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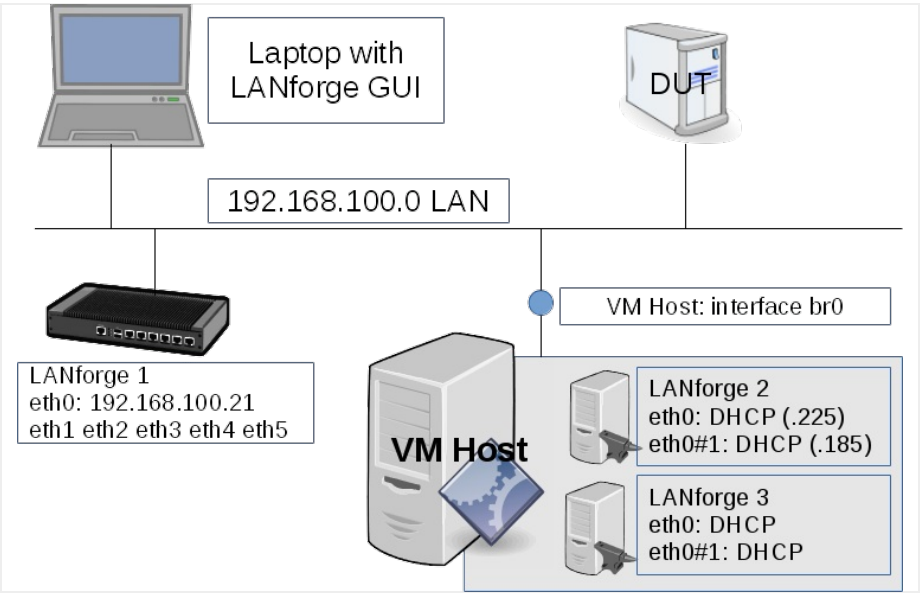
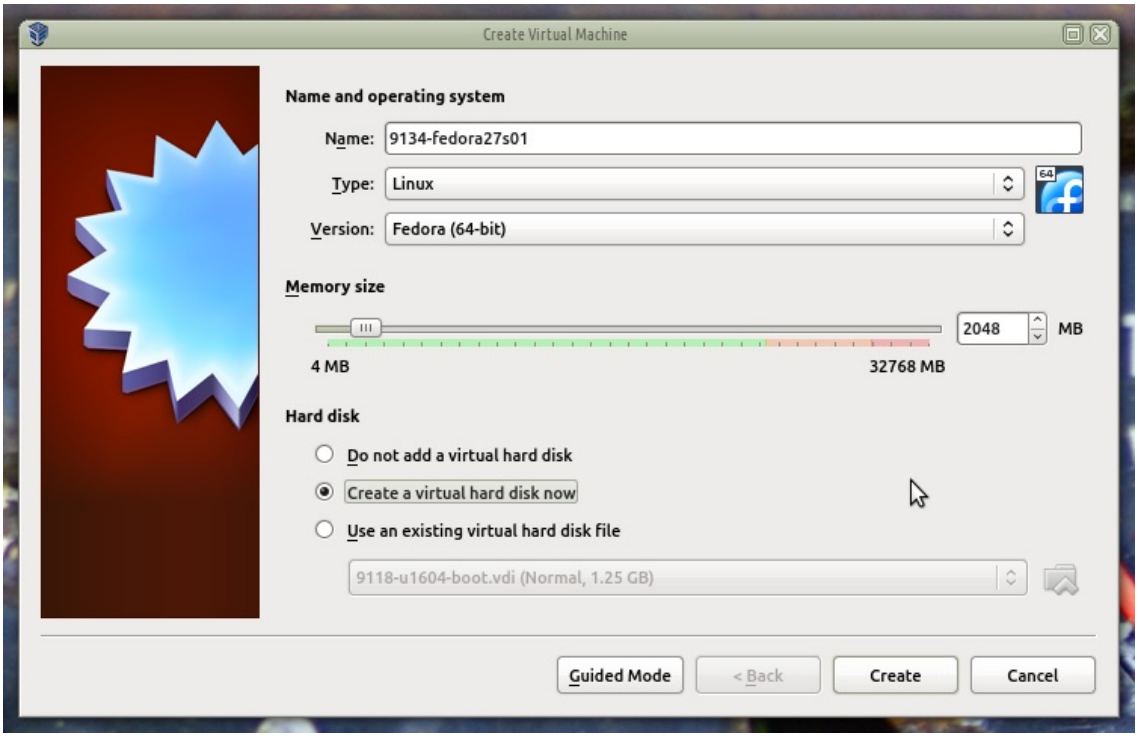
Adding a LANforge Virtual Machine

Goal: Add a virtual machine running LANforge to a LAN with a physical LANforge manager.

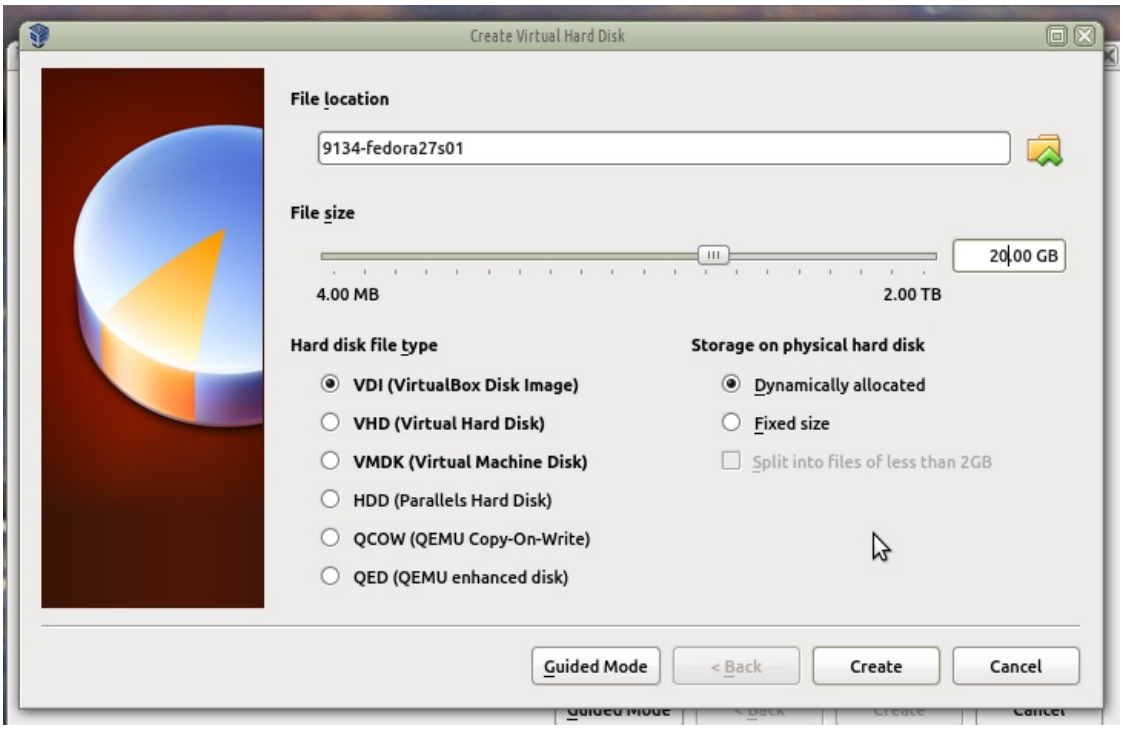
We review the configuration steps necessary to add a virtual LANforge resource. The guest instances will be configured to export MAC-VLAN ports to run traffic on their physical management port. The example here uses VirtualBox 5.2.10 and Fedora 27 Server edition, but our current recommendation for virtual machine platforms is actually **libvirtd/kvm**.



