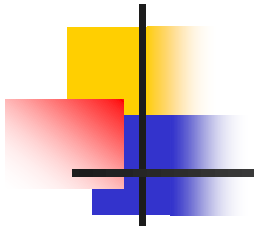
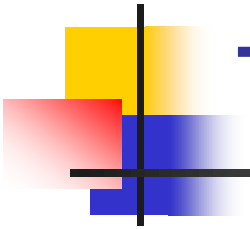
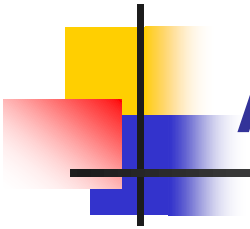


NIC BONDING



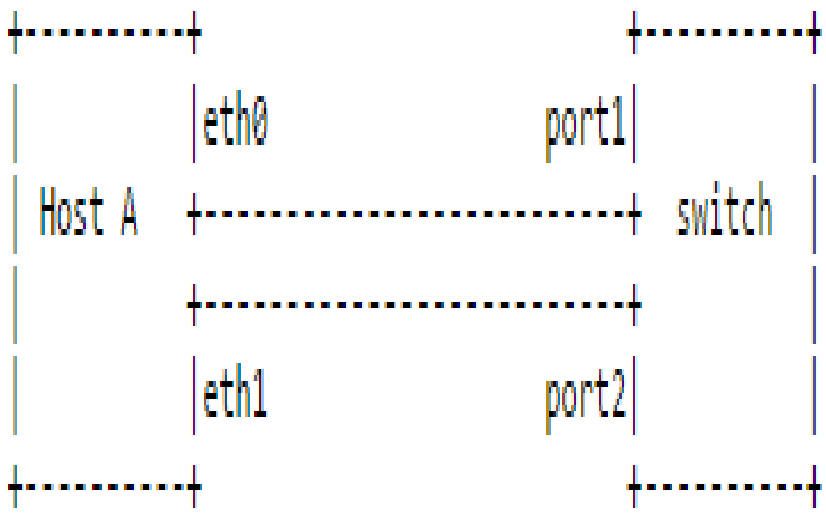
Topics we will discuss

- What is NIC Bonding
- What is the Importance of Bonding
- NIC Bonding configuration
- Troubleshooting

