin oneadmin tty3 2NICs Cont runn   16     64M one-node1    1d 04h27
[oneadmin@one-admin template_files]$ onevm delete 123
[oneadmin@one-admin template_files]$ onetemplate instantiate 14 --name "CentOS 6.5 2"
VM ID: 125
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node2   48d 00h16
    71 oneadmin oneadmin tty1 2 NICs     runn   12     64M one-node2   48d 00h16
   117 oneadmin oneadmin tty_vlan7_1     runn   16     64M one-node4    6d 22h38
   119 oneadmin oneadmin tty_vlan7_insid runn   14     64M one-node2    6d 16h14
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    6d 15h05
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    6d 00h15
   122 oneadmin oneadmin tty_vlan8_insid runn   12     64M one-node1    6d 00h14
   124 oneadmin oneadmin tty3 2NICs Cont runn   14     64M one-node1    1d 04h45
   125 oneadmin oneadmin CentOS 6.5 2            0      0K one-node2    0d 00h00
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn    6     64M one-node2   48d 00h16
    71 oneadmin oneadmin tty1 2 NICs     runn    6     64M one-node2   48d 00h16
   117 oneadmin oneadmin tty_vlan7_1     runn   14     64M one-node4    6d 22h39
   119 oneadmin oneadmin tty_vlan7_insid runn    5     64M one-node2    6d 16h15
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    6d 15h06
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    6d 00h16
   122 oneadmin oneadmin tty_vlan8_insid runn   16     64M one-node1    6d 00h15
   124 oneadmin oneadmin tty3 2NICs Cont runn   14     64M one-node1    1d 04h46
   125 oneadmin oneadmin CentOS 6.5 2    runn   32    512M one-node2    0d 00h00
```

Esta vez ha tardado mucho menos en instanciar la imagen. Vamos a comprobar el datastore.

```
[root@Testit 125]# ll
total 508
-rw-rw-r--. 1 oneadmin oneadmin    868 Dec 10 16:45 deployment.0
-rw-r--r--. 1 oneadmin oneadmin 262144 Dec 10 16:45 disk.0
-rw-r--r--. 1 oneadmin oneadmin 372736 Dec 10 16:45 disk.1
lrwxrwxrwx. 1 oneadmin oneadmin     36 Dec 10 16:45 disk.1.iso ->
/var/lib/one/datastores/0/125/disk.1
```

Esto está mucho mejor. El primer disco es la imagen qcow diferencial, mientras que el segundo disco es la imagen que se monta en la instancia durante el tiempo de arranque conteniendo los parámetros de contextualización:

```
[root@Testit 125]# file disk.0
disk.0: Qemu Image, Format: Qcow , Version: 2
[root@Testit 125]# file disk.1
disk.1: ISO 9660 CD-ROM filesystem data 'CONTEXT
[root@Testit 125]# qemu-img info disk.0
image: disk.0
file format: qcow2
virtual size: 40G (42949672960 bytes)
disk size: 6.7M
cluster_size: 65536
backing file: /var/lib/one/datastores/100/0614c46c17394903e83d1d8816ec665c
```

Bueno, hemos resuelto el problema. Podemos hacer lo mismo con el resto de imágenes, para lanzar las instancias mucho mas deprisa, y ahorrar espacio en disco duro. Después de un rato de haber arrancado la instancia, comprobamos como los datos de escritura nueva en disco se almacenan sobre el fichero qcow diferencial:

```
[root@Testit 125]# ll
total 11772
-rw-rw-r--. 1 oneadmin oneadmin      868 Dec 10 16:45 deployment.0
-rw-r--r--. 1 oneadmin oneadmin 11796480 Dec 10 16:52 disk.0
-rw-r--r--. 1 oneadmin oneadmin   372736 Dec 10 16:45 disk.1
lrwxrwxrwx. 1 oneadmin oneadmin       36 Dec 10 16:45 disk.1.iso ->
/var/lib/one/datastores/0/125/disk.1
```

Y el XML utilizado por libvirtd para la hipervisora tiene los dos discos duros montados, siendo el de contextualización montado como una unidad de CDROM:

```
[root@Testit 125]# more deployment.0
<domain type='qemu' xmlns:qemu='http://libvirt.org/schemas/domain/qemu/1.0'>
        <name>one-125</name>
        <cputune>
                <shares>512</shares>
        </cputune>
        <memory>524288</memory>
        <os>
                <type arch='x86_64'>hvm</type>
                <boot dev='hd'/>
        </os>
        <devices>
                <emulator>/usr/libexec/qemu-kvm</emulator>
                <disk type='file' device='disk'>
                        <source file='/var/lib/one//datastores/0/125/disk.0'/>
                        <target dev='hda'/>
                        <driver name='qemu' type='qcow2' cache='none'/>
                </disk>
```

```
                <disk type='file' device='cdrom'>
                        <source file='/var/lib/one//datastores/0/125/disk.1'/>
                        <target dev='hdb'/>
                        <readonly/>
                        <driver name='qemu' type='raw'/>
                </disk>
                <interface type='bridge'>
                        <source bridge='virbr0'/>
                        <mac address='02:00:c0:a8:7d:4b'/>
                </interface>
                <graphics type='vnc' listen='0.0.0.0' port='6025'/>
        </devices>
        <features>
                <acpi/>
        </features>
</domain>
```

Ahora vamos a reiniciar la instancia, a ver si se mantienen la imagen y los cambios. Entramos en la máquina virtual, para ver si funciona bien la contextualización.

```
[oneadmin@one-admin template_files]$ onevm show 125
VIRTUAL MACHINE 125 INFORMATION
ID                  : 125
NAME                : CentOS 6.5 2
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
START TIME          : 12/10 16:44:47
END TIME            : -
DEPLOY ID           : one-125

VIRTUAL MACHINE MONITORING
USED CPU            : 0
USED MEMORY         : 512M
NET_TX              : 0K
NET_RX              : 39K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                               TYPE SAVE SAVE_AS
```

```
  0 hda    CentOS 6.5 qcow2 driver non per.    file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.75  02:00:c0:a8:7d:4b
                                           fe80::400:c0ff:fea8:7d4b

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node2       none             none  12/10 16:44:59   0d 00h24m   0h00m03s

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.75",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  NETWORK="YES",
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  TARGET="hdb" ]
CPU="0.5"
FEATURES=[
  ACPI="yes" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6025",
  TYPE="VNC" ]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
TEMPLATE_ID="14"
VMID="125"
```

Gracias al uso del cow (copy on write) podemos comprobar como el tiempo de prolog (de copiado de la imagen para generar la instancia) se reduce a 3 segundos. Vamos a probar a entrar en la máquina usando la credencial instalada para el usuario root usando oneadmin:

```
[oneadmin@one-node2 ~]$ ping 192.168.125.75
PING 192.168.125.75 (192.168.125.75) 56(84) bytes of data.
```