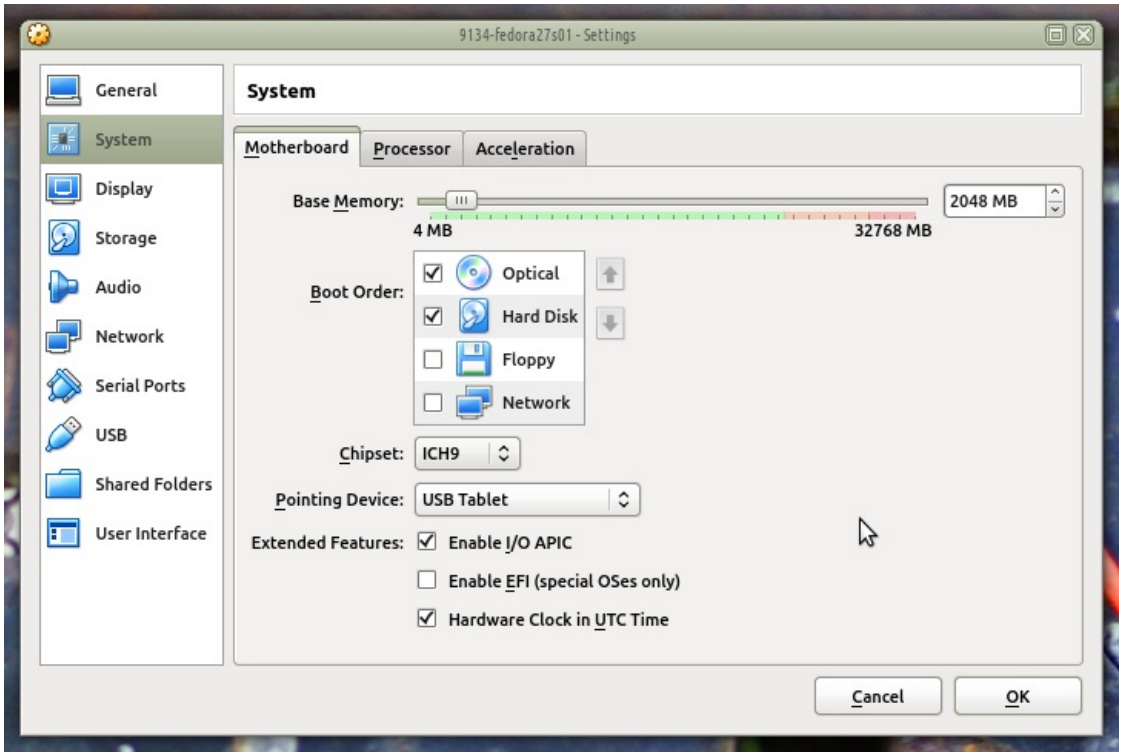
1. Create a new guest instance.
   A. When creating the guest, we should use 2 GB of RAM:



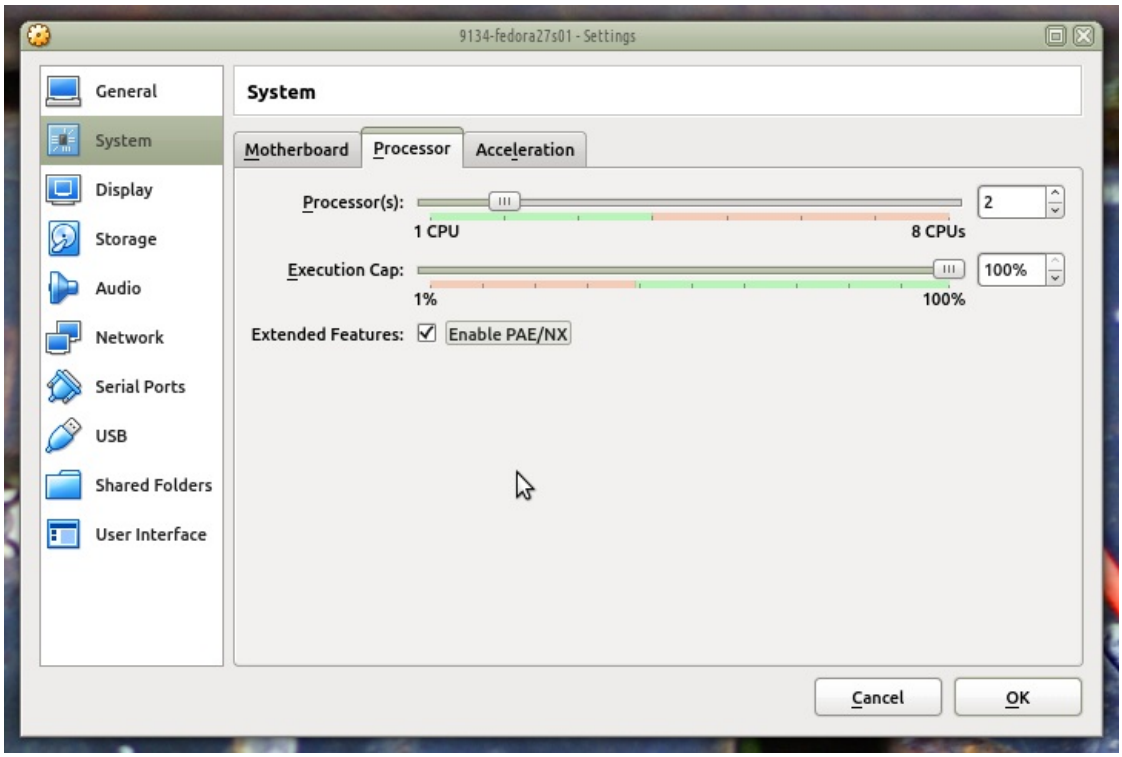
B. **60 GB** of disk:



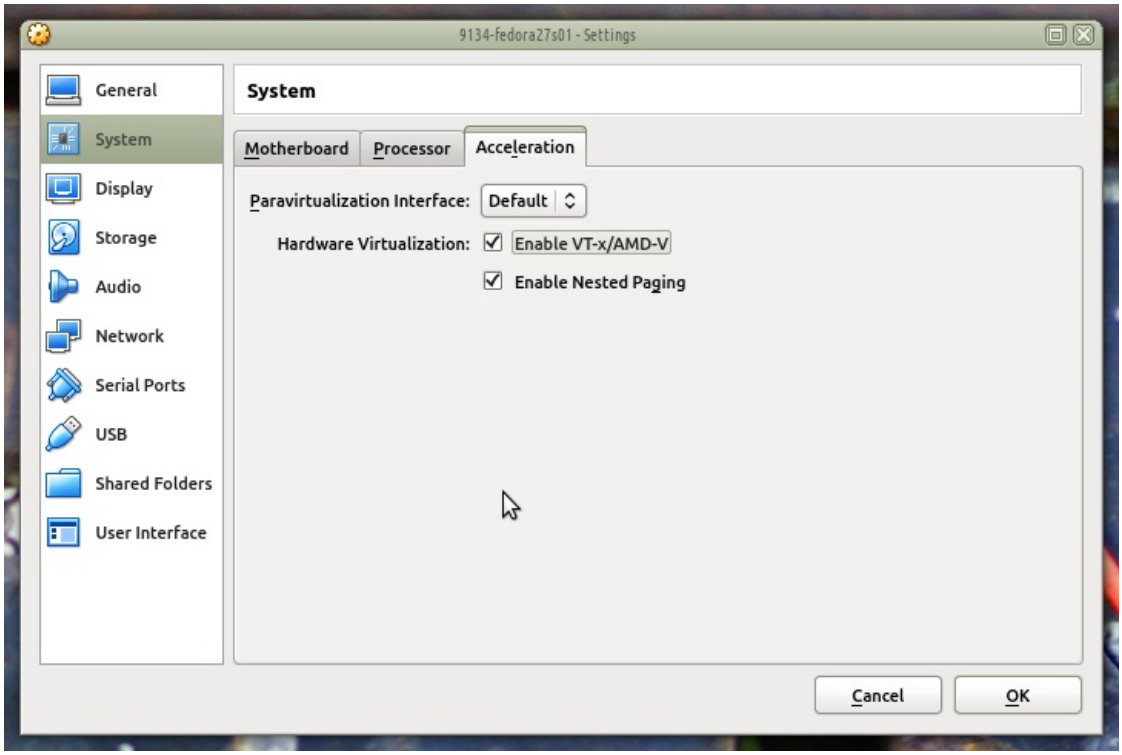
C. Omit a floppy drive, use a USB table as pointing device:



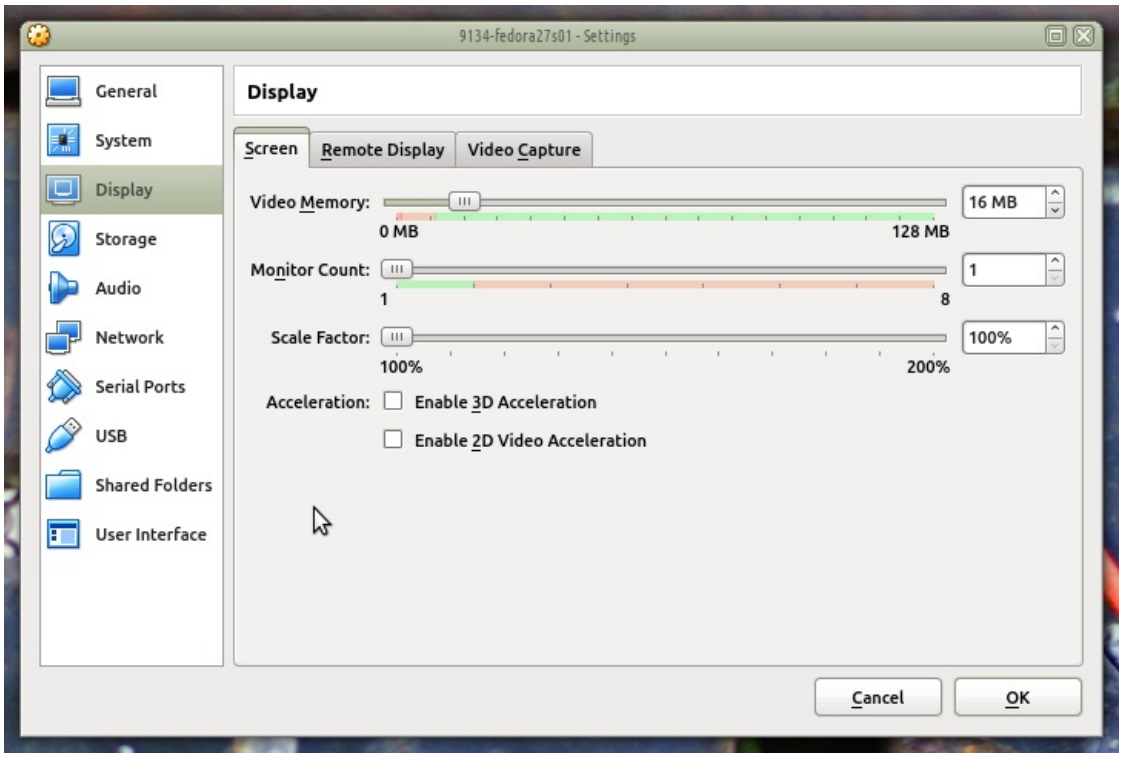
D. Allocate two or more cores and PAE/NX:



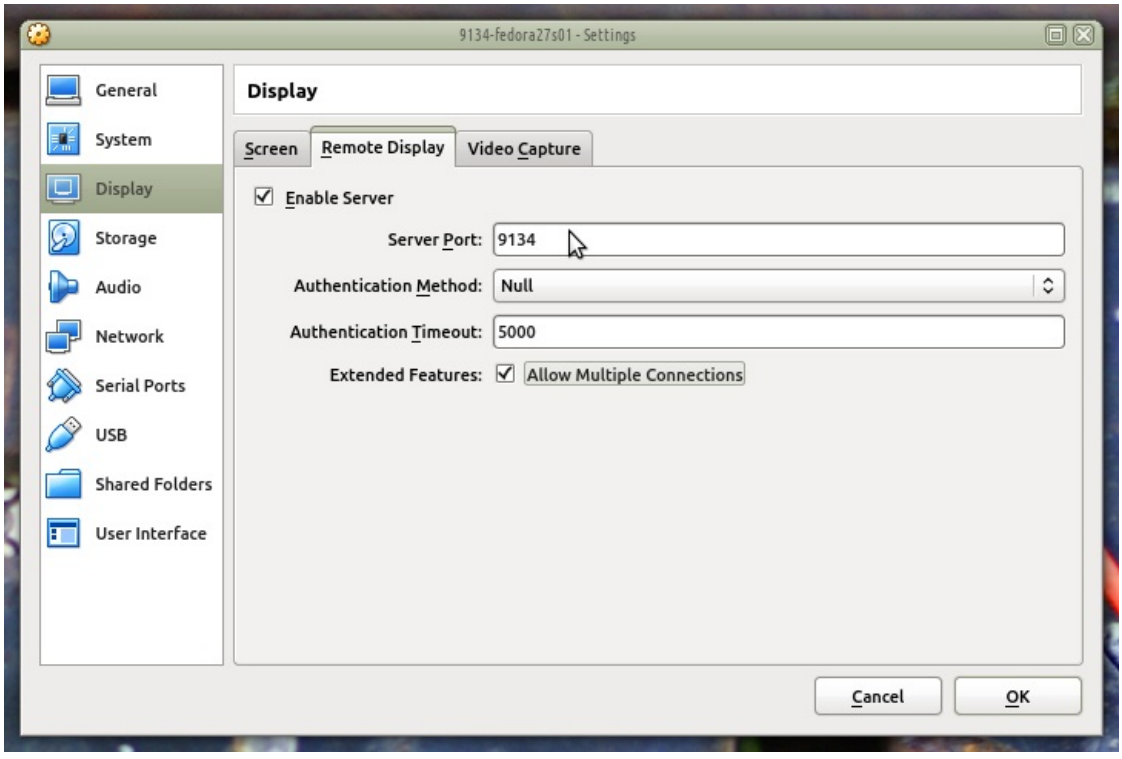
E. And the usual virtual processor features:



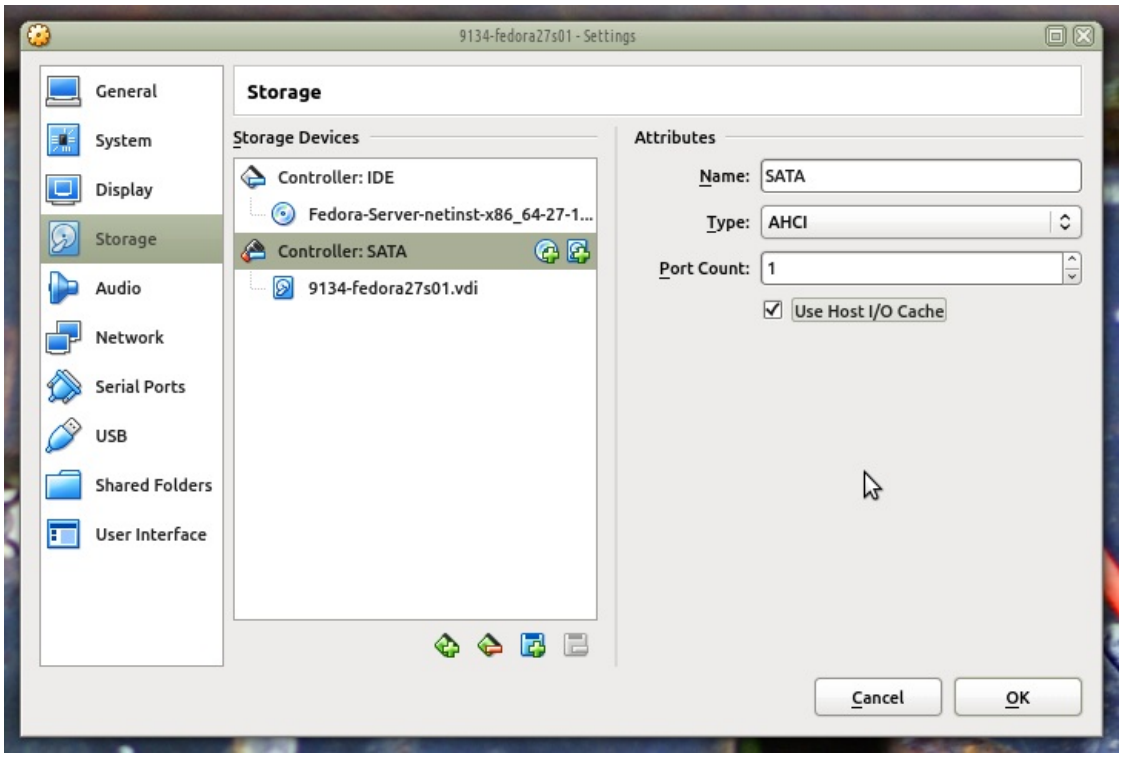
F. We don't need graphics on these nodes, so use minimum graphics memory:



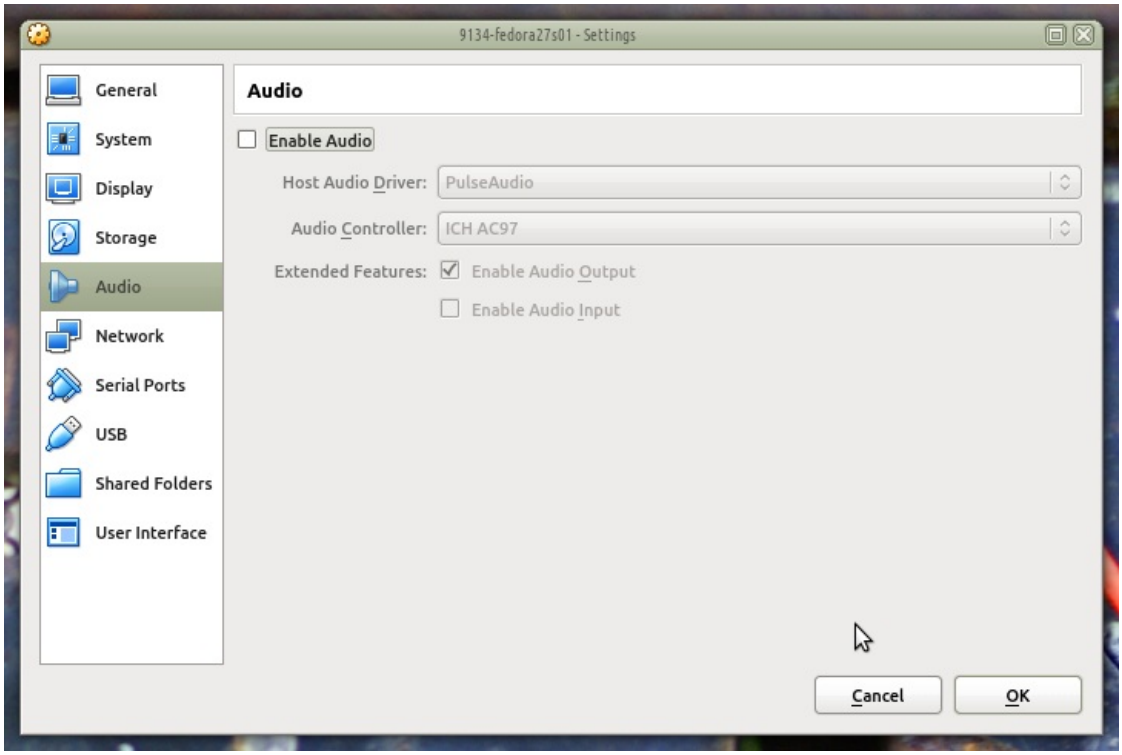
G. Enable RDP access, that is useful. It might be a good habit to allocate separate RDP ports per host, we'll use 9134 for the first guest, 9135 for the second



