

OPTICAL COMPONENTS AND SYSTEMS FOR CLOUD COMPUTING



PHO020A
September 2015

Sinha G.
Project Analyst

ISBN: 1-62296-164-1



BCC Research
49 Walnut Park, Building 2
Wellesley, MA 02481 USA
866-285-7215 (toll-free within the USA),
or (+1) 781-489-7301
www.bccresearch.com
information@bccresearch.com

TABLE OF CONTENTS

TOPIC	PAGE NO.
CHAPTER 1 INTRODUCTION	2
STUDY GOALS AND OBJECTIVES	2
REASONS FOR DOING THE STUDY	2
SCOPE OF REPORT	2
INTENDED AUDIENCE	3
INFORMATION SOURCES	3
ANALYST'S CREDENTIALS	4
RELATED BCC RESEARCH REPORTS	4
BCC RESEARCH WEBSITE	4
DISCLAIMER	4
CHAPTER 2 SUMMARY	6
<i>SUMMARY TABLE GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY COMPONENT TYPE, THROUGH 2020 (\$ MILLIONS)</i>	7
<i>SUMMARY FIGURE GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY COMPONENT TYPE, 2014-2020 (\$ MILLIONS)</i>	8
CHAPTER 3 OVERVIEW	10
MARKET DEFINITION AND EVOLUTION OF OPTICAL SYSTEMS AND COMPONENTRY FOR THE CLOUD	10
FUTURE OUTLOOK AND EXPECTATIONS	11
VALUE CHAIN	11
<i>FIGURE 1 VALUE CHAIN OF OPTICAL SYSTEMS AND COMPONENTS FOR CLOUD</i>	11
IMPORTANT OPTICAL SYSTEMS AND COMPONENTS PATENTS FOR CLOUD COMPUTING	12
PASSIVE OPTICAL NETWORK SYSTEM	12
PERFORMANCE MONITORING IN PASSIVE OPTICAL NETWORK	13
NAVIGATION SYSTEM INCLUDING OPTICAL AND NONOPTICAL SENSORS	13
TEMPERATURE SENSOR USING AN OPTICAL FIBER	14
FIBER OPTIC SENSORS WITHIN SUBSURFACE MOTOR WINDING CHAMBERS	15
METHOD AND APPARATUS FOR ETHERNET DATA COMPRESSION	15
ETHERNET VIRTUAL PRIVATE NETWORK SYSTEM FOR PROVIDING FAST PROTECTION FOR ACCESS RINGS	16
OPTICAL LINE TERMINAL AND METHOD OF REGISTERING OPTICAL NETWORK TERMINAL THEREOF	17
PROGRAMMABLE LOGIC DEVICE AND METHOD FOR DRIVING PROGRAMMABLE LOGIC DEVICE	17
CHAPTER 4 OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SYSTEM	20
INTRODUCTION	20
<i>FIGURE 2 OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING, BY SYSTEM</i>	20
MARKET DYNAMICS	21
DRIVERS	21
Growth in Passive Optical Networks in the European Region	21