```
64 bytes from 192.168.125.75: icmp_seq=1 ttl=64 time=11.1 ms
64 bytes from 192.168.125.75: icmp_seq=2 ttl=64 time=1.02 ms
64 bytes from 192.168.125.75: icmp_seq=3 ttl=64 time=0.714 ms
64 bytes from 192.168.125.75: icmp_seq=4 ttl=64 time=0.532 ms
64 bytes from 192.168.125.75: icmp_seq=5 ttl=64 time=0.504 ms
64 bytes from 192.168.125.75: icmp_seq=6 ttl=64 time=0.484 ms
64 bytes from 192.168.125.75: icmp_seq=7 ttl=64 time=0.499 ms
64 bytes from 192.168.125.75: icmp_seq=8 ttl=64 time=0.471 ms
^C
--- 192.168.125.75 ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7237ms
rtt min/avg/max/mdev = 0.471/1.925/11.174/3.500 ms
[oneadmin@one-node2 ~]$ ssh root@192.168.125.75
The authenticity of host '192.168.125.75 (192.168.125.75)' can't be established.
RSA key fingerprint is 3f:d6:b0:75:21:0a:3e:93:53:5a:ee:8e:b9:8a:9e:17.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.125.75' (RSA) to the list of known hosts.
Last login: Thu Dec  5 13:03:35 2013
[root@localhost ~]#
```

Bien, la clave pública funciona.

```
[root@localhost ~]# cat /etc/resolv.conf
nameserver 8.8.4.4
nameserver 8.8.8.8
nameserver 192.168.125.1
```

Vemos que ha utilizado como servidor de DNS el que configuramos en la plantilla de la red pública, y los que metimos en el apartado de contextualización. Vamos a reiniciar la máquina, a ver que ocurre. Después de reiniciar la instancia, ya no podemos entrar en la máquina con la IP que tenía previamente. Podemos probar a reinstanciar la imagen, para ver si así la podemos recuperar.

```
[oneadmin@one-admin template_files]$ onevm delete 125 --recreate
[root@Testit 0]# ll 125
total 504
-rw-rw-r--. 1 oneadmin oneadmin    868 Dec 10 17:27 deployment.1
-rw-r--r--. 1 oneadmin oneadmin 262144 Dec 10 17:27 disk.0
-rw-r--r--. 1 oneadmin oneadmin 372736 Dec 10 17:27 disk.1
lrwxrwxrwx. 1 oneadmin oneadmin     36 Dec 10 17:27 disk.1.iso ->
/var/lib/one/datastores/0/125/disk.1
```

Efectivamente, al no ser persistente la imagen, se ha creado una nueva desde cero, manteniendo sólo la instancia y los datos del contexto, pero perdiendo la información contenida en el disco duro.

```
[oneadmin@one-admin template_files]$ onevm show 125
VIRTUAL MACHINE 125 INFORMATION
ID                  : 125
NAME                : CentOS 6.5 2
USER                : oneadmin
```

```
GROUP                : oneadmin
STATE                : ACTIVE
LCM_STATE            : RUNNING
RESCHED              : No
HOST                 : one-node2
START TIME           : 12/10 16:44:47
END TIME             : -
DEPLOY ID            : one-125

VIRTUAL MACHINE MONITORING
NET_TX               : 0K
USED MEMORY          : 512M
NET_RX               : 3K
USED CPU             : 92

PERMISSIONS
OWNER                : um-
GROUP                : ---
OTHER                : ---

VM DISKS
 ID TARGET IMAGE                               TYPE SAVE SAVE_AS
  0 hda    CentOS 6.5 qcow2 driver non per.    file   NO       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.75  02:00:c0:a8:7d:4b
                                           fe80::400:c0ff:fea8:7d4b

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node2       delete-recreate  user  12/10 16:44:59   0d 00h41m   0h00m03s
  1 one-node2       none             none  12/10 17:26:59   0d 00h02m   0h00m01s

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.75",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  NETWORK="YES",
```

```
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  TARGET="hdb" ]
CPU="0.5"
FEATURES=[
  ACPI="yes" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6025",
  TYPE="VNC" ]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
TEMPLATE_ID="14"
VMID="125"
```

Esto es lo que contiene la plantilla de despliegue de qemu en el datastore:

```
[root@Testit 125]# more deployment.1
<domain type='qemu' xmlns:qemu='http://libvirt.org/schemas/domain/qemu/1.0'>
        <name>one-125</name>
        <cputune>
                <shares>512</shares>
        </cputune>
        <memory>524288</memory>
        <os>
                <type arch='x86_64'>hvm</type>
                <boot dev='hd'/>
        </os>
        <devices>
                <emulator>/usr/libexec/qemu-kvm</emulator>
                <disk type='file' device='disk'>
                        <source file='/var/lib/one//datastores/0/125/disk.0'/>
                        <target dev='hda'/>
                        <driver name='qemu' type='qcow2' cache='none'/>
                </disk>
                <disk type='file' device='cdrom'>
                        <source file='/var/lib/one//datastores/0/125/disk.1'/>
                        <target dev='hdb'/>
                        <readonly/>
                        <driver name='qemu' type='raw'/>
                </disk>
                <interface type='bridge'>
```

```
                        <source bridge='virbr0'/>
                        <mac address='02:00:c0:a8:7d:4b'/>
                </interface>
                <graphics type='vnc' listen='0.0.0.0' port='6025'/>
        </devices>
        <features>
                <acpi/>
        </features>
</domain>
```

Y este es el perfil que utiliza la hipervisora en el servidor one-node2:

```
[root@one-node2 ~]# virsh dumpxml one-125
<domain type='qemu' id='22'>
  <name>one-125</name>
  <uuid>fa0012cf-7df3-289c-4282-7a4e883dc848</uuid>
  <memory unit='KiB'>524288</memory>
  <currentMemory unit='KiB'>524288</currentMemory>
  <vcpu placement='static'>1</vcpu>
  <cputune>
    <shares>512</shares>
  </cputune>
  <os>
    <type arch='x86_64' machine='rhel6.4.0'>hvm</type>
    <boot dev='hd'/>
  </os>
  <features>
    <acpi/>
  </features>
  <clock offset='utc'/>
  <on_poweroff>destroy</on_poweroff>
  <on_reboot>restart</on_reboot>
  <on_crash>destroy</on_crash>
  <devices>
    <emulator>/usr/libexec/qemu-kvm</emulator>
    <disk type='file' device='disk'>
      <driver name='qemu' type='qcow2' cache='none'/>
      <source file='/var/lib/one//datastores/0/125/disk.0'/>
      <target dev='hda' bus='ide'/>
      <alias name='ide0-0-0'/>
      <address type='drive' controller='0' bus='0' target='0' unit='0'/>
    </disk>
    <disk type='file' device='cdrom'>
      <driver name='qemu' type='raw'/>
      <source file='/var/lib/one//datastores/0/125/disk.1'/>
      <target dev='hdb' bus='ide'/>
      <readonly/>
```