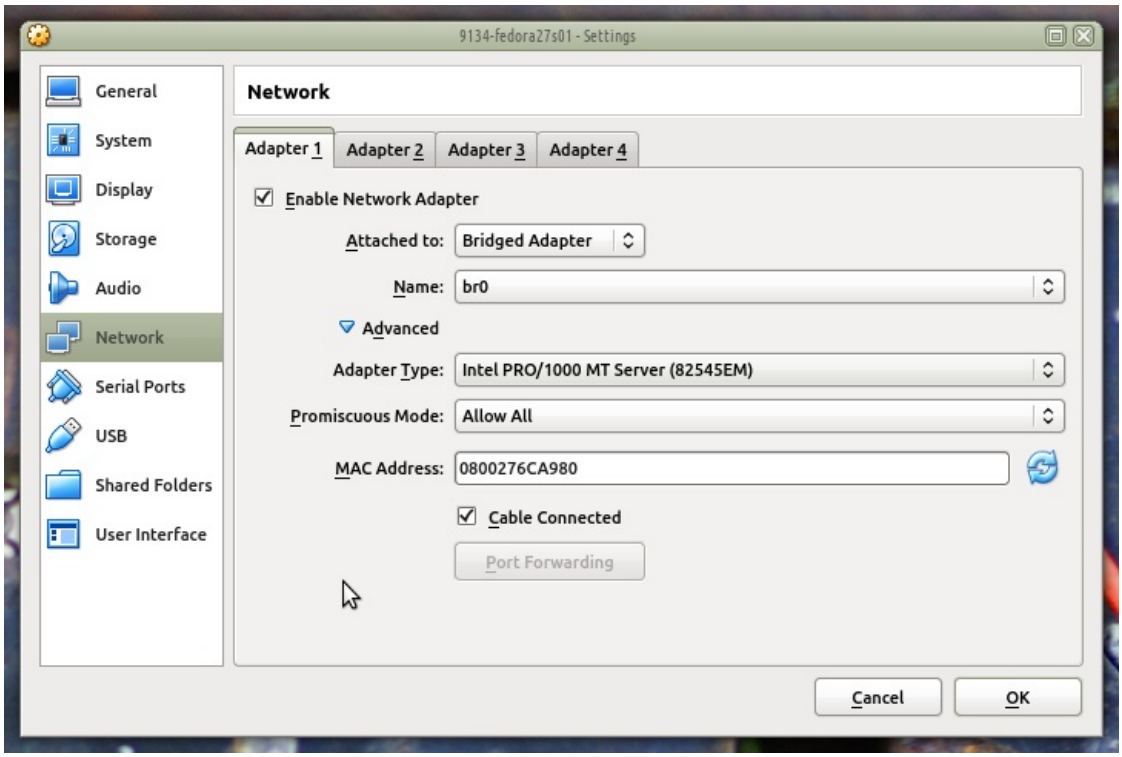
H. Enable Host I/O caching for your SATA device. Specify the Fedora 27 Server ISO image as the DVD:



I. Disable Audio



J. Configure the network adapter to:

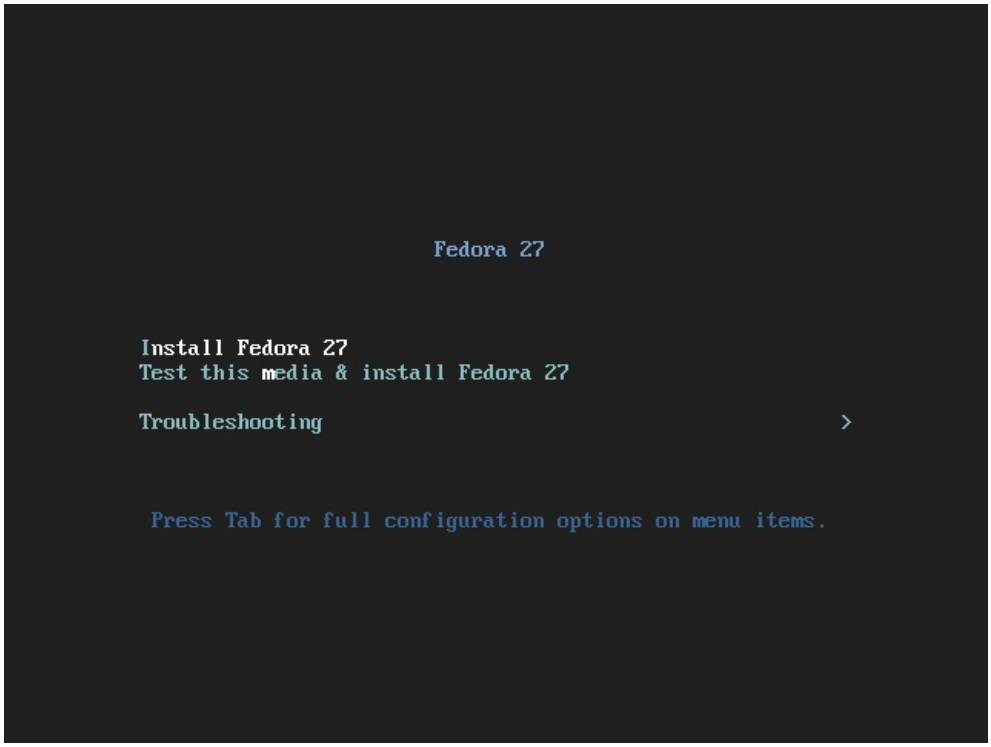


A. Use the LAN bridged adapter `br0`

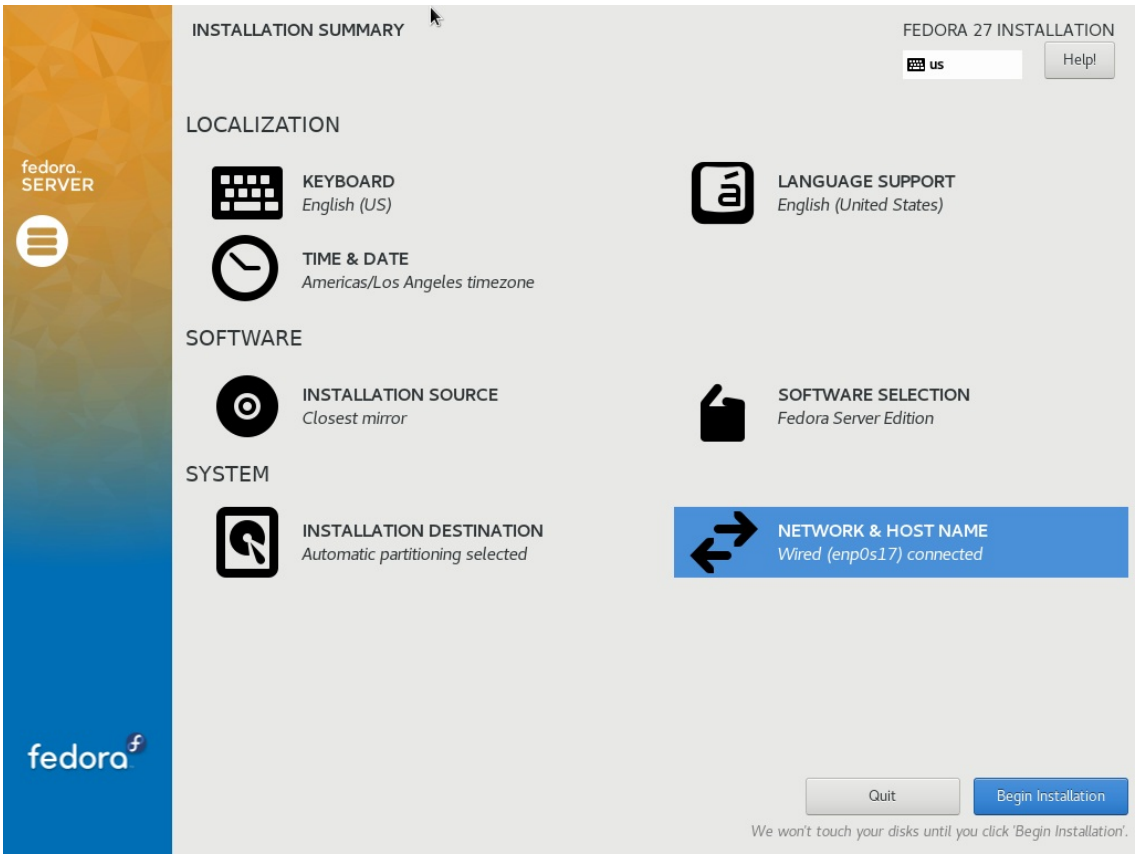
B. Use a server adapter driver

C. Enable Promiscuous Mode to allow sniffing

K. Start the installation

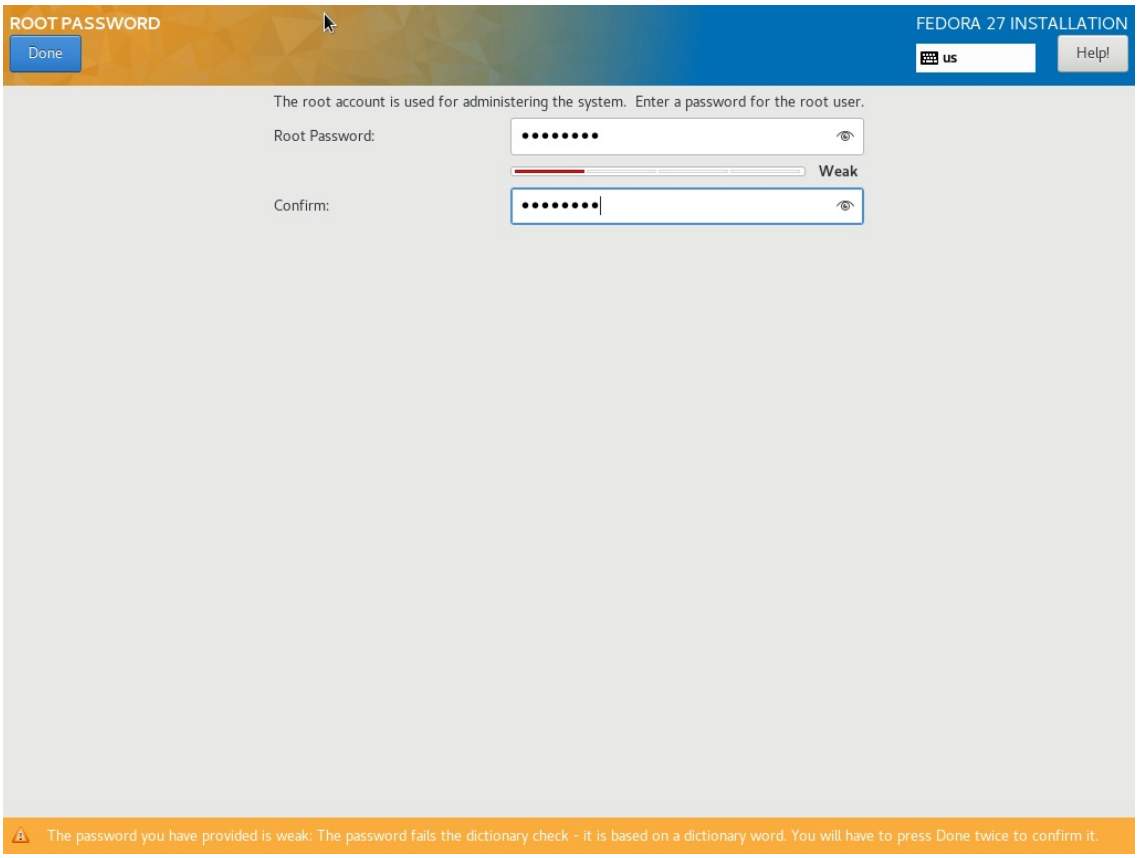


L. Under **System->Installation Destination** please manually partitioning is necessary.

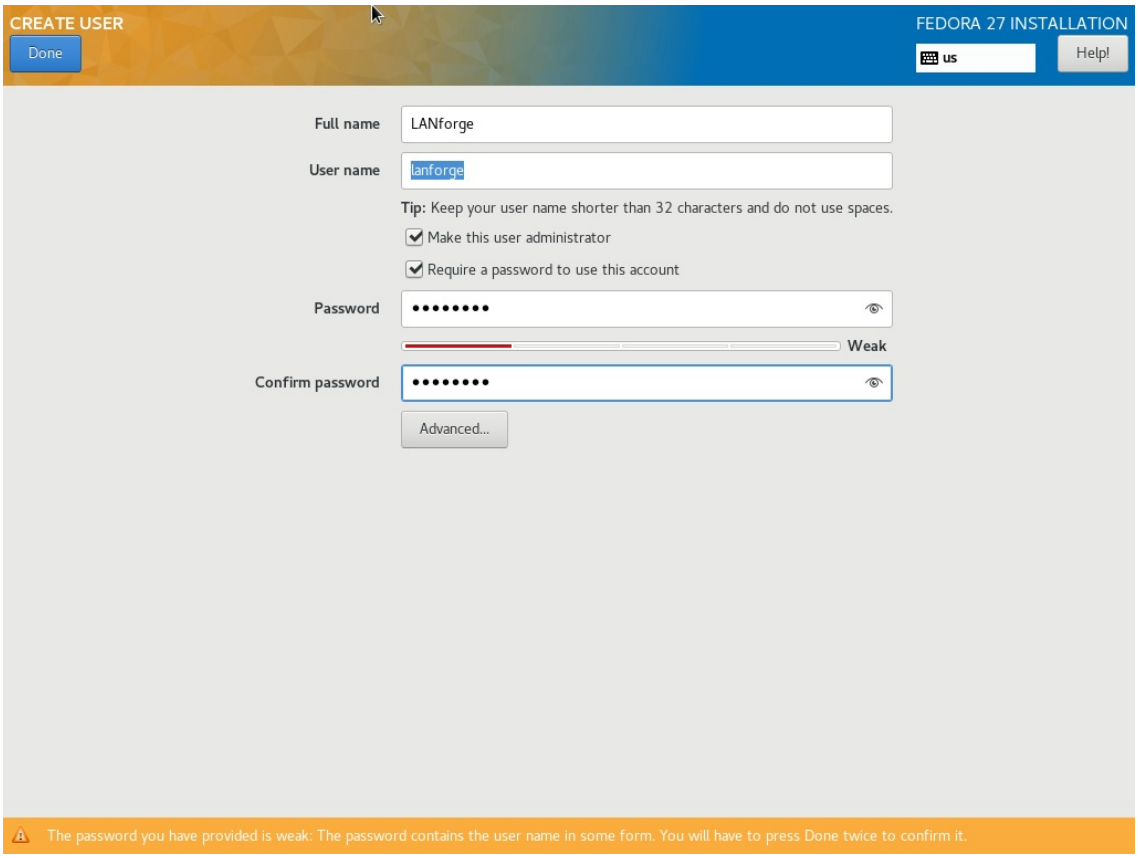


A. **Avoid selecting XFS or BTRFS file systems formats**.
B. Create a 1GB partition for `/boot`, select **ext4** filesystem format.
C. Use the remainder of the drive space for `/`
D. If you want to separate the `/` and `/home` partions select 35GB for `/` partition.

M. Set the **root** password to `lanforge`. Click **Done** twice.

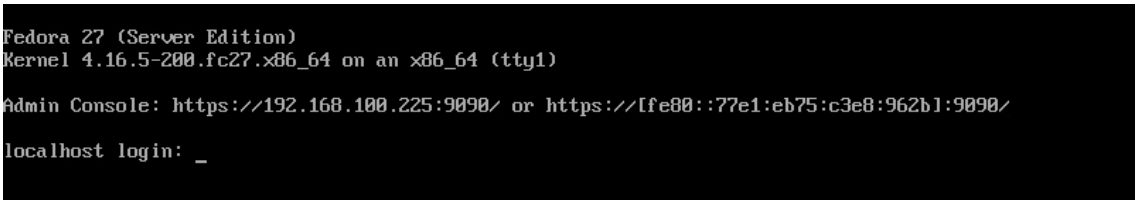


N. Add user LANforge:



A. Make user **lanforge** an Administrator
B. Set password to `lanforge`
C. Click **Done** twice

O. When installation finishes, reboot. You will see a login prompt:



P. Login as `root`. Do updates: `# dnf update -y` ↵
Q. Install perl: `# dnf install -y perl` ↵
R. Set guest's hostname: `# hostnamectl --static set-hostname atlas-fedora27s01` ↵
S. Reboot: `# shutdown -r now` ↵

2. Install LANforge on the guest instance. Start by logging in as `root`:

```
Fedora 27 (Server Edition)
Kernel 4.16.5-200.fc27.x86_64 on an x86_64 (tty1)

Admin Console: https://192.168.100.225:9090/ or https://[fe80::77e1:eb75:c3e8:962b]:9090/

localhost login: root
Password:
[root@localhost ~]# which wget
/usr/bin/wget
[root@localhost ~]# which curl
/usr/bin/curl
[root@localhost ~]# wget http://www.candelatech.com/lf_kinstall.txt
--2018-05-03 15:08:19--  http://www.candelatech.com/lf_kinstall.txt
Resolving www.candelatech.com (www.candelatech.com)... 208.74.158.171
Connecting to www.candelatech.com (www.candelatech.com)|208.74.158.171|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 259852 (254K) [text/plain]
Saving to: 'lf_kinstall.txt'

lf_kinstall.txt          100%[===================================>] 253.76K  --.-KB/s    in 0.08s

2018-05-03 15:08:19 (3.02 MB/s) - 'lf_kinstall.txt' saved [259852/259852]

[root@localhost ~]#
```

