TABLE OF CONTENTS

1 INTRODUCTION 9

1.1 WHO IS THIS BOOK FOR ? 9
1.2 THE EULA LICENSE CONDITIONS FOR PACKET TRACER 9
1.3 THE MAIN CHANGES IN PACKET TRACER 8.2 10
1.4 DETAILED COMMENTS APPLYING TO THE PROGRAM VERSION 10
1.5 "KEEP ME LOGGED IN" OPTION 10
1.6 THE MINIMUM SYSTEM REQUIREMENTS AND INSTALLING. 11
1.7 THE FIRST RUN OF THE PACKET TRACER PROGRAM 13
1.8 FILES NECESSARY TO ANALYZE THE CONTENT 16

2 USING MULTIUSER MODE 19

2.1 MULTIUSER MODE DESCRIPTION 19
2.2 SETTING UP A SERVER ROOM (EXERCISE 1) 21
2.3 CREATING EXTERNAL NETWORKS (EXERCISE 2) 30
2.4 CONNECTING THE SERVER ROOM WITH EXTERNAL NETWORKS (EXERCISE 3) 34
2.5 LIST OF AUXILIARY FILES 56

3 PACKET TRACER IN LINUX 59

3.1 CREATING THE VIRTUAL UBUNTU LINUX MACHINE 59
3.2 FIRST LOGON TO THE UBUNTU STUDENT ACCOUNT 81
3.3 UNLOCKING THE UBUNTU ROOT ACCOUNT 85
3.4 DOWNLOADING PACKET TRACER IN THE UBUNTU MACHINE. 89
3.5 INSTALLING PACKET TRACER IN THE VIRTUAL UBUNTU. 91
3.6 CREATING A NETWORK IN PACKET TRACER IN UBUNTU (EXERCISE 4) 96
3.7 NETWORKING IN PACKET TRACER IN WINDOWS (EXERCISE 5) 99
3.8 CONNECTING NETWORKS IN UBUNTU PT AND WINDOWS PT (EXERCISE 6) 102
3.9 LIST OF AUXILIARY FILES 110

4 DEVICE PAIRING TECHNOLOGY AND TETHERING 113

4.1 WHAT IS BLUETOOTH DEVICE PAIRING? (EXERCISE 7) 113
4.2 SETTING UP TETHERING (EXERCISE 8) 118
4.3 LIST OF AUXILIARY FILES 121

5 MOBILE GSM TELEPHONY 125

5.1 COMMUNICATION BETWEEN TWO GSM MOBILE NETWORKS (EXERCISE 9) 125
5.2 COMMUNICATION BETWEEN THREE GSM MOBILE NETWORKS (EXERCISE 10) 132
5.3 LIST OF AUXILIARY FILES 137

6 NETWORK CONTROLLER 141

6.1 INTRODUCTION TO NETWORK CONTROLLERS 141
6.2 CREATE AN ADMINISTRATOR ACCOUNT (EXERCISE 11) 142
6.3 CONFIGURATION OF AUTHORIZATION (EXERCISE 12) 149
6.4 IDENTIFICATION OF DEVICES (EXERCISE 13) 152
6.5 DISPLAYING THE NETWORK TOPOLOGY (EXERCISE 14) 160
6.6 ACCESSING THE NET CONTROLLER FROM THE REAL NETWORK (EXERCISE 15) 165
6.7 REMOTE RECONFIGURATION OF DEVICES (EXERCISE 16) 168
6.8 LIST OF AUXILIARY FILES 174

7 WIRELESS NETWORK CONTROLLERS 177

7.1 DESCRIPTION OF WLAN AND CAPWAP NETWORK CONTROLLERS 177
7.2 CONFIGURING ACCESS POINTS USING WLC-PT (EXERCISE 17) 179
7.3 MANAGING LOCAL NETWORKS WITH WLC-PT (EXERCISE 18) 189
7.4 INITIALIZING THE WLC-2504 USING THE GUI (EXERCISE 19) 202
7.5 MANAGING WLANS IN WLC-2504 (EXERCISE 20) 217
7.6 LIST OF AUXILIARY FILES 223

8 INTEGRATED INDUSTRIAL ROUTERS 227

8.1 DESCRIPTION OF INTEGRATED ROUTERS 227
8.2 BASIC CONFIGURATION FOR 819HG-4G-IOX (EXERCISE 21) 232
8.3 RUNNING A VIRTUAL MACHINE IN 819HG-4G-IOX (EXERCISE 22) 236
8.4 LIST OF AUXILIARY FILES 241

9 HOT SWAPPING DEVICES 245

9.1 WHAT IS HOT SWAPPING ? 245
9.2 ADDING POWER MODULES (EXERCISE 23) 245
9.3 ADDING POE DEVICES (EXERCISE 24) 249
9.4 LIST OF AUXILIARY FILES 250

10 CLOCK SYNCHRONIZATION 253

10.1 NTP AND PTP PROTOCOL 253
10.2 MASTER-SLAVE SYNCHRONIZATION BETWEEN ROUTERS (EXERCISE 26) 255
10.3 CHAIN SYNCHRONIZATION BETWEEN ROUTERS (EXERCISE 26) 258
10.4 SLAVE-MASTER-NEW MASTER SYNCHRONIZATION (EXERCISE 27) 260
10.5 SYNCHRONIZATION IN BOUNDARY, E2EFORWARD, TRANSPARENT MODES (EXERCISE 28) .. 267
10.6 LIST OF AUXILIARY FILES 272

11 SERVER SERVICES 275

11.1 HTTP SERVICE (EXERCISE 29) 275

11.2 FTP SERVICE (EXERCISE 30) 285
11.3 EMAIL SERVICE (EXERCISE 31) 292
11.4 LIST OF AUXILIARY FILES 298

12 IPV6 PROTOCOL 301

12.1 INTRODUCTION TO IPV6 301
12.2 TUNNELING IN IPV6 PROTOCOL (EXERCISE 32) 306
12.3 CONFIGURING DHCP FOR IPV6 ON THE SERVER (EXERCISE 33) 309
12.4 CONFIGURING DHCP FOR IPV6 ON A ROUTER (EXERCISE 34) 312
12.5 LIST OF AUXILIARY FILES 314

13 HOT STANDBY ROUTER PROTOCOL 317

13.1 FHRP – TYPE PROTOCOLS 317
13.2 HSRP CONFIGURATION (EXERCISE 35). 317
13.3 HSRP CONFIGURATION (EXERCISE 36) 325
13.4 LIST OF AUXILIARY FILES 329

14 ADVANCED PHYSICAL TOPOLOGY 333

14.1 CREATING THE INTERCITY PHYSICAL TOPOLOGY (EXERCISE 37) 333
14.2 CREATING THE ONE CITY PHYSICAL TOPOLOGY (EXERCISE 38) 340
14.3 PHYSICAL TOPOLOGY OF THE LOCAL NETWORK (EXERCISE 39) 346
14.4 PHYSICAL TOPOLOGY FOR WAN (EXERCISE 40) 366
14.5 LIST OF AUXILIARY FILES 392

15 COMMAND PROMPT COMMANDS 395

15.1 TABULAR SUMMARY OF COMMANDS 395
15.2 IPV6CONFIG AND PING 395
15.3 IPCONFIG AND NSLOOKUP 398
15.4 NETSH INTERFACE IPV6 SHOW NEIGHBORS 401
15.5 DIRECTORY COMMANDS 403
15.6 LIST OF AUXILIARY FILES 405

16 INDEX OF TABLES 409

17 INVENTORY OF EXERCISES AND LIST OF SUPPORT FILES 415

18 BIBLIOGRAPHY 419