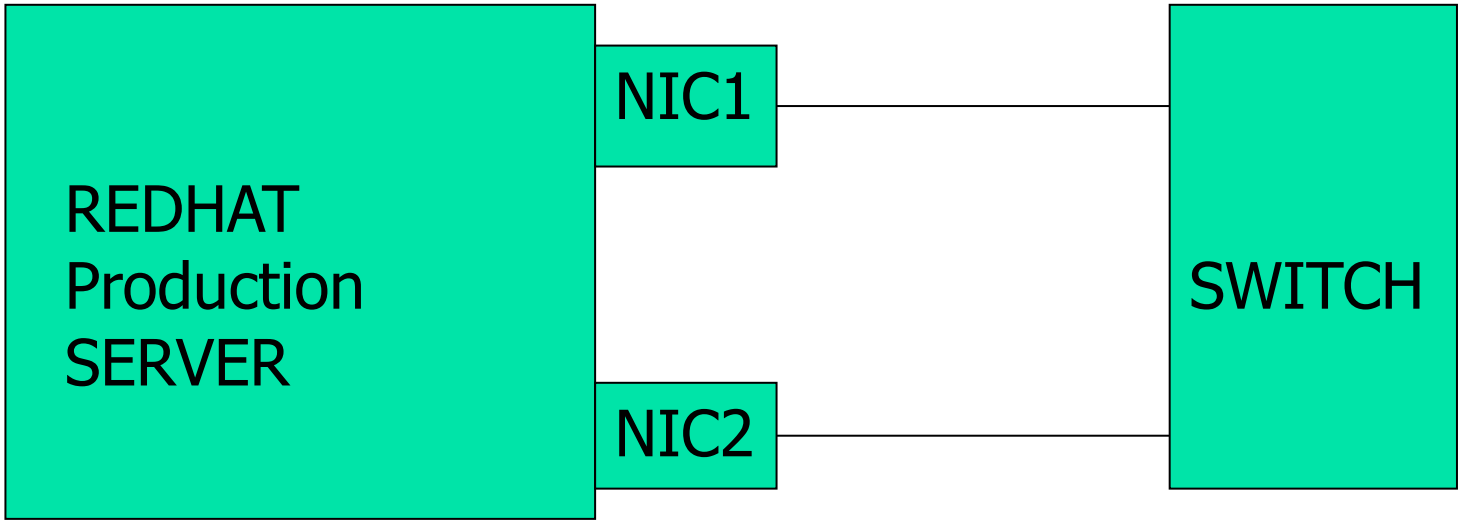


Advantages of NIC Bonding

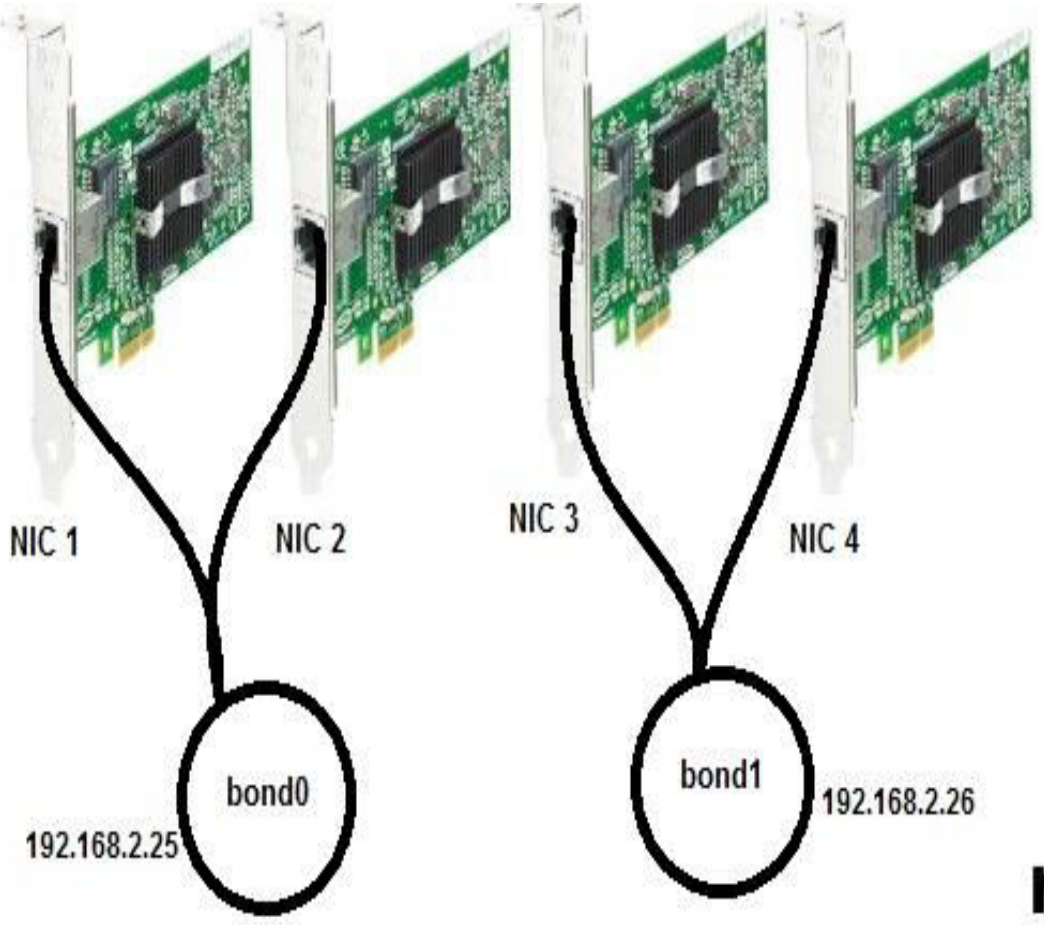
- To avoid server outage by having redundancy for root filesystem using mirroring, Multiple FC links to SAN with help of multi-pathing and many more.
- here the question is how do you provide redundancy in network level ?
- In redhat Linux you need to configure bonding to accomplish the network level redundancy
- Bonding is nothing but Linux kernel feature that allows to aggregate multiple like interfaces (such as eth0, eth1) into a single virtual link such as bond0.
- Once you have configured the bonding/teaming by using two NIC cards,kernel will automatically detect the failure of any NIC and work smartly according to that without any riot
- Bonding can be used for load sharing as well between two physical links.


