

1.112.1 Fundamentals of TCP/IP Weight 4

Linux Professional Institute Certification — 102

Geoffrey Robertson ge@ffrey.com

Nick Urbanik nicku@nicku.org

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Description of Objective

Candidates should demonstrate a proper understanding of network fundamentals. This objective includes the understanding of IP-addresses, network masks and what they mean (i.e. determine a network and broadcast address for a host based on its subnet mask in "dotted quad" or abbreviated notation or determine the network address, broadcast address and netmask when given an IP-address and number of bits). It also covers the understanding of the network classes and classless subnets (CIDR) and the reserved addresses for private network use. It includes the understanding of the function and application of a default route. It also includes the understanding of basic internet protocols (IP, ICMP, TCP, UDP) and the more common TCP and UDP ports (20, 21, 23, 25, 53, 80, 110, 119, 139, 143, 161).

Key files, terms, and utilities include:

`/etc/services`

```
ftp
telnet
host
ping
dig
traceroute
whois
```

(2.2) Networking Fundamentals [14]

1.112.1 Fundamentals of TCP/IP [4]

1.112.3 TCP/IP configuration and troubleshooting [7]

1.112.4 Configure Linux as a PPP client [3]

Fundamentals of TCP/IP [4]

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Fundamentals of TCP/IP [4]

```
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Fundamentals of TCP/IP [4]

TCP/IP Illustrated, Volume 1 The Protocols by W. Richard Stevens Addison Wesley

LPIC 1 Certification Bible *Angie Nash and Jason Nash* Hungry Minds

IP addressing

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IP Address Classes (Classic)

1

```
00000000.00000000.00000000.00000000 - 0.0.0.0
01111111.11111111.11111111.11111111 - 127.255.255.255
```

2

```
10000000.00000000.00000000.00000000 - 128.0.0.0
10111111.11111111.11111111.11111111 - 191.255.255.255
```

3

```
11000000.00000000.00000000.00000000 - 192.0.0.0
11011111.11111111.11111111.11111111 - 223.255.255.255
```

IP Address - Loopback

Reserved Space 127.0.0.0 — 127.255.255.255
127.0.0.1 localhost

IP Address - Private Networks

There are IP ranges set aside for private address spaces. These should not be made visible on the internet.

10.0.0.0 -- 10.255.255.255

172.16.0.0 -- 172.32.255.255

192.168.0.0 -- 192.168.255.255

IP Address - Subnetting

Network: 192.168.192.0
Subnet: 255.255.255.224

IP Address - Default Route

```
# route add default gw 192.168.1.1
```

DoD Layer Model

Application ftp, telnet, mail, http protocols

Transport TCP, UDP protocols

Network IP, ICMP, IGMP protocols

Link Ethernet, Token Ring, FDDI

Basic Internet Protocols**IP****ICMP****TCP****UDP****Ports and Port Numbers**

```
$ less /etc/services
ftp          21/tcp
ftp          21/udp      fsp fspd
ssh          22/tcp      # SSH Remote Login Protocol
ssh          22/udp      # SSH Remote Login Protocol
telnet       23/tcp
telnet       23/udp
# 24 - private mail system
smtp         25/tcp      mail
smtp         25/udp      mail
time         37/tcp      timserver
```

Ports and Port Numbers

FTP 20, 21

Telnet 23

SSH 22

smtp 25

DNS 53

http 80

pop3 110

nntp 119

netbios 137, 138, 139

imap2 143

snmp 161

Port Number vRanges

Original reserved ports (till 1992) (256-1023 UNIX)

Well Known or Famous Port Numbers - Reserved

Unprivileged

The End

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