TOPIC	PAGE NO.
<i>FIGURE 3 NUMBER OF HOUSEHOLDS IN THE EUROPEAN REGION FTTH, 2007-2017 (THOUSANDS)</i>	21
Reliable, Safe and Simplified Network Operations	22
RESTRAINTS	23
High Installation Costs at Operators' Interface and Operational Challenges	23
OPPORTUNITY	23
Technological Advancements	23
<i>FIGURE 4 ADVANCEMENTS IN PASSIVE OPTICAL NETWORKING</i>	24
Growth of Optical Systems in Asia-Pacific	24
<i>FIGURE 5 ECONOMIES WITH HIGHEST PENETRATION RATE OF FIBER-TO-HOME/BUILDING SUBSCRIBERS (%)</i>	25
PASSIVE OPTICAL NETWORK (PON)	26
<i>TABLE 1 GLOBAL MARKET FOR PASSIVE OPTICAL NETWORKS BY TYPE, THROUGH 2020 (\$ MILLIONS)</i>	26
<i>TABLE 2 GLOBAL MARKET FOR PASSIVE OPTICAL NETWORKS FOR CLOUD COMPUTING, BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	27
<i>FIGURE 6 GLOBAL MARKET FOR PASSIVE OPTICAL NETWORKS FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	27
<i>TABLE 3 GLOBAL MARKET FOR PASSIVE OPTICAL NETWORKS FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	28
<i>FIGURE 7 GLOBAL MARKET FOR PASSIVE OPTICAL NETWORKS FOR CLOUD COMPUTING, BY REGION, 2014-2020 (\$ MILLIONS)</i>	28
SONET/SDH	29
<i>TABLE 4 GLOBAL MARKET FOR SONET/SDH FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	30
<i>FIGURE 8 GLOBAL MARKET FOR SONET/SDH FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	30
<i>TABLE 5 GLOBAL MARKET FOR SONET/SDH FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	31
<i>FIGURE 9 GLOBAL MARKET FOR SONET/SDH FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)</i>	31
ETHERNET	32
<i>TABLE 6 GLOBAL MARKET FOR ETHERNET FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	32
<i>FIGURE 10 GLOBAL MARKET FOR ETHERNET FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	32
<i>TABLE 7 GLOBAL MARKET FOR ETHERNET FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	34
<i>FIGURE 11 GLOBAL MARKET FOR ETHERNET FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)</i>	34
FIBER CHANNEL	35
<i>TABLE 8 GLOBAL MARKET FOR FIBER CHANNEL FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	35
<i>FIGURE 12 GLOBAL MARKET FOR FIBER CHANNEL FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	35
<i>TABLE 9 GLOBAL MARKET FOR FIBER CHANNEL FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	36
<i>FIGURE 13 GLOBAL MARKET FOR FIBER CHANNEL FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)</i>	37
CWDM	37

TOPIC	PAGE NO.
<i>TABLE 10 GLOBAL MARKET FOR CWDM FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	38
<i>FIGURE 14 GLOBAL MARKET FOR CWDM FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	38
<i>TABLE 11 GLOBAL MARKET FOR CWDM FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	39
<i>FIGURE 15 GLOBAL MARKET FOR CWDM FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)</i>	39
DWDM	40
<i>TABLE 12 GLOBAL MARKET FOR DWDM FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	40
<i>FIGURE 16 GLOBAL MARKET FOR DWDM FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	40
<i>TABLE 13 GLOBAL MARKET FOR DWDM FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	42
<i>FIGURE 17 GLOBAL MARKET FOR DWDM FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)</i>	42
FTTX	43
<i>TABLE 14 GLOBAL MARKET FOR FTTX FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	43
<i>FIGURE 18 GLOBAL MARKET FOR FTTX FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	43
<i>TABLE 15 GLOBAL MARKET FOR FTTX FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	44
<i>FIGURE 19 GLOBAL MARKET FOR FTTX FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)</i>	45
CHAPTER 5 OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SOFTWARE CONTROL SYSTEMS	47
INTRODUCTION	47
<i>FIGURE 20 OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING, BY SOFTWARE CONTROL SYSTEMS</i>	47
MARKET DYNAMICS	47
DRIVERS	47
Increasing Need for Software in Industrial Automation	47
Rise in Infrastructure Investments in Emerging Markets	48
Growth in Demand for Process Automation Among Different Industry Verticals	48
RESTRAINTS	49
Risk of Cyber Threats	49
Data Management Challenges in Oil and Gas Industry	49
OPPORTUNITY	49
Increasing Demand for Cloud-based Industrial Control	49
HMI	50
<i>TABLE 16 GLOBAL MARKET FOR HMI FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)</i>	50
<i>FIGURE 21 GLOBAL MARKET FOR HMI FOR CLOUD COMPUTING BY COMPONENT, 2014-2020 (\$ MILLIONS)</i>	51
<i>TABLE 17 GLOBAL MARKET FOR HMI FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	52