eth0
port1
Host A
switch
eth1
port2

NIC BONDING FIGURE



The below diagram will explain how the bonding is happening

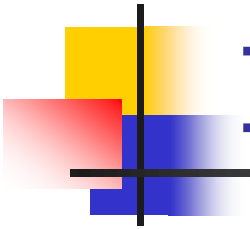


redhat

Policy Details

Policy Name	Code
balance-rr	0
active-backup	1
balance-xor	2
Broadcast	3
802.3ad	4
balance-tlb	5
balance-alb	6

- Description
- Round-Robin policy for fault tolerance
- Active-Backup policy for fault tolerance
- Exclusive-OR policy for fault tolerance
- All transmissions are sent on all slave interfaces.
- Dynamic link aggregation policy
- Transmit Load Balancing policy for fault tolerance
- Active Load Balancing policy for fault tolerance

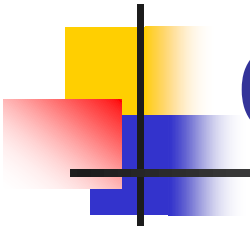


Imp Configuration files

We have 4 important configuration files

- /etc/modeprobe.conf
- /etc/sysconfig/network-scripts/ifcfg-eth0
- /etc/sysconfig/network-scripts/ifcfg-eth1
- /etc/sysconfig/network-scripts/ifcfg-bond0

Configuring NIC



- Check Ethernet card information
- [root@#ifconfig -a |grep eth eth2
- Link encap:Ethernet HWaddr 00:0C:29:79:17:FA eth4 Link encap:Ethernet HWaddr 00:0C:29:79:17:04 eth3 Link encap:Ethernet HWaddr
- Configure bonding between eth2 and eth4 with name of bond0.

NIC Bonding Configuration

- We can configure Linux bonding in 7 different modes. The behavior of the bonded interfaces depends upon the mode .
- 1) **Install ethtool using yum**

  #yum install ethool -y
- **2)Create bond0 config file.**

  # vi /etc/sysconfig/network-scripts/ifcfg-bond0
- **Add the following lines**

```
DEVICE=bond0
BOOTPROTO=static
BONDING_OPTS="mode=active-backup miimon=100"
IPADDR=192.168.2.1
GATEWAY=192.168.2.0
NETMASK=255.255.255.0
USERCTL=no
ONBOOT=yes
```

- 4) **Save this file & Exit**

Modify eth0 and eth1 Configurations

- **5) Edit Etho Config file.**

  #vi /etc/sysconfig/network-scripts/ifcfg-eth0

  Add the following lines.

  DEVICE=eth0

  USERCTL=no

  ONBOOT=yes

  MASTER=bond0

  SLAVE=yes

  BOOTPROTO=none

- **6) Edit Eth1 Config file.**

  #vi /etc/sysconfig/network-scripts/ifcfg-eth1

  Add the following lines.

