

Dynamic Routing

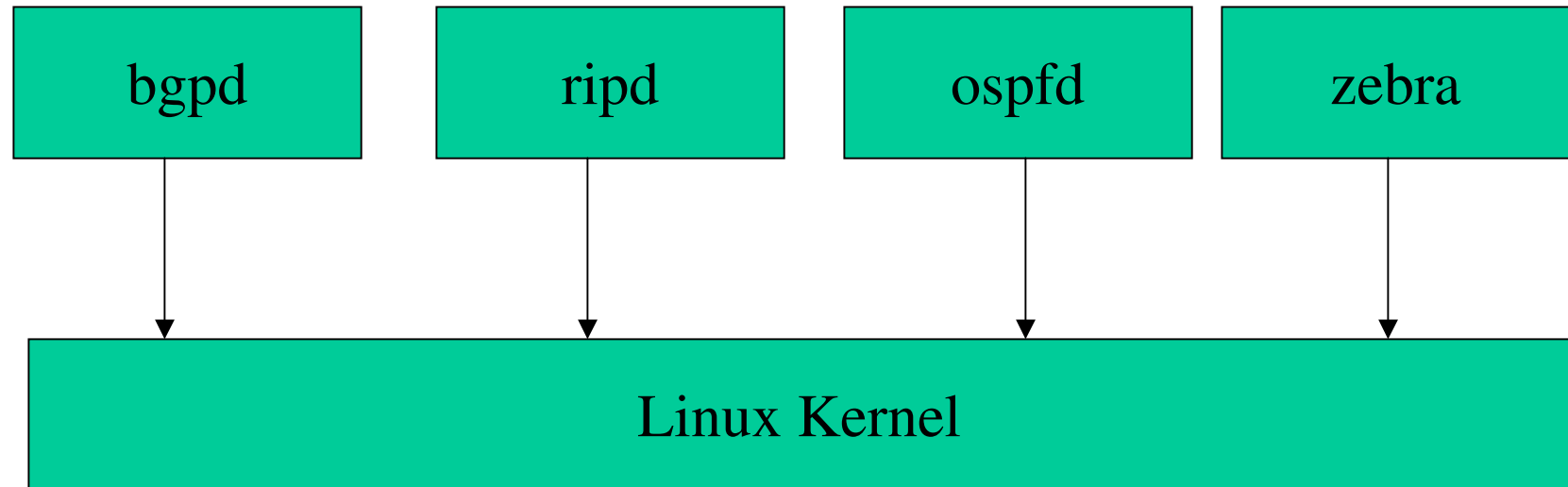
Routing Protocols

- Interior Routing Protocols
 - RIP , IGRP ,OSPF
- Exterior Routing Protocols
 - BGP

Zebra

- GNU Zebra is free software that manages TCP/IP based routing protocols.
- It supports BGP -4 protocol as described in RFC1771 (A Border Gateway Protocol 4) as well as RIPv1, RIPv2 and OSPFv2
- Zebra is unique in its design in that it has a process for each protocol
- Zebra also supports special BGP Route Reflector and Route Server behavior

System Architecture



Supported Platforms

- GNU/Linux 2.0.37
- GNU/Linux 2.2.x
- GNU/Linux 2.3.x
- FreeBSD 2.2.8
- FreeBSD 3.x
- FreeBSD 4.x
- NetBSD 1.4
- OpenBSD 2.5
- Solaris 2.6
- Solaris 7

Basic commands

- There are five routing daemons in use, and there is one manager daemon
 - `ripd`, `ripngd`, `ospfd`, `ospf6d`, `bgpd`
 - `zebra`

Installing

- Get the zebra rpm package which comes with the common distributions
- Install zebra on your machine
- Make sure that there is zebra.conf file in /etc
- If not there then create one

Running Zebra

```
[root@classroom root]# service zebra start
```

```
Starting zebra:
```

```
[ OK ]
```

```
[root@classroom root]# █
```


Zebra.conf file

```
[root@classroom root]#  
[root@classroom root]#  
[root@classroom root]# clear  
[root@classroom root]# service zebra start  
Starting zebra: [ OK ]  
[root@classroom root]# vi /etc/zebra.conf  
hostname classroom  
password kcm  
enable password cisco  
line vty  
login  
password kishor
```

```
[root@classroom root]# telnet localhost zebra
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

```

```
Hello, this is zebra (version 0.93b).
Copyright 1996-2002 Kunihiro Ishiguro.