A. Use wget (or curl) to download `lf_kinstall.txt`:

B. `# cd /root` ↵

C. `# wget http://www.candelatech.com/lf_kinstall.txt` ↵

D. `# chmod +x lf_kinstall.pl` ↵

E. You don't need to do a burn in, so turn off the disk check:

F. `# touch /home/lanforge/did_cpuburn` ↵

G. Install LANforge: `# ./lf_kinstall.pl --lfver 5.3.7 --kver 4.13.16+ --do_all_ct` ↵

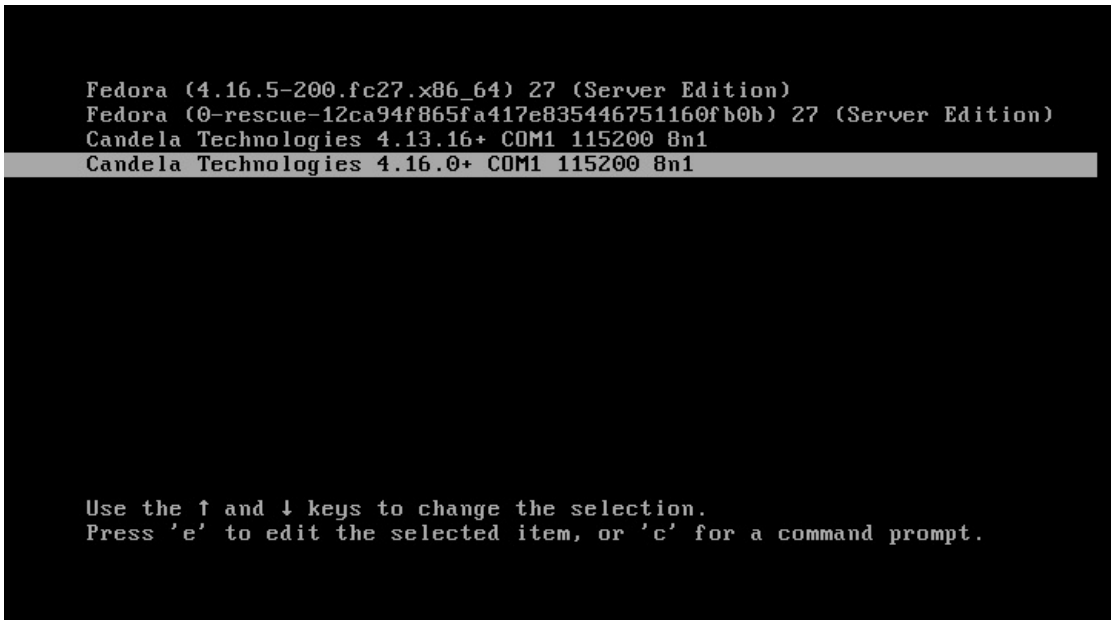
H. You can disable the VNC Server and Xrdp services on these guests:

```
# systemctl stop vncserver@\:1 xrdp.service ↵
# systemctl disable vncserver@\:1 xrdp.service ↵
# systemctl daemon-reload ↵
```

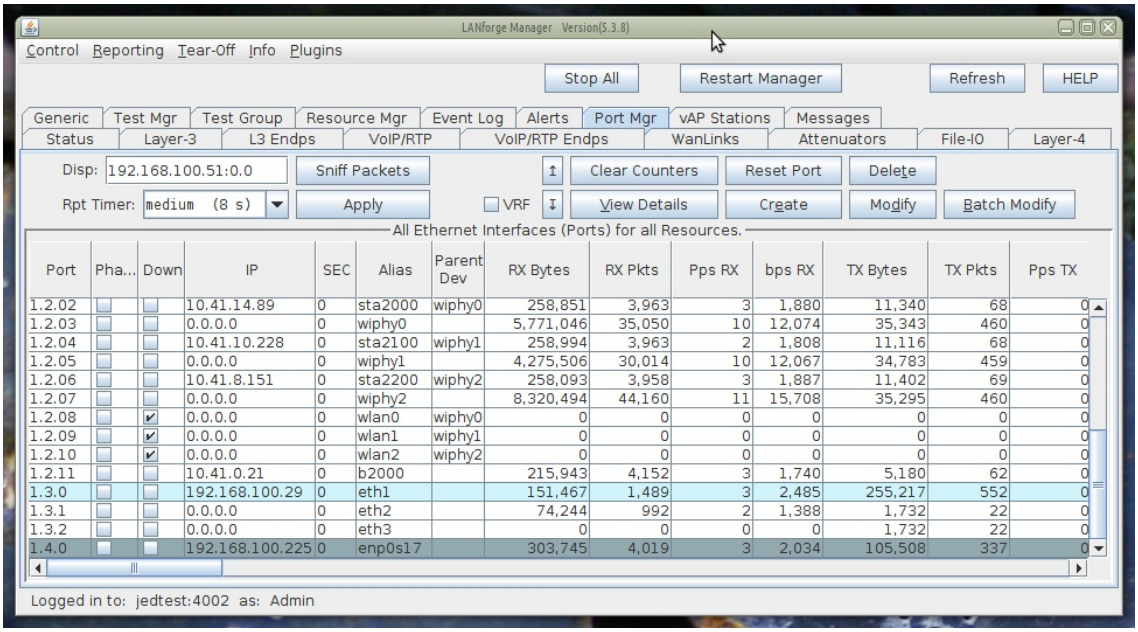
```
[root@localhost lanforge]# systemctl stop vncserver@\:1.service xrdp.service
[root@localhost lanforge]# systemctl disable vncserver@\:1.service xrdp.service
Removed /etc/systemd/system/multi-user.target.wants/xrdp.service.
Removed /etc/systemd/system/multi-user.target.wants/vncserver@:1.service.
Removed /etc/systemd/system/vncserver@:1.service.
[root@localhost lanforge]# systemctl daemon-reload
[root@localhost lanforge]#
```

I. When installation finishes, reboot: `# shutdown -r now` ↵

J. On next boot, you will see a LANforge kernel option, it should be automatically selected:

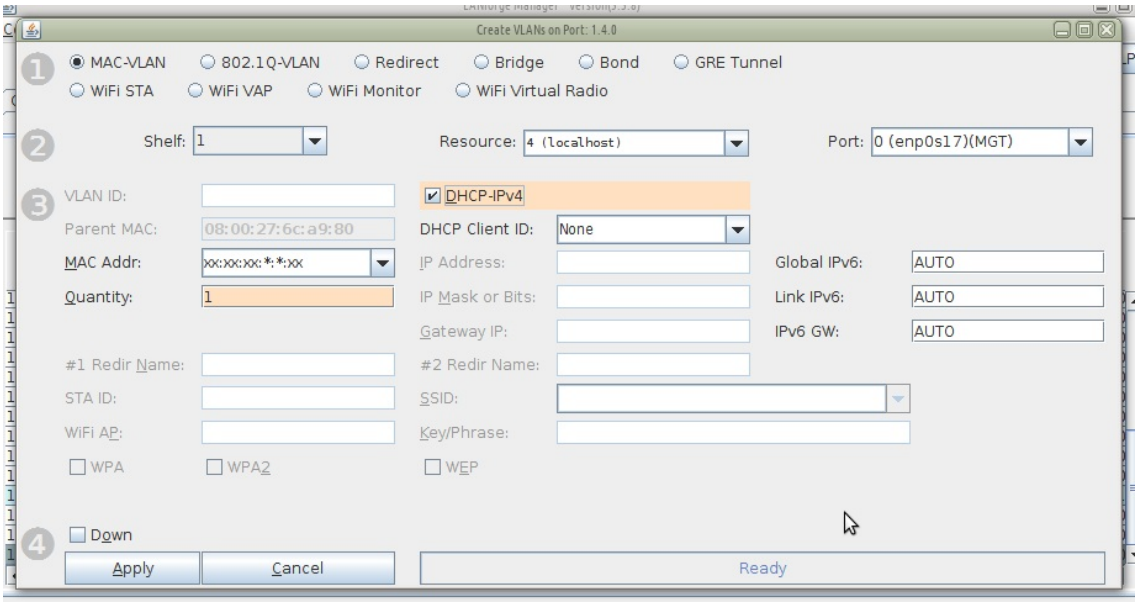


3. From your LANforge GUI, configure a MAC-VLAN the on default Ethernet port.
   A. In the LANforge GUI, choose the Port Mgr tab, and highlight the new `enp0s17` port:



   B. Click the **Create** button

C. create one MAC-VLAN port



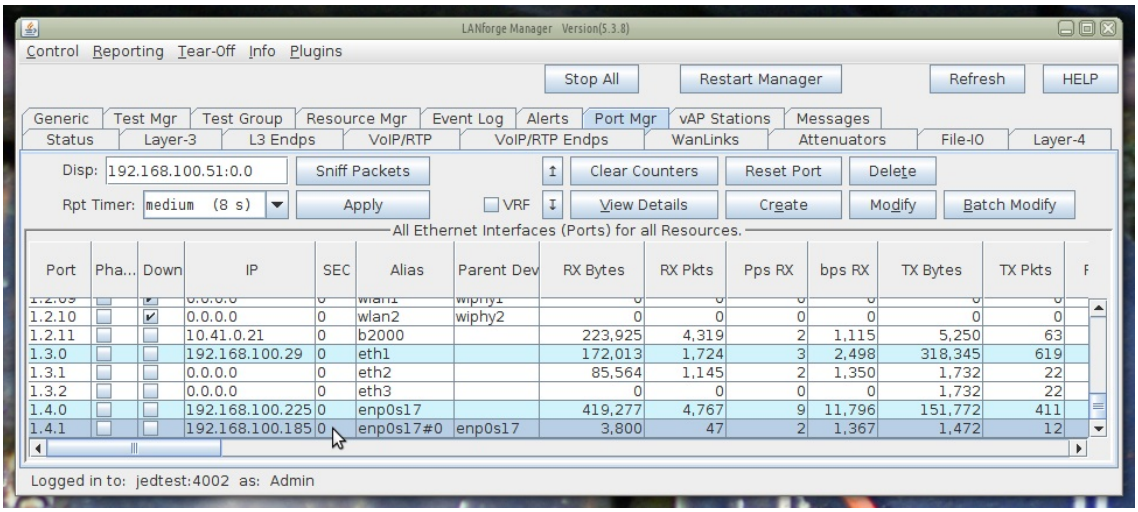
A. Select **MAC-VLAN**

B. Quantity: 1

C. Select **DHCP-IPv4**

D. Click **Apply**

D. You will see the new port in the GUI:



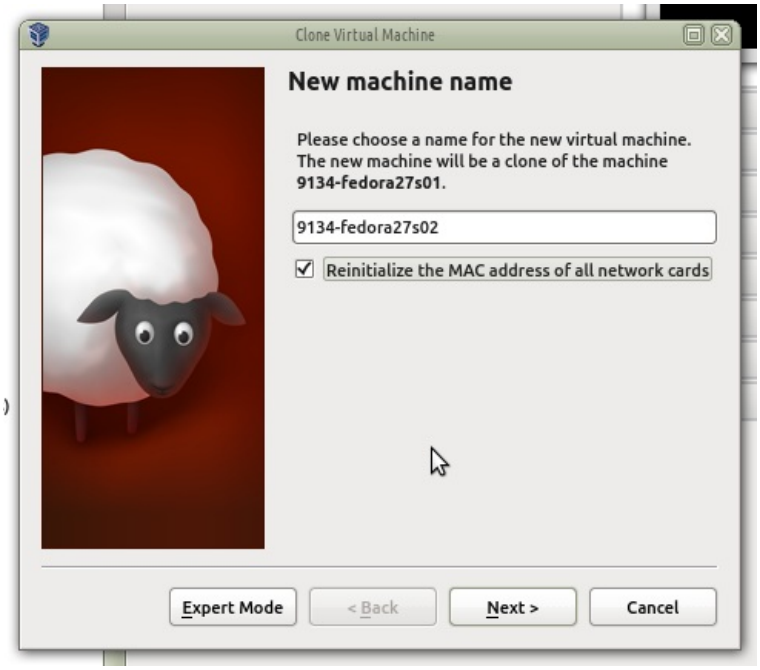
E. In the guest VM, you will also see the new port: `# ip -br a show ↵`

```
[root@localhost lanforge]# df -h
Filesystem               Size  Used Avail Use% Mounted on
devtmpfs                 971M     0  971M   0% /dev
tmpfs                    992M     0  992M   0% /dev/shm
tmpfs                    992M  868K  991M   1% /run
tmpfs                    992M     0  992M   0% /sys/fs/cgroup
/dev/mapper/fedora-root   15G  8.3G  6.8G  55% /
tmpfs                    992M   20K  992M   1% /tmp
/dev/sda1                976M  190M  720M  21% /boot
tmpfs                    199M     0  199M   0% /run/user/1000
[root@localhost lanforge]# ip a show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: enp0s17: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 10
00
    link/ether 08:00:27:6c:a9:80 brd ff:ff:ff:ff:ff:ff
    inet 192.168.100.225/24 brd 192.168.100.255 scope global dynamic enp0s17
       valid_lft 84783sec preferred_lft 84783sec
    inet6 fe80::a00:27ff:fe6c:a980/64 scope link
       valid_lft forever preferred_lft forever
3: enp0s17#0@enp0s17: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue master _vrf1 state UP
 group default qlen 1000
    link/ether 08:00:27:c5:b9:80 brd ff:ff:ff:ff:ff:ff
    inet 192.168.100.185/24 brd 192.168.100.255 scope global enp0s17#0
       valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fec5:b980/64 scope link
       valid_lft forever preferred_lft forever
4: _vrf1: <NOARP,MASTER,UP,LOWER_UP> mtu 65536 qdisc noqueue state UP group default qlen 1000
    link/ether 12:51:bc:d9:ca:a7 brd ff:ff:ff:ff:ff:ff
[root@localhost lanforge]#
```

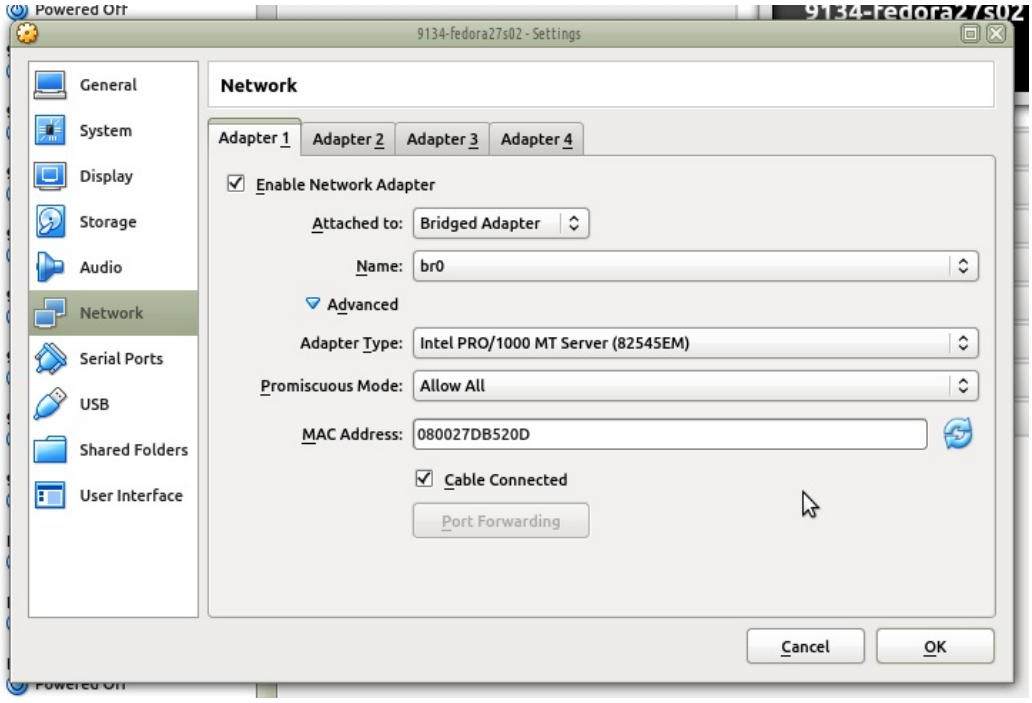
4. Add a second VM
   A. Shut down the previous VM: `# shutdown -r now ↵`

B. clone the VM

A. Select the Reinitialize MAC addresses choice, these machine will operate simultaneously.



B. Verify the MAC address of the new guest is set



C. Boot the second guest

C. Change the hostname of the second guest:

```
# [root@localhost]# echo 'atlas-fedora27s02' > /etc/hostname
```

```
[root@localhost ~]# hostnamectl --static set-hostname atlas-fedora27s02
```

D. Make sure that the MAC address of the second guest is not listed in the `ifcfg-enp0s17` file.

```
[root@localhost systemd]# cd /etc/sysconfig/network-scripts/
[root@localhost network-scripts]# ls
ifcfg-enp0s17  ifdown-ipv6    ifdown-Team      ifup-eth    ifup-post      ifup-tunnel
ifcfg-lo       ifdown-isdn    ifdown-TeamPort  ifup-ippp   ifup-ppp       ifup-wireless
ifdown         ifdown-post    ifdown-tunnel    ifup-ipv6   ifup-routes    init.ipv6-global
ifdown-bnep    ifdown-ppp     ifup             ifup-isdn   ifup-sit       network-functions
ifdown-eth     ifdown-routes  ifup-aliases     ifup-plip   ifup-Team      network-functions-ipv6
ifdown-ippp    ifdown-sit     ifup-bnep        ifup-plusb  ifup-TeamPort
[root@localhost network-scripts]# cat ifcfg-enp0s17
TYPE=Ethernet
PROXY_METHOD=none
BROWSER_ONLY=no
BOOTPROTO=dhcp
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=yes
IPV6_AUTOCONF=yes
IPV6_DEFROUTE=yes
IPV6_FAILURE_FATAL=no
IPV6_ADDR_GEN_MODE=stable-privacy
NAME=enp0s17
UUID=01539fff-8a66-3a66-b056-473b36c7357e
ONBOOT=yes
AUTOCONNECT_PRIORITY=-999
DEVICE=enp0s17
[root@localhost network-scripts]# _
```