  DEVICE=eth1

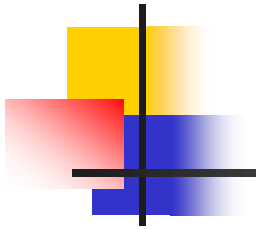
  USERCTL=no

  ONBOOT=yes

  MASTER=bond0

  SLAVE=yes

  BOOTPROTO=none



- **9) Load the Modules on boot:**

  # vi /etc/modprobe.conf

  Add the Following :

  alias bond0 bonding

  options bond0 mode=active-backup miimon=100

  #options bond0 miimon=100 mode=1 primary=eth0

  or

  #modprobe bonding miimon=100 mode=1

11**) Load the Modules**

modprobe –r bonding (Without reboot)

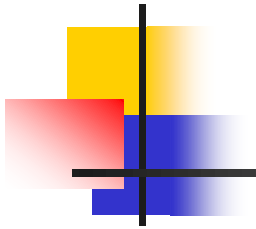
reboot or init 6 (with reboot)

12) Restart the Network Service

Service network restart

13) shows the network interface

less /proc/net/bonding/bond0



- **14) list the interfaces seen by the system**

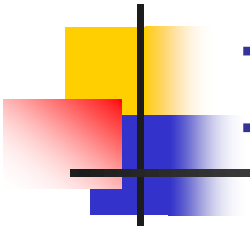
  # ifconfig

- **16) (you need to create new file called "bonding.conf" under /etc/modprobe.d/ with below mentioned line.)- RHEL6**

  Add the below line in /etc/modprobe.conf/bonding.conf to load the bonding module in to kernel