```
      <alias name='ide0-0-1'/>
      <address type='drive' controller='0' bus='0' target='0' unit='1'/>
    </disk>
    <controller type='usb' index='0'>
      <alias name='usb0'/>
      <address type='pci' domain='0x0000' bus='0x00' slot='0x01' function='0x2'/>
    </controller>
    <controller type='ide' index='0'>
      <alias name='ide0'/>
      <address type='pci' domain='0x0000' bus='0x00' slot='0x01' function='0x1'/>
    </controller>
    <interface type='bridge'>
      <mac address='02:00:c0:a8:7d:4b'/>
      <source bridge='virbr0'/>
      <target dev='vnet6'/>
      <alias name='net0'/>
      <address type='pci' domain='0x0000' bus='0x00' slot='0x03' function='0x0'/>
    </interface>
    <input type='mouse' bus='ps2'/>
    <graphics type='vnc' port='6025' autoport='no' listen='0.0.0.0'>
      <listen type='address' address='0.0.0.0'/>
    </graphics>
    <video>
      <model type='cirrus' vram='9216' heads='1'/>
      <alias name='video0'/>
      <address type='pci' domain='0x0000' bus='0x00' slot='0x02' function='0x0'/>
    </video>
    <memballoon model='virtio'>
      <alias name='balloon0'/>
      <address type='pci' domain='0x0000' bus='0x00' slot='0x04' function='0x0'/>
    </memballoon>
  </devices>
  <seclabel type='none'/>
</domain>
```

Vamos a entrar en la máquina y a apagarla.

```
[root@one-node2 ~]# su - oneadmin
[oneadmin@one-node2 ~]$ ping 192.168.125.75
PING 192.168.125.75 (192.168.125.75) 56(84) bytes of data.
64 bytes from 192.168.125.75: icmp_seq=1 ttl=64 time=7.69 ms
64 bytes from 192.168.125.75: icmp_seq=2 ttl=64 time=1.11 ms
64 bytes from 192.168.125.75: icmp_seq=3 ttl=64 time=0.505 ms
64 bytes from 192.168.125.75: icmp_seq=4 ttl=64 time=0.460 ms
64 bytes from 192.168.125.75: icmp_seq=5 ttl=64 time=0.414 ms
^C
--- 192.168.125.75 ping statistics ---
```

```
5 packets transmitted, 5 received, 0% packet loss, time 4204ms
rtt min/avg/max/mdev = 0.414/2.037/7.693/2.839 ms
[oneadmin@one-node2 ~]$ ssh root@192.168.125.75
Last login: Thu Dec  5 13:03:35 2013
[root@localhost ~]# init 0
[root@localhost ~]# Connection to 192.168.125.75 closed by remote host.
Connection to 192.168.125.75 closed.
```

Comprobamos que cuando apagamos la máquina, esta desaparece de la hipervisora:

```
[root@one-node2 ~]# virsh list --all
 Id    Name                           State
----------------------------------------------------

 17    one-70                         running
 18    one-71                         running
 19    one-119                        running
 22    one-125                        running

[root@one-node2 ~]# virsh list --all
 Id    Name                           State
----------------------------------------------------

 17    one-70                         running
 18    one-71                         running
 19    one-119                        running
```

Y como no la hemos apagado a través del interfaz de OpenNebula, su estado permanece desconocido hasta que haga el refresco de estado:

```
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   16     64M one-node2   48d 01h07
    71 oneadmin oneadmin tty1 2 NICs     runn   14     64M one-node2   48d 01h07
   117 oneadmin oneadmin tty_vlan7_1     runn   15     64M one-node4    6d 23h30
   119 oneadmin oneadmin tty_vlan7_insid runn   13     64M one-node2    6d 17h05
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    6d 15h57
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    6d 01h06
   122 oneadmin oneadmin tty_vlan8_insid runn   19     64M one-node1    6d 01h06
   124 oneadmin oneadmin tty3 2NICs Cont runn   14     64M one-node1    1d 05h37
   125 oneadmin oneadmin CentOS 6.5 2    unkn   93    512M one-node2    0d 00h51
```

Bueno, vamos a clonar la imagen qcow para trabajar con otra versión que sea persistente.

```
[oneadmin@one-admin template_files]$ oneimage clone 7 "CentOS 6.5 qcow pesistente"
ID: 8
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    6
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   6 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No rdy     0
   7 oneadmin   oneadmin   CentOS 6.5 qcow qcow2_imag    3.2G OS    No used    1
   8 oneadmin   oneadmin   CentOS 6.5 qcow qcow2_imag    3.2G OS    No lock    0
```

Como está copiando la imagen original, tardará un tiempo en tenerla disponible.

```
[oneadmin@one-admin template_files]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    6
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   6 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No rdy     0
   7 oneadmin   oneadmin   CentOS 6.5 qcow qcow2_imag    3.2G OS    No used    1
   8 oneadmin   oneadmin   CentOS 6.5 qcow qcow2_imag    3.2G OS    No rdy     0
[oneadmin@one-admin template_files]$ more centos65_x86_64_qcow2_persistent.tmpl
NAME          = "CentOS 6.5 qcow2 driver persistent"
PATH          = /tmp/centos65_x86_64.qcow2
TYPE          = OS
DRIVER        = qcow2
DESCRIPTION   = "CentOS 6.5 64 bits with qcow2 driver persistent"
[oneadmin@one-admin template_files]$ oneimage update 8 centos65_x86_64_qcow2_persistent.tmpl
[oneadmin@one-admin template_files]$ oneimage show 8
IMAGE 8 INFORMATION
ID             : 8
NAME           : CentOS 6.5 qcow pesistente
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : qcow2_images
TYPE           : OS
REGISTER TIME  : 12/10 17:39:53
PERSISTENT     : No
SOURCE         : /var/lib/one/datastores/100/080374a0b2494c14832f3ae66d881980
PATH           : /var/lib/one/datastores/100/0614c46c17394903e83d1d8816ec665c
SIZE           : 3.2G
STATE          : rdy
RUNNING_VMS    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="CentOS 6.5 64 bits with qcow2 driver persistent"
DRIVER="qcow2"
NAME="CentOS 6.5 qcow2 driver persistent"
PATH="/tmp/centos65_x86_64.qcow2"
TYPE="OS"

VIRTUAL MACHINES
```

```
[oneadmin@one-admin template_files]$ oneimage persistent 8
[oneadmin@one-admin template_files]$ oneimage show 8
IMAGE 8 INFORMATION
ID             : 8
NAME           : CentOS 6.5 qcow pesistente
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : qcow2_images
TYPE           : OS
REGISTER TIME  : 12/10 17:39:53
PERSISTENT     : Yes
SOURCE         : /var/lib/one/datastores/100/080374a0b2494c14832f3ae66d881980
PATH           : /var/lib/one/datastores/100/0614c46c17394903e83d1d8816ec665c
SIZE           : 3.2G
STATE          : rdy
RUNNING_VMS    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="CentOS 6.5 64 bits with qcow2 driver persistent"
DRIVER="qcow2"
NAME="CentOS 6.5 qcow2 driver persistent"
PATH="/tmp/centos65_x86_64.qcow2"
TYPE="OS"

VIRTUAL MACHINES
```

Bien, ahora creamos una nueva plantilla que use esta imagen, para ver como se comporta.

