

TABLE OF CONTENTS

1	INTRODUCTION.....	11
1.1	MAIN CHANGES IN THE PACKET TRACER 8.2	11
1.2	DETAILED COMMENTS APPLYING TO THE PROGRAM VERSION.....	12
1.3	KEEP ME LOGGED IN OPTION	12
1.4	THE MINIMUM SYSTEM REQUIREMENTS.	13
2	DOWNLOADING AND INSTALLING CISCO PACKET TRACER.....	17
2.1	DOWNLOADING FROM NETACAD	17
2.2	INSTALLING THE PACKET TRACER (VERSION 8.2.0)	23
2.3	THE FIRST RUN OF THE PACKET TRACER PROGRAM	24
3	GETTING STARTED WITH THE CISCO PACKET TRACER.....	29
3.1	THE MAIN PROGRAM WINDOW	29
3.2	THE MAIN AREAS OF THE PROGRAM WINDOW.....	30
3.3	TOOLBAR ICONS.....	32
3.4	GENERAL PURPOSE TOOLBAR ICONS	35
4	BASICS OF WORKING WITH THE CISCO PACKET TRACER.....	39
4.1	FIRST STEPS	39
4.1.1	<i>Working with Devices.....</i>	<i>39</i>
4.1.2	<i>Replacing and Adding Modules.....</i>	<i>40</i>
4.1.3	<i>Network Cabling.....</i>	<i>45</i>
4.1.4	<i>Connecting Devices.....</i>	<i>47</i>
4.1.5	<i>Basic Device Configuration.....</i>	<i>49</i>
4.1.5.1	Global Configuration Mode.....	49
4.1.5.2	Desktop Tools	50
4.1.6	<i>Check the Status of Your Configuration.....</i>	<i>52</i>
4.1.6.1	Status of Network Adapter LEDs	52
4.1.6.2	IP Address Display	54
4.1.6.3	Inspect Tool	54
4.1.6.4	Command Line for PC.....	55
4.1.7	<i>Testing Connection (Real Mode)</i>	<i>57</i>
4.1.7.1	Simple Way - Graphic PING.....	57
4.1.7.2	Standard Method - PING via Command Line	58
4.1.7.3	Advanced Graphic PING.....	59
4.1.8	<i>Testing Connection (Simulation Mode)</i>	<i>61</i>

Table of Contents

5	DEVICES USED TO CREATE NETWORK	67
5.1	HUBS.....	67
5.2	REPEATERS	77
5.3	BRIDGES.....	78
5.3.1	<i>Two-segment Network Built with Two Hubs.....</i>	<i>78</i>
5.3.2	<i>Sample Network with a Bridge.....</i>	<i>80</i>
5.4	SWITCHES.....	83
5.5	ACCESS POINTS.....	86
5.6	OTHER ACCESS POINT WIRELESS DEVICES	92
5.6.1	<i>LAP-PT Devices</i>	<i>92</i>
5.6.2	<i>3702i Device</i>	<i>92</i>
5.6.3	<i>WLC-PT Device.....</i>	<i>93</i>
5.6.4	<i>WLC-2504 Device.....</i>	<i>93</i>
5.7	WI-FI ACCESS ROUTERS	94
5.7.1	<i>Standard Configuration of the Wi-Fi Router.....</i>	<i>94</i>
5.7.2	<i>Configuration of Wi-Fi Router via HTTP</i>	<i>99</i>
5.8	DEVICES FOR CREATING GSM NETWORKS	118
5.9	HARDWARE FIREWALLS	119
5.9.1	<i>Meraki-MX65W Device</i>	<i>119</i>
5.9.2	<i>Meraki-Server Device</i>	<i>120</i>
5.9.3	<i>ASA5505 and ASA5506 Devices.....</i>	<i>121</i>
5.9.3.1	<i>ASA 5505 Device.....</i>	<i>122</i>
5.9.3.2	<i>ASA 5506 Device.....</i>	<i>122</i>
6	BASICS OF DATA TRANSMISSION AND OVERVIEW OF NETWORK SERVICES	125
6.1	TRANSMISSION TYPES	125
6.1.1	<i>Half Duplex.....</i>	<i>125</i>
6.1.2	<i>Full Duplex.....</i>	<i>127</i>
6.2	CONFIGURING NETWORK SERVICES.....	127
6.2.1	<i>DHCP.....</i>	<i>128</i>
6.2.2	<i>HTTP</i>	<i>130</i>
6.2.3	<i>FTP.....</i>	<i>133</i>
6.2.4	<i>SMTP/POP3</i>	<i>138</i>
6.2.5	<i>DNS.....</i>	<i>143</i>
6.2.6	<i>Firewall.....</i>	<i>148</i>
7	SKILL EXERCISES – PART I.....	159