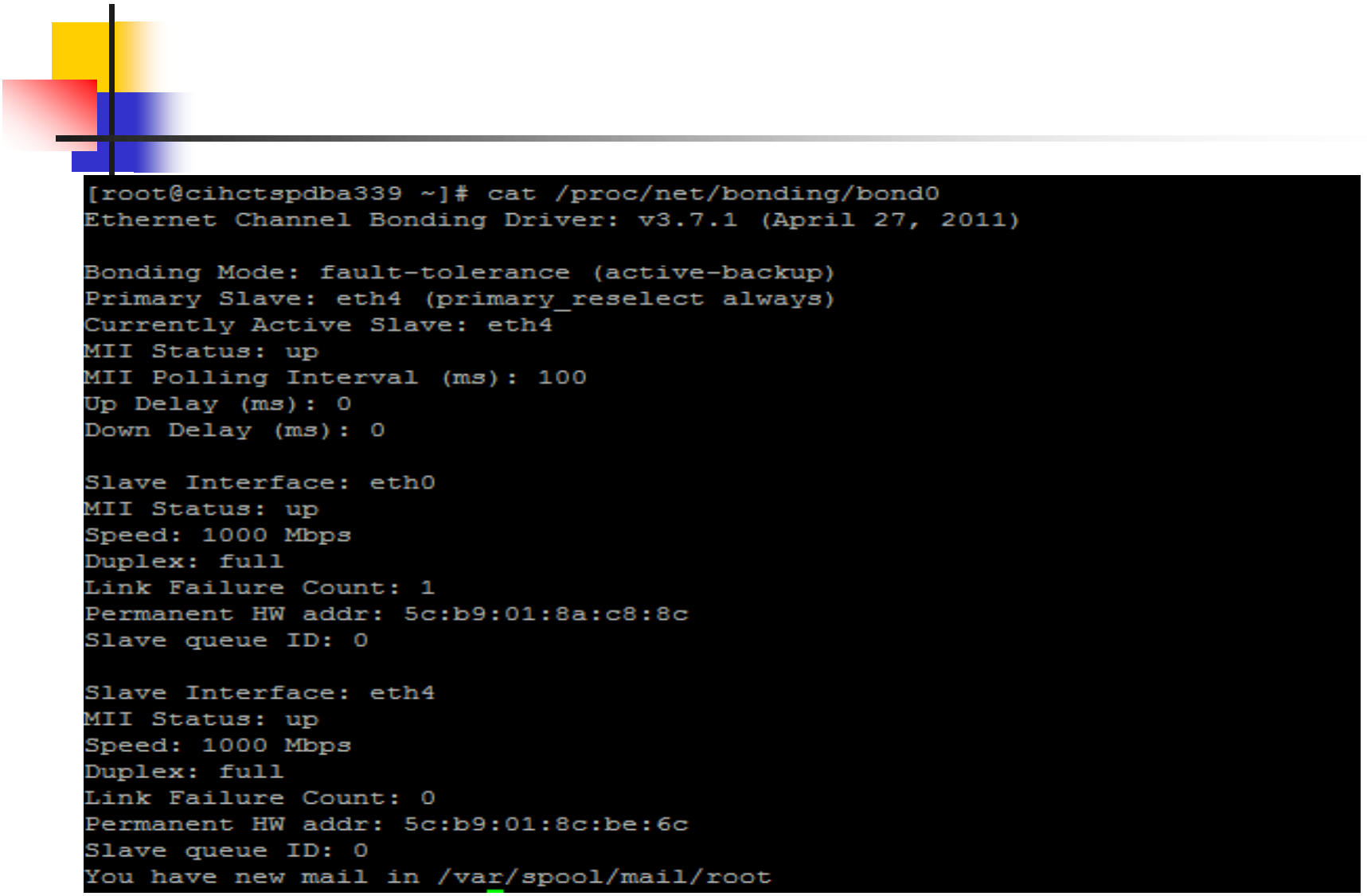
  # cat /etc/modprobe.d/bonding.conf

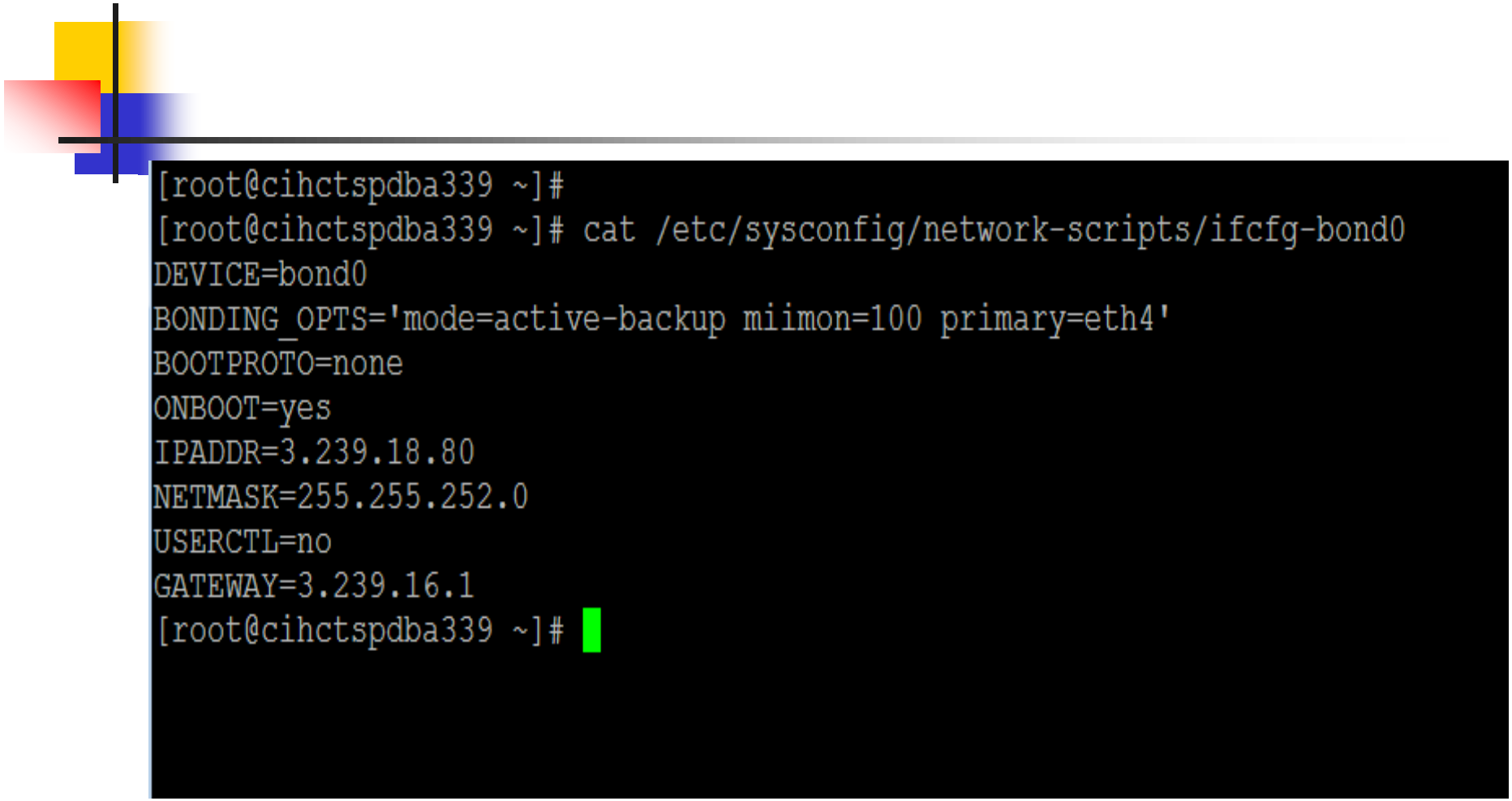
  alias bond0 bonding

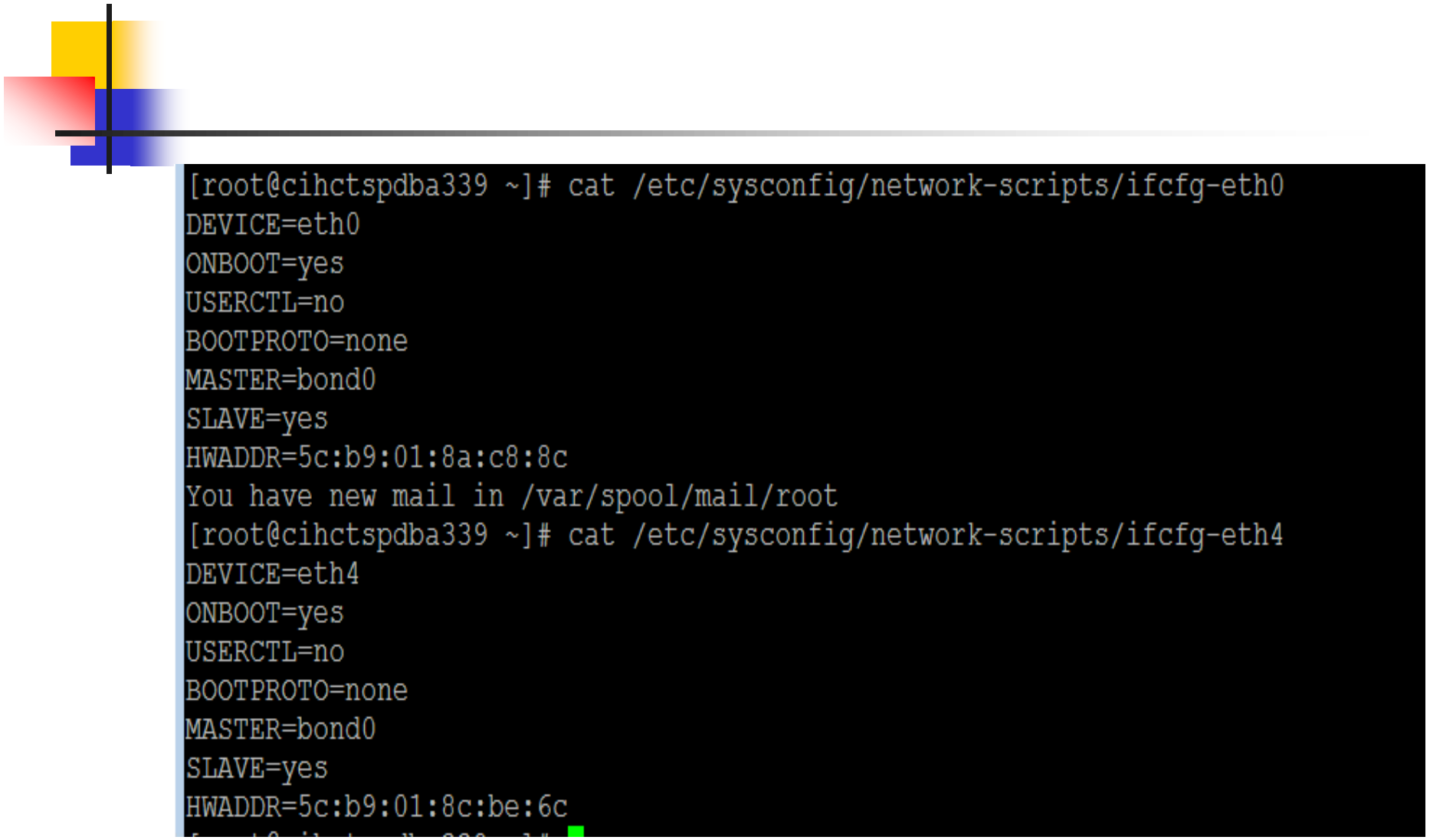


IMP

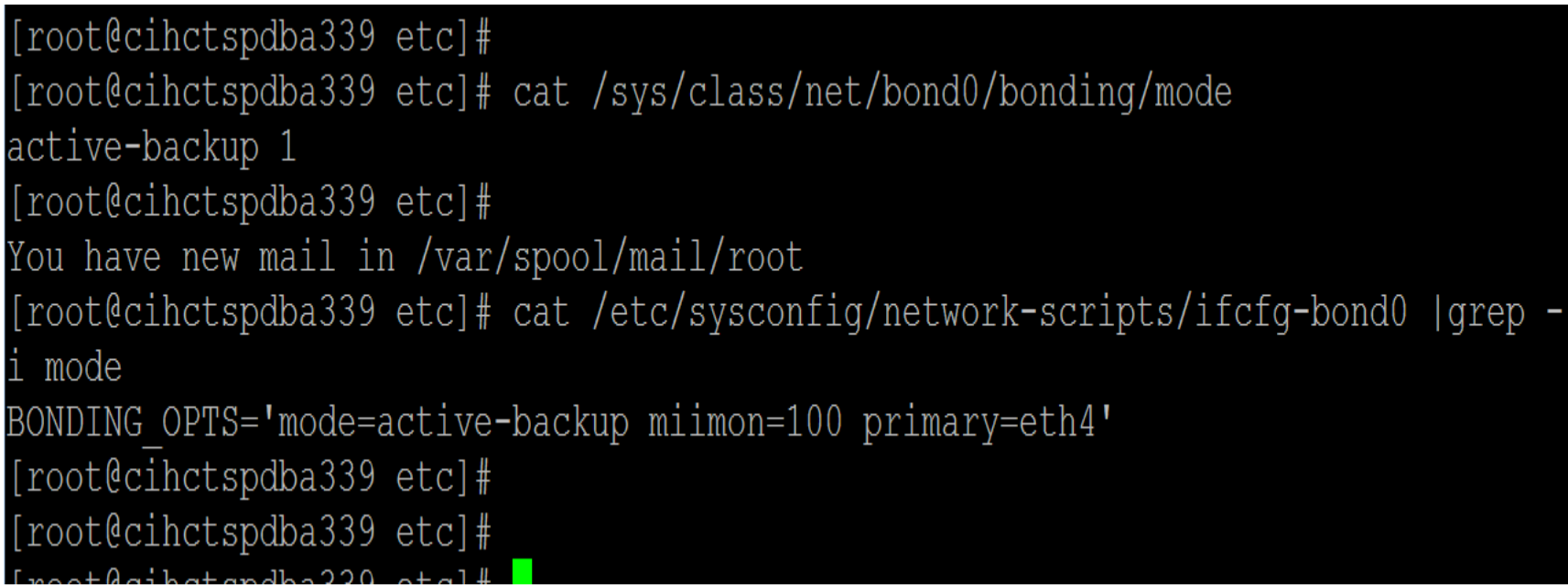
- To find which interface is active have a look in **/proc/net/bonding/bond0**
- To change which is active have a look at the ifenslave command and try something like this:
  #**ifenslave -c bond0 eth1**
- **miimon :**
  Specifies the MII link monitoring frequency in **milliseconds**. This determines how often the link state of each slave is inspected for link failures. A value of zero disables MII link monitoring. A value of 100 is a good starting point.
- **mode :**
  specifies the kind of protocol used by bond driver for its slaves.
  balance-rr
  active-standby ..etc.