```
[oneadmin@one-admin template_files]$ more centos65_1NIC_qcow_per.tmpl
NAME="CentOS 6.5 1NIC qcow2 persistent"
CPU="0.5"
DISK=[
  IMAGE_ID="8" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
FEATURES=[
```

```
  ACPI="yes" ]
NIC = [ NETWORK="Internet LAN" ]


CONTEXT=[
  HOSTNAME = CentOS_65-$VMID,
  NETWORK        = "YES",
  SSH_PUBLIC_KEY = "ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  DNS            = "8.8.4.4 8.8.8.8" ]
[oneadmin@one-admin template_files]$ onetemplate create centos65_1NIC_qcow_per.tmpl
ID: 15
[oneadmin@one-admin template_files]$ onetemplate list
  ID USER            GROUP           NAME                              REGTIME
   0 oneadmin        oneadmin        tty template                 10/20 00:31:36
   1 oneadmin        oneadmin        tty public                   10/21 16:20:21
   2 oneadmin        oneadmin        tty public2                  10/22 00:02:56
   3 oneadmin        oneadmin        tty public nodes 3 4         10/22 01:10:12
   4 oneadmin        oneadmin        tty public 2 NICs nodes 3 4  10/22 11:27:40
   5 oneadmin        oneadmin        tty 2 NICs                   10/23 17:24:04
   6 oneadmin        oneadmin        routervlan7                  12/02 16:47:34
   8 oneadmin        oneadmin        tty 2 NICs VLAN7             12/03 15:56:57
   9 oneadmin        oneadmin        tty 2NICs VLAN7 inside       12/04 00:22:12
  10 oneadmin        oneadmin        routervlan8                  12/04 12:39:30
  11 oneadmin        oneadmin        tty 2NICs VLAN8 inside       12/04 12:43:06
  12 oneadmin        oneadmin        CentOS 6.5 1NIC              12/05 18:07:15
  13 oneadmin        oneadmin        tty 2 NICs context           12/09 11:36:10
  14 oneadmin        oneadmin        CentOS 6.5 1NIC qco2         12/10 16:17:45
  15 oneadmin        oneadmin        CentOS 6.5 1NIC qcow2 persi  12/10 18:16:48
[oneadmin@one-admin template_files]$ onetemplate instantiate 15
VM ID: 126
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node2   48d 01h49
    71 oneadmin oneadmin tty1 2 NICs     runn   12     64M one-node2   48d 01h49
   117 oneadmin oneadmin tty_vlan7_1     runn   20     64M one-node4    7d 00h11
   119 oneadmin oneadmin tty_vlan7_insid runn   12     64M one-node2    6d 17h47
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    6d 16h38
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    6d 01h48
   122 oneadmin oneadmin tty_vlan8_insid runn   14     64M one-node1    6d 01h47
   124 oneadmin oneadmin tty3 2NICs Cont runn   14     64M one-node1    1d 06h19
   126 oneadmin oneadmin CentOS 6.5 1NIC pend    0      0K              0d 00h00
[oneadmin@one-admin template_files]$ onevm list
```

```
  ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
  70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node2   48d 01h49
  71 oneadmin oneadmin tty1 2 NICs     runn   12     64M one-node2   48d 01h49
 117 oneadmin oneadmin tty_vlan7_1     runn   17     64M one-node4    7d 00h12
 119 oneadmin oneadmin tty_vlan7_insid runn   12     64M one-node2    6d 17h48
 120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    6d 16h39
 121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    6d 01h49
 122 oneadmin oneadmin tty_vlan8_insid runn   15     64M one-node1    6d 01h48
 124 oneadmin oneadmin tty3 2NICs Cont runn   13     64M one-node1    1d 06h19
 126 oneadmin oneadmin CentOS 6.5 1NIC runn    0      0K one-node2    0d 00h00
```

Ahora vemos que la cosa ha cambiado en el datastore: ya no se crea una imagen diferencial, sino un link a la imagen original:

```
[root@Testit 0]# ll 126
total 372
-rw-rw-r--. 1 oneadmin oneadmin    868 Dec 10 18:18 deployment.0
lrwxrwxrwx. 1 oneadmin oneadmin     60 Dec 10 18:18 disk.0 ->
/var/lib/one/datastores/100/080374a0b2494c14832f3ae66d881980
-rw-r--r--. 1 oneadmin oneadmin 372736 Dec 10 18:18 disk.1
lrwxrwxrwx. 1 oneadmin oneadmin     36 Dec 10 18:18 disk.1.iso ->
/var/lib/one/datastores/0/126/disk.1
```

Esto significa que cualquier modificación que se realice se hará directamente sobre la imagen original. Tenemos que seguir trabajando sobre el tema de la persistencia de las imágenes, y la conservación de los cambios.

Ahora vamos a trabajar en la correcta contextualización de las máquinas. Para poder hacer pruebas con la imagen tty_linux, necesitamos que la máquina quede completamente contextualizada, de forma similar a como lo hace la imagen de Centos 6.5. Para ello, vamos a clonar la imagen en el datastore, y hacerla persistente, para que conserve los cambios realizados.