A. Compare the adapter to the file:

B. `# cd /etc/sysconfig/network-scripts ↵`

C. `# cat ifcfg-enp0s17 ↵`

D. If it is listed, change it or remove it.

E. LANforge changes the `/etc/udev/rules.d/70-persistent-net.rules` file.Edit tht file those as to match the value of your mac address:

```
# cd /etc/udev/rules.d ↵
# ip li show enp0s17 ↵
# cat 70-persistent-net.rules ↵
```

F. Stop LANforge and change the resource ID for this guest:

```
# service lanforge stop ↵
# cd /home/lanforge ↵
# ./lfconfig ↵
Your command: resource 5 ↵
Your command: config ↵
```

```
connect_mgr       [host:port]
gps_dev           [device file]              NONE
max_tx            [1-500]                    5
max_send_mmsg_mem [1000-500000]              32000
max_send_mmsg_pkts [1-1000]                  500
keepalive         [1000-500000]              30000
wl_probe_timer    [50-2000]                  50
Other Commands:   help, show_all
*************************************************

If these values are correct, enter 'config', otherwise change
the values by entering the key followed by the new value, for example:
mode manager
Your command: resource 5

Interfaces: _vrf1 enp0s17#0 enp0s17
Resource interface assignment:
  Resource 5:  _vrf1 enp0s17#0
Specified Resource Addresses:

Key               Acceptable Values          Value
*************************************************
log_level         [0-65535]                  7
log_dir           [directory path]           /home/lanforge
add_resource_addr [host:port]                SEE LIST ABOVE
rem_resource_addr [host:port]                SEE LIST ABOVE
realm             [1-255]                    26
resource          [1-511]                    5
mgt_dev           [ethernet device]          enp0s17
mode              [resource, manager, both]  resource
Other Commands:   help, show_all
*************************************************

If these values are correct, enter 'config', otherwise change
the values by entering the key followed by the new value, for example:
mode manager
Your command: config
```

G. Reboot the second guest: `# shutdown -r now ↵`

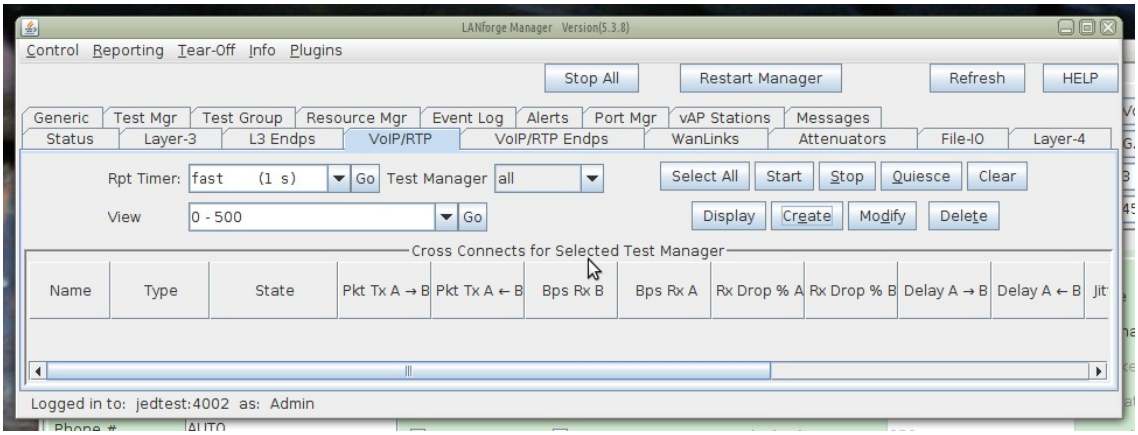
H. Start up your first guest (resource 4)

I. In your LANforge GUI, you should see your two VMs.

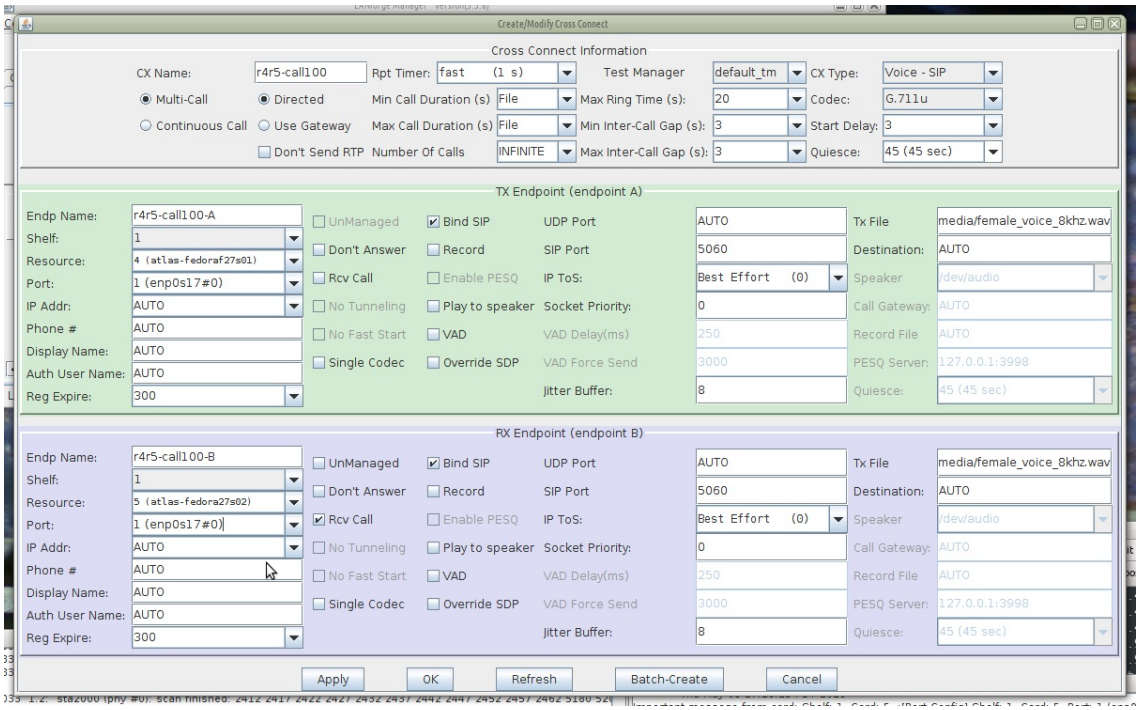
J. Create a MAC-VLAN port for the second guest

5. Create a VOIP connection between the two guests.

A. In the VOIP tab, click **Create**



B. You configure:

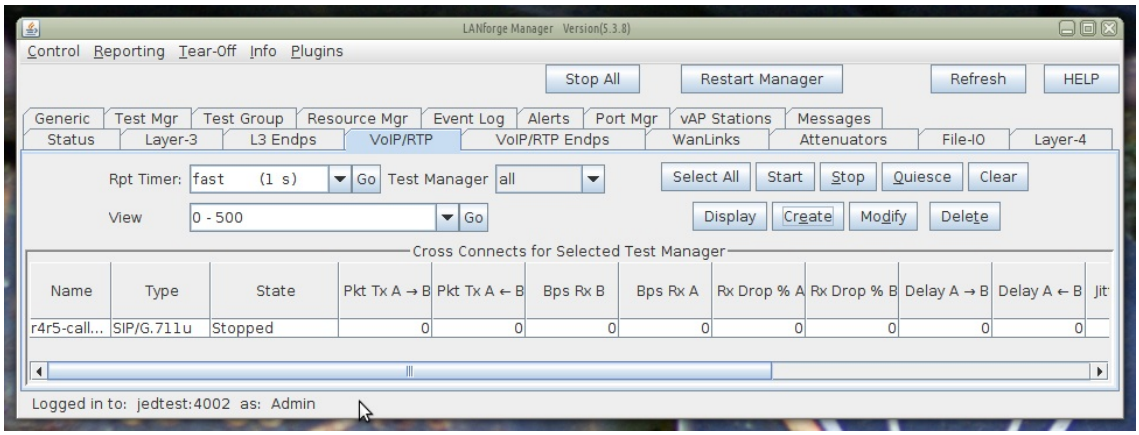


A. Side-A will be resource 3

B. Side-B will be resource 4

C. Click **Apply**

C. See the newly created connection:



D. In the VOIP/RPT tab, click **Start**

E. Monitor traffic on the connection with the Modify->View button