TOPIC	PAGE NO.
<i>FIGURE 22 GLOBAL MARKET FOR HMI FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)</i>	52
DCS	53
<i>TABLE 18 GLOBAL MARKET FOR DCS FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)</i>	53
<i>FIGURE 23 GLOBAL MARKET FOR DCS FOR CLOUD COMPUTING BY COMPONENT, 2014-2020 (\$ MILLIONS)</i>	53
<i>TABLE 19 GLOBAL MARKET FOR DCS FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	54
<i>FIGURE 24 GLOBAL MARKET FOR DCS FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)</i>	55
PLC	55
<i>TABLE 20 GLOBAL MARKET FOR PLC FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)</i>	56
<i>FIGURE 25 GLOBAL MARKET FOR PLC FOR CLOUD COMPUTING BY COMPONENT, 2014-2020 (\$ MILLIONS)</i>	56
<i>TABLE 21 GLOBAL MARKET FOR PLC FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	57
<i>FIGURE 26 GLOBAL MARKET FOR PLC FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)</i>	57
SCADA	58
<i>TABLE 22 GLOBAL MARKET FOR SCADA FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)</i>	58
<i>FIGURE 27 GLOBAL MARKET FOR SCADA FOR CLOUD COMPUTING BY COMPONENTRY, 2014-2020 (\$ MILLIONS)</i>	59
<i>TABLE 23 GLOBAL MARKET FOR SCADA FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	60
<i>FIGURE 28 GLOBAL MARKET FOR SCADA FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)</i>	60
CHAPTER 6 OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY APPLICATION	62
INTRODUCTION	62
<i>FIGURE 29 OPTICAL SYSTEMS AND COMPONENTRY MARKET BY APPLICATION</i>	62
MARKET DYNAMICS	62
DRIVERS	62
Increasing Number of Business Processes Moving to the Cloud	62
Increasing Applications of Cloud Computing in Defense	63
RESTRAINTS	63
Privacy and Legal Issues in Cloud Computing	63
OPPORTUNITIES	64
Adoption in Developing Countries of Latin America and Africa	64
LOGISTICS AND WAREHOUSING	64
<i>TABLE 24 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN LOGISTICS AND WAREHOUSING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	65
<i>FIGURE 30 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN LOGISTICS AND WAREHOUSING BY REGION, 2014-2020 (\$ MILLIONS)</i>	65
MILITARY	66

TOPIC	PAGE NO.
<i>TABLE 25 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN MILITARY APPLICATIONS BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	66
<i>FIGURE 31 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN MILITARY APPLICATIONS BY REGION, 2014-2020 (\$ MILLIONS)</i>	66
HEALTHCARE	67
<i>TABLE 26 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN HEALTHCARE BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	67
<i>FIGURE 32 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN HEALTHCARE BY REGION, 2014-2020 (\$ MILLIONS)</i>	67
INFORMATION TECHNOLOGY	68
<i>TABLE 27 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN INFORMATION TECHNOLOGY BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	69
<i>FIGURE 33 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN INFORMATION TECHNOLOGY BY REGION, 2014-2020 (\$ MILLIONS)</i>	69
ENTERTAINMENT	70
<i>TABLE 28 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN ENTERTAINMENT BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	70
<i>FIGURE 34 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN ENTERTAINMENT BY REGION, 2014-2020 (\$ MILLIONS)</i>	70
OTHERS	71
<i>TABLE 29 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN OTHERS SEGMENT BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	72
<i>FIGURE 35 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN OTHERS SEGMENT BY REGION, 2014-2020 (\$ MILLIONS)</i>	72
CHAPTER 7 OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COMPONENTRY	74
INTRODUCTION	74
<i>FIGURE 36 OPTICAL SYSTEMS AND COMPONENTRY MARKET BY COMPONENTS</i>	74
MARKET DYNAMICS	75
DRIVERS	75
Accelerating Bandwidth Requirements	75
Increasing Demand for Passive Optical Networks in Asia-Pacific	75
RESTRAINTS	75
Technical and Operational Issues such as Dispersion, Distortion, Attenuation and Signal Losses	75
OPPORTUNITY	76
Untapped Potential in the Developing Economies	76
OPTICAL SENSORS	76
<i>TABLE 30 GLOBAL MARKET FOR OPTICAL SENSORS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	77
<i>FIGURE 37 GLOBAL MARKET FOR OPTICAL SENSORS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	77
<i>TABLE 31 GLOBAL MARKET FOR OPTICAL SENSORS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)</i>	78