7.1	DEVICE-TO-DEVICE CONNECTIONS	159
7.1.1	Connection of Devices According to the Scheme.....	159
7.1.2	Connecting Devices to the Wi-Fi Router and Access Point	160
7.1.3	Connecting Computers That Are At Longer Distance Than 100 Meters	161
7.1.4	Using a HUB to Connect Devices Into a Single Local Network.....	162
7.1.5	Using a Bridge to Limit Packet Collisions on a Local Network.....	163
7.2	CONFIGURE SERVICES ON SERVERS	164
7.2.1	DNS and HTTP Configuration	164
7.2.2	Configuring DHCP and FTP	165
7.2.3	Mail Server Configuration (SMTP, POP3)	167
8	CONFIGURING CISCO ROUTERS	171
8.1	EXPLORING THE EQUIPMENT OF CISCO ROUTERS	171
8.1.1	Series 1841	171
8.1.2	Series 1941	173
8.1.3	Series 2620XM.....	174
8.1.4	Series 2621XM.....	177
8.1.5	Series 2811	178
8.1.6	Series 2901	179
8.1.7	Series 2911	179
8.1.8	IR829 Router.....	180
8.1.9	819IOX Router	181
8.1.10	CGR 1240 Router	182
8.1.11	ISR 4321 Router.....	182
8.1.12	819IOX Router	184
8.1.13	819HGW Router	184
8.1.14	Series PT Router.....	185
8.2	CONFIGURE CISCO ROUTERS USING THE GRAPHICAL INTERFACE	187
8.2.1	Interface Configuration	187
8.2.2	GUI-Configurable Routing Protocols	192
8.2.2.1	Static Routing	192
8.2.2.2	RIP Routing Protocol	196
8.3	CONFIGURING CISCO ROUTERS IN CISCO IOS.....	200
8.3.1	Basics.....	201
8.3.2	Wizard Mode.....	203
8.3.2.1	Simple Wizard Mode	204
8.3.2.2	Advanced Wizard Mode	207

Table of Contents

8.3.3	<i>Basic Router Configuration Modes</i>	210
8.3.3.1	Console Mode Support.....	210
8.3.3.2	Using Help	212
8.3.3.3	View the Status of the Router	216
8.3.4	<i>Configure Router Name, Passwords, and Message Of The Day (MOTD)</i> 219	
8.3.5	<i>Other Modes of Operation of the Router</i>	222
8.3.5.1	Console Port Configuration	223
8.3.5.2	Configuration of Virtual Terminals (Telnet, SSH).....	224
8.3.5.3	Interface Configuration	228
8.3.5.4	Configuration of Sub-Interfaces.....	235
8.3.6	<i>DHCP Configuration</i>	236
8.3.7	<i>Static Routing Configuration</i>	238
8.3.8	<i>RIP Routing Protocol Configuration</i>	241
8.3.9	<i>EIGRP Routing Protocol Configuration</i>	245
8.3.10	<i>OSPF Routing Protocol Configuration</i>	248
8.3.11	<i>Local Definition of Router Names</i>	252
8.3.12	<i>Save the Current Configuration</i>	254
8.3.13	<i>Securing Your Configuration</i>	256
9	CONFIGURING CISCO SWITCHES	263
9.1	EXPLORING THE EQUIPMENT OF CISCO SWITCHES	263
9.1.1	<i>Switch 2950</i>	263
9.1.2	<i>Switch 2950T</i>	264
9.1.3	<i>Switch 2960</i>	264
9.1.4	<i>PT-Switch and PT-Empty Switch</i>	264
9.1.5	<i>Series 3560</i>	266
9.1.6	<i>Series IE 2000</i>	266
9.2	CONFIGURE CISCO SWITCHES USING THE GRAPHICAL INTERFACE	267
9.2.1	<i>Interface Configuration</i>	267
9.2.2	<i>Configuring Virtual LANs (VLANs)</i>	270
9.2.3	<i>Enabling Communication Between VLANs</i>	274
9.3	CONFIGURING CISCO SWITCHES IN THE IOS.....	278
9.3.1	<i>Basic Information</i>	278
9.3.2	<i>Basic Switch Configuration Modes</i>	279
9.3.3	<i>Interface Configuration</i>	279
9.3.4	<i>VLAN Configuration</i>	280