```

User Access Verification

```
Password:
classroom> en
Password:
classroom#
classroom#
classroom# show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP, 0 - OSPF,
       B - BGP, > - selected route, * - FIB route

K>* 0.0.0.0/0 via 203.78.162.97, eth0
K>* 10.38.0.0/16 via 192.168.100.100, eth1
K * 127.0.0.0/8 is directly connected, lo
C>* 127.0.0.0/8 is directly connected, lo
K>* 169.254.0.0/16 is directly connected, eth1
K>* 172.16.100.0/24 via 192.168.100.1, eth1
K>* 192.168.10.0/24 via 192.168.100.1, eth1

```

```
[root@classroom root]# telnet localhost zebra
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

```

```
Hello, this is zebra (version 0.93b).
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```

```
User Access Verification

```

```
Password:
classroom> en
Password:
classroom#
classroom# config t
classroom(config)#
classroom(config)#
classroom(config)# int
    IFNAME Interface's name
classroom(config)# int eth1
classroom(config-if)#
```

```
classroom# show int eth1
Interface eth1
  index 3 metric 1 mtu 1500 <UP,BROADCAST,RUNNING,MULTICAST>
  HWaddr: 00:80:ad:02:63:ce
  inet 192.168.100.100/24 broadcast 192.168.100.255
    input packets 6372092, bytes 1165025360, dropped 0, multicast packets 0
    input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
    output packets 4943561, bytes 2147483647, dropped 0
    output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
    collisions 336139
classroom#
```

```
[root@classroom root]# service ospfd start
```

```
Starting ospfd: [ OK ]
```

```
[root@classroom root]# service bgpd start
```

```
[root@classroom root]#
```

```
[root@classroom root]# service ospfd start
Starting ospfd: [ OK ]
[root@classroom root]# service bgpd start
[root@classroom root]# telnet localhost ospfd
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
[ OK ]
```

```
Hello, this is zebra (version 0.93b).
Copyright 1996-2002 Kunihiro Ishiguro.
```

```
User Access Verification
```

```
Password:
kishor>
kishor>
kishor>
kishor> en
Password:
Password:
kishor#
kishor#
kishor#
kishor#
kishor# show ip route
% Unknown command.
kishor# show ip ospf
 OSPF Routing Process not enabled
kishor#
```

```
kishor(config-router)#
area          OSPF area parameters
auto-cost    Calculate OSPF interface cost according to bandwidth
capability   Enable specific OSPF feature
compatible   OSPF compatibility list
default-information Control distribution of default information
default-metric Set metric of redistributed routes
distance     Define an administrative distance
distribute-list Filter networks in routing updates
end          End current mode and change to enable mode.
exit        Exit current mode and down to previous mode
help       Description of the interactive help system
list      Print command list
mpls-te   Configure MPLS-TE parameters
neighbor  Specify neighbor router
network   Enable routing on an IP network
no       Negate a command or set its defaults
ospf     OSPF specific commands
passive-interface Suppress routing updates on an interface
quit     Exit current mode and down to previous mode
redistribute Redistribute information from another routing protocol
refresh  Adjust refresh parameters
router-id router-id for the OSPF process
timers   Adjust routing timers
write    Write running configuration to memory, network, or terminal
```

```
kishor(config-router)# network
A.B.C.D/M OSPF network prefix
kishor(config-router)# network 192.168.100.0
% There is no matched command.
kishor(config-router)# network 192.168.100.0
% Unknown command.
kishor(config-router)# network 192.168.100.0/24
% Command incomplete.
kishor(config-router)# network 192.168.100.0/24
area Set the OSPF area ID
kishor(config-router)# network 192.168.100.0/24 area
<0-4294967295> OSPF area ID as a decimal value
```