

- Advanced IOS Functions -

The Configuration Register

The **configuration register (config-register)** is a hexadecimal value that controls various aspects of how a router boots, including:

- Baud Rate
- Boot Messages (enable/disable)
- Break (disable/ignore)
- Flash (read-only, read-write)
- NVRAM (use startup-config/bypass startup-config)

The **default** config-register is **0x2102**. To view your router's current config-register setting:

```
Router# show version

<snip>

32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read ONLY)

Configuration register is 0x2102
```

Common config-register settings include:

<u>Value</u>	<u>Baud Rate</u>	<u>Boots Into?</u>	<u>Flash</u>	<u>Startup-Config</u>
0x2101	9600	IOS from ROM	Read/Write	Uses
0x2102	9600	IOS from Flash	Read/Only	Uses
0x2142	9600	IOS from Flash	Read/Only	Bypass

Remember, **0x2102** is the default config-register value on Cisco routers. In order to upgrade the Cisco IOS, the config-register must be changed to **0x2101**, so that the Flash memory becomes writeable.

To change the config-register from the IOS:

```
Router(config)# config-register 0x2142
```

This configuration change **does not take affect** until the **next reboot**.

(Reference: http://www.cisco.com/en/US/products/hw/routers/ps133/products_tech_note09186a008022493f.shtml)

* * *

All original material copyright © 2007 by Aaron Balchunas (aaron@routeralley.com),
unless otherwise noted. All other material copyright © of their respective owners.

This material may be copied and used freely, but may not be altered or sold without the expressed written consent of the owner of the above copyright. Updated material may be found at <http://www.routeralley.com>.

Backing up and Restoring the Cisco IOS

The Cisco IOS is stored in flash. Multiple IOS files can be loaded into flash, assuming there is enough free space. You can view available free space, and the name of any file(s) in flash, by typing:

Router# *show flash*

```
System flash directory:
File   Length   Name/status
  1    4467254  c2500-ik9s-mz.122-4

[4467254 bytes used, 12309962 available, 16777216 total]
16384K bytes of processor board System flash (Read/Write)
```

To backup the IOS, a TFTP server is required. The TFTP server must have IP connectivity to the router.

To backup the IOS file from the router's flash to the TFTP server:

Router# *copy flash tftp*

You will be prompted for the following information:

- Address of remote host (the TFTP server)
- Source file name (the name of the file in flash)
- Destination file name

To load an IOS file from a TFTP server to the router's flash:

Router# *copy tftp flash*

The process is nearly identical to copy a startup-configuration file to or from a router's NVRAM:

Router# *copy startup tftp*

Router# *copy tftp startup*

* * *

All original material copyright © 2007 by Aaron Balchunas (aaron@routeralley.com), unless otherwise noted. All other material copyright © of their respective owners.

This material may be copied and used freely, but may not be altered or sold without the expressed written consent of the owner of the above copyright. Updated material may be found at <http://www.routeralley.com>.

CDP (Cisco Discovery Protocol)

CDP is a Cisco propriety protocol used to collect information about locally attached Cisco switches and routers. CDP is enabled by default on all IOS enabled routers and switches, and sends out updates every **60 seconds**.

CDP will provide the following information about directly connected neighbors:

- **Device ID** – hostname of remote router/switch
- **Local Interface** – interface that remote router/switch is directly connected to
- **Holdtime** – amount of time before remote device information is purged from CDP table
- **Capability** – Type of remote device (router, switch, host)
- **Platform** – Model of remote device

To view CDP timers and hold-down information:

```
Router# show cdp
```

To display neighbor information:

```
Router# show cdp neighbors
```

To display traffic statistics:

```
Router# sh cdp traffic
```

To display port and interface information:

```
Router# sh cdp interface
```

To disable CDP on an interface:

```
Router(config-if)# no cdp enable
```

To globally disable CDP:

```
Router(config)# no cdp run
```

* * *

All original material copyright © 2007 by Aaron Balchunas (aaron@routeralley.com), unless otherwise noted. All other material copyright © of their respective owners.

This material may be copied and used freely, but may not be altered or sold without the expressed written consent of the owner of the above copyright. Updated material may be found at <http://www.routeralley.com>.

Resolving Hostnames on Cisco IOS Devices

There are two ways to resolve hostnames on Cisco devices:

- Building a host table on each router
- Pointing each router to a centralized DNS server

To manually build a host table on a router:

```

Router(config)# ip host Router1 172.16.1.1
Router(config)# ip host Router2 172.17.1.2

```

To view your host table:

```

Router# show hosts

```

To disable DNS lookups:

```

Router(config)# no ip domain-lookup

```

To point your router to a DNS server:

```

Router(config)# ip name-server IPADDRESS

```

To add a domain name to your router:

```

Router(config)# ip domain-name CISCO.COM

```

Telnet

It is possible to telnet *from* a router into a remote device, using either the hostname or IP address of the remote device:

```

Router# telnet Router2
Router# telnet 172.17.1.2

```

To exit a telnet session:

```

Router2# exit

```

To return to the router you telnetted *from*, without exiting the session:

- Hold *CTRL+SHIFT+6* and then release
- Type the character *x*

To view all open telnet sessions:

```

Router# show sessions

```

* * *

All original material copyright © 2007 by Aaron Balchunas (aaron@routeralley.com), unless otherwise noted. All other material copyright © of their respective owners.

This material may be copied and used freely, but may not be altered or sold without the expressed written consent of the owner of the above copyright. Updated material may be found at <http://www.routeralley.com>.

Privilege Levels

IOS devices have a total of **16 privilege levels**, numbered 0 through 15. **User Exec** mode is privilege level 1. **Privileged Exec** mode is privilege level 15.

We can create a custom Privilege level, including the commands users are allowed to input at that mode:

```
Router(config)# privilege exec all level 3 show interface
Router(config)# privilege exec all level 3 show ip route
Router(config)# privilege exec all level 3 show reload
```

To then enter that privilege level from User Mode:

```
Router> enable 3
```

Observing Performance Statistics on Cisco Routers

To view the processor load on a Cisco Router:

```
Router# show processes cpu
```

* * *

All original material copyright © 2007 by Aaron Balchunas (aaron@routeralley.com), unless otherwise noted. All other material copyright © of their respective owners.

This material may be copied and used freely, but may not be altered or sold without the expressed written consent of the owner of the above copyright. Updated material may be found at <http://www.routeralley.com>.