```
[oneadmin@one-admin ~]$ oneimage list
  ID USER       GROUP      NAME            DATASTORE     SIZE TYPE PER STAT RVMS
   0 oneadmin   oneadmin   ttylinux - kvm  default        40M OS    No used    6
   1 oneadmin   oneadmin   OpenNebula 4.2  default        83M OS    No used    2
   6 oneadmin   oneadmin   CentOS 6.5 qcow default       3.2G OS    No rdy     0
   7 oneadmin   oneadmin   CentOS 6.5 qcow qcow2_imag    3.2G OS    No rdy     0
   8 oneadmin   oneadmin   CentOS 6.5 qcow qcow2_imag    3.2G OS   Yes used    1
[oneadmin@one-admin ~]$ oneimage show 0
IMAGE 0 INFORMATION
ID             : 0
NAME           : ttylinux - kvm
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : default
TYPE           : OS
REGISTER TIME  : 10/19 23:57:44
PERSISTENT     : No
SOURCE         : /var/lib/one/datastores/1/b09f38dfc1c040db8233fa0f09eb02e6
```

```
PATH           : http://marketplace.c12g.com/appliance/4fc76a938fb81d3517000003/download
SIZE           : 40M
STATE          : used
RUNNING_VMS    : 6

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="small image for testing"
DEV_PREFIX="hd"
DRIVER="raw"
MD5="04c7d00e88fa66d9aaa34d9cf8ad6aaa"

VIRTUAL MACHINES

    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   15     64M one-node2   50d 20h07
    71 oneadmin oneadmin tty1 2 NICs     runn   13     64M one-node2   50d 20h07
   117 oneadmin oneadmin tty_vlan7_1     runn   13     64M one-node4    9d 18h30
   119 oneadmin oneadmin tty_vlan7_insid runn   12     64M one-node2    9d 12h06
   122 oneadmin oneadmin tty_vlan8_insid runn   12     64M one-node1    8d 20h06
   124 oneadmin oneadmin tty3 2NICs Cont runn   15     64M one-node1    4d 00h37
```

Vamos a clonar la imagen:

```
[oneadmin@one-admin ~]$ oneimage clone 0 "ttylinuxV2"
ID: 9
[oneadmin@one-admin ~]$ oneimage show 9
IMAGE 9 INFORMATION
ID             : 9
NAME           : ttylinuxV2
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : default
TYPE           : OS
REGISTER TIME  : 12/13 12:37:37
PERSISTENT     : No
SOURCE         :
PATH           : /var/lib/one/datastores/1/b09f38dfc1c040db8233fa0f09eb02e6
SIZE           : 40M
STATE          : lock
RUNNING_VMS    : 0

PERMISSIONS
```

```
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="small image for testing"
DEV_PREFIX="hd"
DRIVER="raw"
FSTYPE=""
MD5="04c7d00e88fa66d9aaa34d9cf8ad6aaa"

VIRTUAL MACHINES
```

Y cuando ha terminado el proceso, ya tenemos la imagen clonada:

```
[oneadmin@one-admin ~]$ oneimage show 9
IMAGE 9 INFORMATION
ID             : 9
NAME           : ttylinuxV2
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : default
TYPE           : OS
REGISTER TIME  : 12/13 12:37:37
PERSISTENT     : No
SOURCE         : /var/lib/one/datastores/1/bc97bdfd85f230f4dcfd2bfd25c3f511
PATH           : /var/lib/one/datastores/1/b09f38dfc1c040db8233fa0f09eb02e6
SIZE           : 40M
STATE          : rdy
RUNNING_VMS    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="small image for testing"
DEV_PREFIX="hd"
DRIVER="raw"
FSTYPE=""
MD5="04c7d00e88fa66d9aaa34d9cf8ad6aaa"

VIRTUAL MACHINES
```

Ahora hacemos la imagen persistente:

```
[oneadmin@one-admin ~]$ oneimage persistent 9
[oneadmin@one-admin ~]$ oneimage show 9
IMAGE 9 INFORMATION
ID             : 9
NAME           : ttylinuxV2
USER           : oneadmin
GROUP          : oneadmin
DATASTORE      : default
TYPE           : OS
REGISTER TIME  : 12/13 12:37:37
PERSISTENT     : Yes
SOURCE         : /var/lib/one/datastores/1/bc97bdfd85f230f4dcfd2bfd25c3f511
PATH           : /var/lib/one/datastores/1/b09f38dfc1c040db8233fa0f09eb02e6
SIZE           : 40M
STATE          : rdy
RUNNING_VMS    : 0

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

IMAGE TEMPLATE
DESCRIPTION="small image for testing"
DEV_PREFIX="hd"
DRIVER="raw"
FSTYPE=""
MD5="04c7d00e88fa66d9aaa34d9cf8ad6aaa"

VIRTUAL MACHINES
```

Ahora preparamos una plantilla para poder instanciarla, y trabajar sobre ella. Vamos a hacer que pueda conectarse con la máquina CentOS que tenemos funcionando con contextualización, con la idea de poder copiar y adaptar los scripts de contextualización sobre la nueva instancia.

```
[oneadmin@one-admin template_files]$ more ttyV2_contextP.tmpl
NAME="tty_linuxV2 persistent"
CPU="0.1"
DISK=[
  IMAGE_ID="9" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
FEATURES=[
```

```
  ACPI="no" ]
NIC = [ NETWORK="Internet LAN" ]
NIC = [ NETWORK="RTVLAN8" ]


CONTEXT=[
  NETWORK        = "YES",
  SSH_PUBLIC_KEY = "ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  DNS            = "8.8.4.4 8.8.8.8" ]
[oneadmin@one-admin template_files]$ onetemplate create ttyV2_contextP.tmpl
ID: 16
[oneadmin@one-admin template_files]$ onetemplate show 16
TEMPLATE 16 INFORMATION
ID             : 16
NAME           : tty_linuxV2 persistent
USER           : oneadmin
GROUP          : oneadmin
REGISTER TIME  : 12/13 12:50:59

PERMISSIONS
OWNER          : um-
GROUP          : ---
OTHER          : ---

TEMPLATE CONTENTS
CONTEXT=[
  DNS="8.8.4.4 8.8.8.8",
  NETWORK="YES",
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin" ]
CPU="0.1"
DISK=[
  IMAGE_ID="9" ]
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  TYPE="VNC" ]
MEMORY="64"
```

```
NIC=[
  NETWORK="Internet LAN" ]
NIC=[
  NETWORK="RTVLAN8" ]
```

Y lanzamos la instancia. Nota: como trabajamos con una imagen persistente, sólo podemos lanzar una instancia con esta imagen.

```
[oneadmin@one-admin template_files]$ onetemplate instantiate 16 --name "tty_linuxV2 1"
VM ID: 127
[oneadmin@one-admin template_files]$ onevm show 127
VIRTUAL MACHINE 127 INFORMATION
ID                  : 127
NAME                : tty_linuxV2 1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node4
START TIME          : 12/13 12:52:37
END TIME            : -
DEPLOY ID           : one-127

VIRTUAL MACHINE MONITORING
USED MEMORY         : 64M
NET_RX              : 7K
USED CPU            : 10
NET_TX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                              TYPE SAVE SAVE_AS
  0 hda    ttylinuxV2                         file  YES       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.2   02:00:c0:a8:7d:02
                                           fe80::400:c0ff:fea8:7d02
  1 RTVLAN8               yes brhm8        192.168.128.4   02:00:c0:a8:80:04
                                           fe80::400:c0ff:fea8:8004

VIRTUAL MACHINE HISTORY
```

```
SEQ HOST            ACTION          REAS           START        TIME     PROLOG
  0 one-node4       none            none   12/13 12:52:51   0d 00h04m   0h00m02s

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.2",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  ETH1_IP="192.168.128.4",
  ETH1_MASK="255.255.248.0",
  ETH1_NETWORK="192.168.128.0/21",
  NETWORK="YES",
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  TARGET="hdb" ]
CPU="0.1"
FEATURES=[
  ACPI="no" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6027",
  TYPE="VNC" ]
MEMORY="64"
TEMPLATE_ID="16"
VMID="127"
```

Bien, como la instancia de CentOS 6.5 contextualizada por nosotros tiene una sola VLAN conectada a la salida del bridge del host2, vamos a migrar esta instancia del host4 al host2, para que se puedan ver entre si, ya que esa VLAN no usa 802.1Q y no está interconectada entre los hosts.