TOPIC	PAGE NO.
<i>FIGURE 38 GLOBAL MARKET FOR OPTICAL SENSORS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY TYPE, 2014-2020 (\$ MILLIONS)</i>	78
CARRIER ETHERNET	79
<i>TABLE 32 GLOBAL MARKET FOR CARRIER ETHERNET IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	79
<i>FIGURE 39 GLOBAL MARKET FOR CARRIER ETHERNET IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING, BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	79
OPTICAL TRANSCEIVERS	81
<i>TABLE 33 GLOBAL MARKET FOR OPTICAL TRANSCEIVERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	81
<i>FIGURE 40 GLOBAL MARKET FOR OPTICAL TRANSCEIVERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	81
OPTICAL TRANSMITTERS	82
<i>TABLE 34 GLOBAL MARKET FOR OPTICAL TRANSMITTERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	83
<i>FIGURE 41 GLOBAL MARKET FOR OPTICAL TRANSMITTERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	83
OPTICAL RESPONDERS	84
<i>TABLE 35 GLOBAL MARKET FOR OPTICAL RESPONDERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	84
<i>FIGURE 42 GLOBAL MARKET FOR OPTICAL RESPONDERS IN OPTICAL SYSTEM AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	84
OPTICAL RECEIVERS	85
<i>TABLE 36 GLOBAL MARKET FOR OPTICAL RECEIVERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	86
<i>FIGURE 43 GLOBAL MARKET FOR OPTICAL RECEIVERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	86
OPTICAL AMPLIFIERS	87
<i>TABLE 37 GLOBAL MARKET FOR OPTICAL AMPLIFIERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	87
<i>FIGURE 44 GLOBAL MARKET FOR OPTICAL AMPLIFIERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	87
OPTICAL NETWORK TERMINALS	88
<i>TABLE 38 GLOBAL MARKET FOR OPTICAL NETWORK TERMINALS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	89
<i>FIGURE 45 GLOBAL MARKET FOR OPTICAL NETWORK TERMINALS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	89
OPTICAL LINE TERMINAL	90
<i>TABLE 39 GLOBAL MARKET FOR OPTICAL LINE TERMINALS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	90

TOPIC	PAGE NO.
<i>FIGURE 46 GLOBAL MARKET FOR OPTICAL LINE TERMINALS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)</i>	90
CHAPTER 8 OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY REGION	93
INTRODUCTION	93
<i>FIGURE 47 OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY REGION</i>	93
NORTH AMERICA	93
<i>TABLE 40 NORTH AMERICAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SYSTEM, THROUGH 2020 (\$ MILLIONS)</i>	94
<i>TABLE 41 NORTH AMERICAN PASSIVE OPTICAL NETWORK MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)</i>	94
<i>TABLE 42 NORTH AMERICAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SOFTWARE CONTROL SYSTEMS, THROUGH 2020 (\$ MILLIONS)</i>	95
<i>TABLE 43 NORTH AMERICAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)</i>	95
<i>TABLE 44 NORTH AMERICAN OPTICAL SENSORS MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)</i>	96
<i>TABLE 45 NORTH AMERICAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	96
<i>TABLE 46 NORTH AMERICAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COUNTRY, THROUGH 2020 (\$ MILLIONS)</i>	97
EUROPE	98
<i>TABLE 47 EUROPEAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SYSTEM, THROUGH 2020 (\$ MILLIONS)</i>	99
<i>TABLE 48 EUROPEAN PASSIVE OPTICAL NETWORK MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)</i>	99
<i>TABLE 49 EUROPEAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SOFTWARE CONTROL SYSTEMS, THROUGH 2020 (\$ MILLIONS)</i>	100
<i>TABLE 50 EUROPEAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)</i>	100
<i>TABLE 51 EUROPEAN OPTICAL SENSORS MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)</i>	101
<i>TABLE 52 EUROPEAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	102
<i>TABLE 53 EUROPEAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COUNTRY, THROUGH 2020 (\$ MILLIONS)</i>	102
ASIA-PACIFIC	103
<i>TABLE 54 ASIA-PACIFIC OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SYSTEM, THROUGH 2020 (\$ MILLIONS)</i>	103
<i>TABLE 55 ASIA-PACIFIC PASSIVE OPTICAL NETWORK MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)</i>	104
<i>TABLE 56 ASIA-PACIFIC OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SOFTWARE CONTROL SYSTEMS, THROUGH 2020 (\$ MILLIONS)</i>	104
<i>TABLE 57 ASIA-PACIFIC OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)</i>	105
<i>TABLE 58 ASIA-PACIFIC OPTICAL SENSORS MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)</i>	106