[root@cihctspdba339 ~]# cat /proc/net/bonding/bond0
Ethernet Channel Bonding Driver: v3.7.1 (April 27, 2011)
Bonding Mode: fault-tolerance (active-backup)
Primary Slave: eth4 (primary_reselect always)
Currently Active Slave: eth4
MII Status: up
MII Polling Interval (ms): 100
Up Delay (ms): 0
Down Delay (ms): 0
Slave Interface: eth0
MII Status: up
Speed: 1000 Mbps
Duplex: full
Link Failure Count: 1
Permanent HW addr: 5c:b9:01:8a:c8:8c
Slave queue ID: 0
Slave Interface: eth4
MII Status: up
Speed: 1000 Mbps
Duplex: full
Link Failure Count: 0
Permanent HW addr: 5c:b9:01:8c:be:6c
Slave queue ID: 0
You have new mail in /var/spool/mail/root


[root@cihctspdba339 ~]#
[root@cihctspdba339 ~]# cat /etc/sysconfig/network-scripts/ifcfg-bond0
DEVICE=bond0
BONDING_OPTS='mode=active-backup miimon=100 primary=eth4'
BOOTPROTO=none
ONBOOT=yes
IPADDR=3.239.18.80
NETMASK=255.255.252.0
USERCTL=no
GATEWAY=3.239.16.1
[root@cihctspdba339 ~]#


[root@cihctspdba339 ~]# cat /etc/sysconfig/network-scripts/ifcfg-eth0
DEVICE=eth0
ONBOOT=yes
USERCTL=no
BOOTPROTO=none
MASTER=bond0
SLAVE=yes
HWADDR=5c:b9:01:8a:c8:8c
You have new mail in /var/spool/mail/root
[root@cihctspdba339 ~]# cat /etc/sysconfig/network-scripts/ifcfg-eth4
DEVICE=eth4
ONBOOT=yes
USERCTL=no
BOOTPROTO=none
MASTER=bond0
SLAVE=yes
HWADDR=5c:b9:01:8c:be:6c

How to Verify the type of bonding?



To list the currently configured bonds

- /sys/class/net/bonding_masters

```
[root@cihctspdba339 etc]#
[root@cihctspdba339 etc]# cat /sys/class/net/bonding_masters
bond0
You have new mail in /var/spool/mail/root
[root@cihctspdba339 etc]#
```

NIC Bonding -optional

- **Now time to create a bonding interface configuration file in /etc/sysconfig/network-scripts/ directory like the below one.**
- [root@# pwd
- **/etc/sysconfig/network-scripts**
- [root@ network-scripts]# cat ifcfg-bond0
- #This is congiguration file for bond0.Used NIC's eth2 & eth4 DEVICE=bond0
- **IPADDR=192.168.10.25**
- **NETMASK=255.255.255.0**
- **USRCTL=no**
- **ONBOOT=yes**
- **BOOTPRO=none**
- **BONDING_OPTS="mode=0 miimon=100**"
- [root@mylinz2 network-scripts]#