```
[oneadmin@one-admin template_files]$ onevm migrate 127 11 --live
[oneadmin@one-admin template_files]$ onevm list
    ID USER     GROUP    NAME            STAT UCPU    UMEM HOST             TIME
    70 oneadmin oneadmin tty0 2 NICs     runn   13     64M one-node2   50d 20h41
    71 oneadmin oneadmin tty1 2 NICs     runn   11     64M one-node2   50d 20h41
   117 oneadmin oneadmin tty_vlan7_1     runn   12     64M one-node4    9d 19h03
   119 oneadmin oneadmin tty_vlan7_insid runn   13     64M one-node2    9d 12h39
   120 oneadmin oneadmin router_vlan7_1  runn    0    512M one-node1    9d 11h30
   121 oneadmin oneadmin router_vlan8_1  runn    0    512M one-node4    8d 20h40
```

```
   122 oneadmin oneadmin tty_vlan8_insid runn   13     64M one-node1    8d 20h39
   124 oneadmin oneadmin tty3 2NICs Cont runn   16     64M one-node1    4d 01h10
   126 oneadmin oneadmin CentOS 6.5 1NIC runn    0  542.7M one-node2    2d 18h51
   127 oneadmin oneadmin tty_linuxV2 1   runn    1     64M one-node2    0d 00h17
[oneadmin@one-admin template_files]$ onevm show 126
VIRTUAL MACHINE 126 INFORMATION
ID                  : 126
NAME                : CentOS 6.5 1NIC qcow2 persistent-126
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
START TIME          : 12/10 18:17:52
END TIME            : -
DEPLOY ID           : one-126

VIRTUAL MACHINE MONITORING
USED MEMORY         : 517.9M
NET_RX              : 6.2M
USED CPU            : 0
NET_TX              : 1K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                               TYPE SAVE SAVE_AS
  0 hda    CentOS 6.5 qcow pesistente          file  YES       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.75  02:00:c0:a8:7d:4b
                                           fe80::400:c0ff:fea8:7d4b

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node2       none             none  12/10 18:18:14   2d 18h53m   0h00m02s

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DISK_ID="1",
```

```
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.75",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  HOSTNAME="CentOS_65-126",
  NETWORK="YES",
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  TARGET="hdb" ]
CPU="0.5"
FEATURES=[
  ACPI="yes" ]
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6026",
  TYPE="VNC" ]
MEMORY="512"
OS=[
  ARCH="x86_64",
  BOOT="hd" ]
TEMPLATE_ID="15"
VMID="126"
[oneadmin@one-admin template_files]$ onevm show 127
VIRTUAL MACHINE 127 INFORMATION
ID                  : 127
NAME                : tty_linuxV2 1
USER                : oneadmin
GROUP               : oneadmin
STATE               : ACTIVE
LCM_STATE           : RUNNING
RESCHED             : No
HOST                : one-node2
START TIME          : 12/13 12:52:37
END TIME            : -
DEPLOY ID           : one-127

VIRTUAL MACHINE MONITORING
NET_RX              : 5K
USED CPU            : 12
USED MEMORY         : 64M
```

```
NET_TX              : 0K

PERMISSIONS
OWNER               : um-
GROUP               : ---
OTHER               : ---

VM DISKS
 ID TARGET IMAGE                           TYPE SAVE SAVE_AS
  0 hda    ttylinuxV2                      file  YES       -

VM NICS
 ID NETWORK              VLAN BRIDGE       IP              MAC
  0 Internet LAN           no virbr0       192.168.125.2   02:00:c0:a8:7d:02
                                           fe80::400:c0ff:fea8:7d02
  1 RTVLAN8               yes brhm8        192.168.128.4   02:00:c0:a8:80:04
                                           fe80::400:c0ff:fea8:8004

VIRTUAL MACHINE HISTORY
SEQ HOST            ACTION           REAS           START        TIME     PROLOG
  0 one-node4       live-migrate     user   12/13 12:52:51   0d 00h16m   0h00m02s
  1 one-node2       none             none   12/13 13:09:27   0d 00h02m   0h00m00s

VIRTUAL MACHINE TEMPLATE
CONTEXT=[
  DISK_ID="1",
  DNS="8.8.4.4 8.8.8.8",
  ETH0_DNS="192.168.125.1",
  ETH0_GATEWAY="192.168.125.1",
  ETH0_IP="192.168.125.2",
  ETH0_MASK="255.255.255.0",
  ETH0_NETWORK="192.168.125.0/24",
  ETH1_IP="192.168.128.4",
  ETH1_MASK="255.255.248.0",
  ETH1_NETWORK="192.168.128.0/21",
  NETWORK="YES",
  SSH_PUBLIC_KEY="ssh-dss
AAAAB3NzaC1kc3MAAACBAPBRT1bazpK8uwjtoj0TbDBgWVDSNcik2vv/kT6uHD4VYmZVRnC8XGEDuSgNK/MmoA5Se6WtZTp2jl9nP
TyccIIpEuWJXJj9Cb63zZC93cYhzYg03g21LDS+jGc5CdrbI2cvmKCw+ShIknOEzHS/4pkzK+Gf/LfOtlkkiMjX5MdjAAAAFQC1+D
XEQIq6UlqG4XaHsUAzLytFHwAAAIEA6eC6W3wQeIbHOYKwKxTWJAiZyvj5hAAYG23o+VT0MHjdFm7ulD+vjVe3O0SDazQh9L9/yls
5IXu3cCVQyx7181BT8W6bk821N8F+LrN60mOuMeKz1hKiXHkTcU+c42MiRBac483gCwmGFaE0koWmUwWrbNvWmgdAsSN6jhtIDEcA
AACAIjL2gDd6+Q5V5jKMVMrrWIOgt69ScMnxjvw3v5wzvDE4cN3ckeEtQmn1CAZfQTvrzJ1y6GlRxWFJeNEPRDBIXvLFSh/sA51v2
Sueh5NNsQVITSbP6rp8Kc6obwCLJgWm2gD7cPICDhMfid7HtWy9cKBNhTHeS08AnFgRLq3jhnc= oneadmin@one-admin",
  TARGET="hdb" ]
CPU="0.1"
FEATURES=[
  ACPI="no" ]
```

```
GRAPHICS=[
  LISTEN="0.0.0.0",
  PORT="6027",
  TYPE="VNC" ]
MEMORY="64"
TEMPLATE_ID="16"
VMID="127"
```

Vamos a entrar en las dos máquinas, desde el host2: la 192.168.125.2 es la del tty_linux y la 192.168.125.75 la del CentOS 6.5:

```
[root@one-node2 ~]# ssh root@192.168.125.2
root@192.168.125.2's password:

Chop wood, carry water.