9.3.5	<i>Configuration of Virtual Terminals (Telnet, SSH)</i>	283
9.3.6	<i>REP Protocol</i>	286
9.3.6.1	Purpose of REP	287
9.3.6.2	Basic Concepts of REP.....	287
10	PHYSICAL TOPOLOGY IN THE CISCO PACKET TRACER	293
10.1	ARRANGING DEVICES	301
10.2	PHYSICAL CABLE LENGTHS AND DISTANCES	301
10.3	CABLE MANAGEMENT.....	304
11	SKILL EXERCISES – PART II	309
11.1	CONFIGURE DEVICES USING THE GRAPHICAL INTERFACE	309
11.1.1	<i>Interface configuration, static routing</i>	309
11.1.2	<i>Switch Modes, VLANs Configuration</i>	310
11.2	ROUTING PROTOCOLS, REMOTE MANAGEMENT	311
11.2.1	<i>RIPv2 and Configuration Using Telnet, Local Name Definition</i>	311
11.2.2	<i>RIPv2 and Configuration Using Telnet, Local Name Definition</i>	312
11.2.3	<i>EIGRP and Configuration via SSH, HTTP and DNS</i>	313
11.3	VLANs, ROUTER ON A STICK, REMOTE MANAGEMENT	314
11.3.1	<i>Switch Modes, VLAN Configuration</i>	314
11.3.2	<i>VLAN Configuration, Routing Between VLANs</i>	315
11.3.3	<i>Remote Switch Management</i>	316
11.3.4	<i>Protocol REP in Switches</i>	317
12	WORKING WITH LARGE TOPOLOGIES	321
12.1	INTRODUCTION TO DEVICE GROUPING	321
12.2	DEVICE GROUPING – DESCRIPTION OF TOOL BUTTONS.....	321
12.3	DEVICE GROUPING – STEP-BY-STEP ALGORITHM	322
12.4	MOVE A SINGLE DEVICE FROM THE CLOUD TO THE ROOT LEVEL.....	324
12.5	MOVE A SINGLE DEVICE FROM THE ROOT LEVEL TO THE CLOUD	326
12.6	PURPOSE OF THE SET TILED BACKGROUND BUTTON	327
12.7	RENAME A CLOUD.....	329
12.8	MULTIUSER MODE.....	329
13	DHCP PROTOCOL FOR IPV4	339
13.1	INTRODUCTION TO DHCP.....	339
13.1.1	<i>DHCP Basics</i>	339
13.1.2	<i>DHCP Phases</i>	340

Table of Contents

13.2	CONFIGURING DHCP ON THE SERVER	345
13.2.1	<i>Configuring the DHCP Server Service</i>	345
13.2.2	<i>Erasing DHCP on the Server</i>	348
13.2.3	<i>Disabling DHCP on the Server</i>	348
13.2.4	<i>Deleting DHCP Address Pool on the Server</i>	348
13.3	CONFIGURING DHCP ON YOUR ROUTER	349
13.3.1	<i>Configure the Router (DHCP Server) Address Pool</i>	351
13.3.2	<i>Viewing the Assigned IP Address Array in DHCP</i>	353
13.3.3	<i>Verifying the DHCP Service Is Working on the Router</i>	353
13.3.4	<i>Deleting the DHCP Configuration on the Router (DHCP Server)</i>	355
13.3.5	<i>Deleting DHCP Configurations on Computers (DHCP Clients)</i>	355
13.4	DHCP ON A NETWORK WITH MULTIPLE ROUTERS	355
13.4.1	<i>Set Up an Intermediary Router</i>	356
13.4.2	<i>Start DHCP and Configure the Address Pool</i>	357
13.4.3	<i>Check the Array of Assigned IP Addresses on the Router</i>	358
13.5	CONFIGURING DHCP ON THE WIRELESS ROUTER	358
13.5.1	<i>Configuring DHCP on the WRT300N</i>	358
13.5.2	<i>Configuring DHCP Based on MAC Addresses</i>	364
14	SKILL EXERCISES – PART III	371
14.1	GROUPING DEVICES AND COMBINE TWO INSTANCES OF THE PROGRAM	371
14.1.1	<i>Grouping Devices</i>	371
14.1.2	<i>Device Grouping and Multiuser Function</i>	372
14.2	DHCP FOR IPV4	373
14.2.1	<i>Configuring DHCP on the Server</i>	373
14.2.2	<i>Configuring DHCP on the Router</i>	374
14.2.3	<i>Configuring DHCP on the Wireless Router</i>	375
14.2.4	<i>DHCP Configuration on a Server That Is on a Remote Network</i>	376
15	MISTAKES MADE DURING NETWORK CONFIGURATION	381
15.1	WIRING OR PORT ERRORS.....	381
15.2	DEVICE RELATED ERRORS.....	383
15.3	IP ADDRESSING ERRORS	383
16	LIST OF THE SAMPLES AND SKILL EXERCISE’S SOLUTIONS	391
16.1	THE SAMPLE SOLUTION FILES	391
16.2	THE SKILL EXERCISE’S SOLUTIONS	393