# PS1="${USER}@$HOSTNAME # "
root@ttylinux_host #

[root@one-node2 ~]# ssh root@192.168.125.75
The authenticity of host '192.168.125.75 (192.168.125.75)' can't be established.
RSA key fingerprint is 3f:d6:b0:75:21:0a:3e:93:53:5a:ee:8e:b9:8a:9e:17.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.125.75' (RSA) to the list of known hosts.
root@192.168.125.75's password:
Last login: Thu Dec 12 18:16:17 2013
[root@localhost ~]# rpm -ql opennebula-context
/etc/init.d/vmcontext
/etc/one-context.d/00-network
/etc/one-context.d/01-dns
/etc/one-context.d/02-ssh_public_key
/etc/one-context.d/03-selinux-ssh
/etc/one-context.d/04-mount-swap
/etc/udev/rules.d/75-cd-aliases-generator.rules
/etc/udev/rules.d/75-persistent-net-generator.rules
```

Como la imagen tty_linux ya está ligeramente contextualizada, y no utiliza ni udev ni SELinux, copiaremos los siguientes scripts:

```
/etc/init.d/vmcontext
/etc/one-context.d/00-network
/etc/one-context.d/01-dns
/etc/one-context.d/02-ssh_public_key
/etc/one-context.d/04-mount-swap
[root@localhost ~]# cd /etc
[root@localhost etc]# scp -Crp one-context.d root@192.168.125.2:/etc/
The authenticity of host '192.168.125.2 (192.168.125.2)' can't be established.
RSA key fingerprint is 5b:d6:3a:a9:8a:53:21:66:70:0c:b7:26:34:45:b1:27.
Are you sure you want to continue connecting (yes/no)? yes
```

```
Warning: Permanently added '192.168.125.2' (RSA) to the list of known hosts.
root@192.168.125.2's password:
01-dns                                                                        100%
1617     1.6KB/s   00:01
03-selinux-ssh                                                                100%
28       0.0KB/s   00:00
02-ssh_public_key                                                             100%
1550     1.5KB/s   00:00
04-mount-swap                                                                 100%
15       0.0KB/s   00:00
00-network                                                                    100%
3735     3.7KB/s   00:00
[root@localhost init.d]# scp -Cp vmcontext root@192.168.125.2:/etc/rc.d/init.d/
root@192.168.125.2's password:
vmcontext                                                                     100%
2133     2.1KB/s   00:00
[root@localhost init.d]#
```

Bien, ahora trabajamos desde la máquina tty_linux. Esta máquina es una distribución diferente de Linux, y por tanto la estructura de directorios no es igual a la de CentOS:

```
root@ttylinux_host # pwd
/etc/rc.d
root@ttylinux_host # ll *
-rw-r--r--    1 root     root          179 Sep  7  2009 rc.context
-rw-r--r--    1 root     root         3.4K Aug 18  2009 rc.functions
-rwxr-xr-x    1 root     root         1.1K Sep  2  2009 rc.local*
-rwxr-xr-x    1 root     root         3.9K Aug 18  2009 rc.sysdone*
-rwxr-xr-x    1 root     root        15.0K Aug 18  2009 rc.sysinit*

init.d:
drwxr-xr-x    2 root     root         1.0K Dec 13 12:42 ./
drwxr-xr-x    5 root     root         1.0K Sep  7  2009 ../
-rwxr-xr-x    1 root     root         4.2K Aug 18  2009 firewall*
-rwxr-xr-x    1 root     root         3.3K Aug 18  2009 inetd*
-rwxr-xr-x    1 root     root         4.4K Aug 18  2009 network*
-rwxr-xr-x    1 root     root         2.9K Aug 18  2009 random*
-rwxr-xr-x    1 root     root         4.0K Aug 18  2009 sshd*
-rwxr-xr-x    1 root     root         3.5K Aug 18  2009 syslog*
-rwxr-xr-x    1 root     root         2.1K Jul 24 16:37 vmcontext*
-rwxr-xr-x    1 root     root         3.0K Sep  7  2009 vmcontexttty*

rc.shutdown:
drwxr-xr-x    2 root     root         1.0K Aug 18  2009 ./
drwxr-xr-x    5 root     root         1.0K Sep  7  2009 ../
lrwxrwxrwx    1 root     root           15 Sep  2  2009 20.inetd -> ../init.d/inetd*
lrwxrwxrwx    1 root     root           14 Sep  2  2009 30.sshd -> ../init.d/sshd*
lrwxrwxrwx    1 root     root           17 Sep  2  2009 40.network -> ../init.d/network*
lrwxrwxrwx    1 root     root           16 Sep  2  2009 50.syslog -> ../init.d/syslog*
```

```
lrwxrwxrwx    1 root     root           16 Sep  2  2009 99.random -> ../init.d/random*

rc.startup:
drwxr-xr-x    2 root     root         1.0K Oct 29  2009 ./
drwxr-xr-x    5 root     root         1.0K Sep  7  2009 ../
lrwxrwxrwx    1 root     root           16 Sep  2  2009 00.random -> ../init.d/random*
lrwxrwxrwx    1 root     root           16 Sep  2  2009 05.syslog -> ../init.d/syslog*
lrwxrwxrwx    1 root     root           22 Sep  7  2009 09.vmcontexttty -> ../init.d/vmcontexttty*
lrwxrwxrwx    1 root     root           17 Sep  2  2009 10.network -> ../init.d/network*
lrwxrwxrwx    1 root     root           14 Sep  2  2009 20.sshd -> ../init.d/sshd*
lrwxrwxrwx    1 root     root           15 Sep  2  2009 30.inetd -> ../init.d/inetd*
```

En el directorio /etc/rc.d/rc.startup/ podemos ver el enlace 09.vmcontexttty -> ../init.d/vmcontexttty Vamos a modificar el fichero vmcontext, trabajando sobre una copia, para poder montar la unidad de contextualización como si fuese una unidad de CDROM.

```
root@ttylinux_host # cp vmcontext vmcontext.org
root@ttylinux_host # diff vmcontext vmcontext.org
--- vmcontext   Fri Dec 13 13:13:52 2013
+++ vmcontext.org       Fri Dec 13 12:52:17 2013
@@ -50,12 +50,16 @@
     done
 }

-mount -t iso9660 -o ro /dev/hdb /mnt/context
+if [ -e "/dev/disk/by-label/CONTEXT" ]; then
+    mount -t iso9660 -L CONTEXT -o ro /mnt
+    if [ -f /mnt/context.sh ]; then
+        export_rc_vars /mnt/context.sh
+    fi

-if [ -f /mnt/context/context.sh ]; then
-    export_rc_vars /mnt/context/context.sh
     execute_scripts
-    umount /mnt/context
+
+    umount /mnt
 else
-    . /etc/rc.d/init.d/vmcontexttty
+    execute_scripts
 fi
+
```

Por si no queda claro, estas son las líneas de código del nuevo script:

```
#!/bin/bash
#
```

```
function export_rc_vars
{
    if [ -f $1 ] ; then
        ONE_VARS=`cat $1 | egrep -e '^[a-zA-Z\-\_0-9]*=' | sed 's/=.*$//'`

        . $1

        for v in $ONE_VARS; do
            export $v
        done
    fi
}

function execute_scripts {
    SCRIPTS_DIR="/etc/one-context.d"
    for script in $SCRIPTS_DIR/*; do
        $script
    done
}

mount -t iso9660 -o ro /dev/hdb /mnt/context

if [ -f /mnt/context/context.sh ]; then
    export_rc_vars /mnt/context/context.sh
    execute_scripts
    umount /mnt/context
else
    . /etc/rc.d/init.d/vmcontexttty
fi
```

Ahora modificamos el fichero /etc/rc.d/rc.local para que no ejecute el fichero rc.context del mismo directorio:

```
root@ttylinux_host # ll
drwxr-xr-x    5 root     root         1.0K Sep  7  2009 ./
drwxr-xr-x    8 root     root         1.0K Dec 13 12:39 ../
drwxr-xr-x    2 root     root         1.0K Dec 13 12:52 init.d/
-rw-r--r--    1 root     root          179 Sep  7  2009 rc.context
-rw-r--r--    1 root     root         3.4K Aug 18  2009 rc.functions
-rwxr-xr-x    1 root     root         1.1K Sep  2  2009 rc.local*
drwxr-xr-x    2 root     root         1.0K Aug 18  2009 rc.shutdown/
drwxr-xr-x    2 root     root         1.0K Oct 29  2009 rc.startup/
-rwxr-xr-x    1 root     root         3.9K Aug 18  2009 rc.sysdone*
-rwxr-xr-x    1 root     root        15.0K Aug 18  2009 rc.sysinit*
root@ttylinux_host # diff  rc.local rc.local.org
--- rc.local    Fri Dec 13 13:19:57 2013
+++ rc.local.org        Fri Dec 13 13:19:00 2013
```

```
@@ -25,6 +25,8 @@
                echo "keycode 111 = Delete"    | /bin/loadkeys
        fi

+       # OpenNebula Contextualization
+       . /etc/rc.d/rc.context


root@ttylinux_host # rm rc.local.org
rm: remove 'rc.local.org'? y
root@ttylinux_host # rm rc.context
rm: remove 'rc.context'? y
root@ttylinux_host # cd rc.startup/
root@ttylinux_host # ll
drwxr-xr-x    2 root     root         1.0K Oct 29  2009 ./
drwxr-xr-x    5 root     root         1.0K Dec 13 13:20 ../
lrwxrwxrwx    1 root     root           16 Sep  2  2009 00.random -> ../init.d/random*
lrwxrwxrwx    1 root     root           16 Sep  2  2009 05.syslog -> ../init.d/syslog*
lrwxrwxrwx    1 root     root           22 Sep  7  2009 09.vmcontexttty -> ../init.d/vmcontexttty*
lrwxrwxrwx    1 root     root           17 Sep  2  2009 10.network -> ../init.d/network*
lrwxrwxrwx    1 root     root           14 Sep  2  2009 20.sshd -> ../init.d/sshd*
lrwxrwxrwx    1 root     root           15 Sep  2  2009 30.inetd -> ../init.d/inetd*
root@ttylinux_host # rm 09.vmcontexttty
rm: remove '09.vmcontexttty'? y
root@ttylinux_host # ln -s ../init.d/vmcontext 09.vmcontext
root@ttylinux_host # ll
drwxr-xr-x    2 root     root         1.0K Dec 13 13:21 ./
drwxr-xr-x    5 root     root         1.0K Dec 13 13:20 ../
lrwxrwxrwx    1 root     root           16 Sep  2  2009 00.random -> ../init.d/random*
lrwxrwxrwx    1 root     root           16 Sep  2  2009 05.syslog -> ../init.d/syslog*
lrwxrwxrwx    1 root     root           19 Dec 13 13:21 09.vmcontext -> ../init.d/vmcontext*
lrwxrwxrwx    1 root     root           17 Sep  2  2009 10.network -> ../init.d/network*
lrwxrwxrwx    1 root     root           14 Sep  2  2009 20.sshd -> ../init.d/sshd*
lrwxrwxrwx    1 root     root           15 Sep  2  2009 30.inetd -> ../init.d/inetd*
```

Y limpiamos el directorio /etc/one-context.d/

```
root@ttylinux_host # cd /etc/one-context.d/
root@ttylinux_host # ll
drwxr-xr-x    2 root     root         1.0K Dec  5 11:31 ./
drwxr-xr-x    8 root     root         1.0K Dec 13 12:39 ../
-rwxr-xr-x    1 root     root         3.6K Jul 24 16:37 00-network*
-rwxr-xr-x    1 root     root         1.6K Jul 24 16:37 01-dns*
-rwxr-xr-x    1 root     root         1.5K Jul 24 16:37 02-ssh_public_key*
-rwxr-xr-x    1 root     root           28 Jul 24 16:37 03-selinux-ssh*
-rwxr-xr-x    1 root     root           15 Jul 24 16:37 04-mount-swap*
```

```
root@ttylinux_host # rm 03-selinux-ssh
rm: remove '03-selinux-ssh'? y
root@ttylinux_host # rm 04-mount-swap
rm: remove '04-mount-swap'? y
```

Con esto ya estaría todo preparado para contextualizar completamente la imagen.

Esto lo usamos para poner el prompt de la línea de comandos correctamente:

```
export PS1='[\u@\h \w]\$ '
```

Lo agregamos al final del fichero /etc/profile, y ya tenemos nuestra máquina preparada para migrar al entorno de producción, junto con la imagen de CentOS 6.5 completamente contextualizada desde cero por nosotros.

Con estos pasos damos por completadas todas las pruebas realizadas sobre la maqueta. Estas pruebas garantizarán el correcto funcionamiento de la plataforma en el entorno de producción. Con esto finaliza este entregable del TFM, correspondiente al anexo1.