TOPIC	PAGE NO.
<i>TABLE 59 ASIA-PACIFIC OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	106
<i>TABLE 60 ASIA-PACIFIC OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COUNTRY, THROUGH 2020 (\$ MILLIONS)</i>	107
REST OF THE WORLD	107
<i>TABLE 61 REST OF THE WORLD OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SYSTEM, THROUGH 2020 (\$ MILLIONS)</i>	107
<i>TABLE 62 REST OF THE WORLD PASSIVE OPTICAL NETWORK MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)</i>	108
<i>TABLE 63 REST OF THE WORLD OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SOFTWARE CONTROL SYSTEMS, THROUGH 2020 (\$ MILLIONS)</i>	109
<i>TABLE 64 REST OF THE WORLD OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)</i>	109
<i>TABLE 65 REST OF THE WORLD OPTICAL SENSORS MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)</i>	110
<i>TABLE 66 REST OF THE WORLD OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)</i>	111
<i>TABLE 67 REST OF THE WORLD OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)</i>	111
CHAPTER 9 INDUSTRY STRUCTURE AND COMPETITIVE ANALYSIS	114
MARKET SHARE ANALYSIS	114
<i>TABLE 68 GLOBAL OPTICAL SYSTEMS AND COMPONENTRY MARKET, MARKET SHARE BY KEY PLAYERS, BY SYSTEM, 2014 (%)</i>	114
<i>TABLE 69 GLOBAL OPTICAL SYSTEMS AND COMPONENTRY MARKET, MARKET SHARE BY KEY PLAYERS, BY SOFTWARE CONTROL SYSTEMS, 2014 (%)</i>	115
PORTER'S FIVE FORCES	116
<i>FIGURE 48 PORTER'S FIVE FORCES FOR FREE-SPACE OPTICAL COMMUNICATION</i>	116
BARGAINING POWER OF SUPPLIERS	117
BARGAINING POWER OF BUYERS	117
THREAT FROM SUBSTITUTES	117
THREAT FROM NEW ENTRANTS	118
DEGREE OF COMPETITION	118
CHAPTER 10 COMPANY PROFILES	120
ALCATEL-LUCENT SA	120
OVERVIEW	120
PRIMARY BUSINESS	120
FINANCIALS	120
BUSINESS STRATEGIES	120
Strengthening Product Portfolio through Strategic Partnership	120
Extensive Focus on Research and Development	121
DEVELOPMENTS	121
<i>TABLE 70 DEVELOPMENTS OF ALCATEL LUCENT SA</i>	121
AVAGO TECHNOLOGIES LTD.	121
OVERVIEW	121
PRIMARY BUSINESS	122
FINANCIALS	122
BUSINESS STRATEGIES	122

TOPIC	PAGE NO.
New Product Development	122
Research and Development	122
DEVELOPMENTS	123
<i>TABLE 71 DEVELOPMENTS OF AVAGO TECHNOLOGIES LTD.</i>	123
BROADCOM CORP.	123
OVERVIEW	123
PRIMARY BUSINESS	123
FINANCIALS	124
BUSINESS STRATEGIES	124
New Product Development	124
DEVELOPMENTS	124
<i>TABLE 72 DEVELOPMENTS OF BROADCOM CORP.</i>	124
CIENA CORP.	124
OVERVIEW	124
PRIMARY BUSINESS	125
FINANCIALS	125
BUSINESS STRATEGIES	125
Strategic Partnership	125
Expanding Overseas Business Operation	125
DEVELOPMENTS	126
<i>TABLE 73 DEVELOPMENTS OF CIENA CORP.</i>	126
CISCO SYSTEMS INC	126
OVERVIEW	126
PRIMARY BUSINESS	126
FINANCIALS	127
BUSINESS STRATEGIES	127
Strategic Partnership	127
DEVELOPMENTS	127
<i>TABLE 74 DEVELOPMENTS OF CISCO SYSTEMS INC.</i>	127
EMCORE CORP.	127
OVERVIEW	128
PRIMARY BUSINESS	128
FINANCIALS	128
BUSINESS STRATEGIES	128
Strategic Agreements	128
DEVELOPMENTS	129
<i>TABLE 75 DEVELOPMENTS OF EMCORE CORP.</i>	129
FINISAR CORP.	129
OVERVIEW	129
PRIMARY BUSINESS	129
FINANCIALS	129
BUSINESS STRATEGIES	130
New Product Development	130
DEVELOPMENTS	130
<i>TABLE 76 DEVELOPMENTS OF FINISAR CORP.</i>	130
FREESCALE SEMICONDUCTOR INC.	130
OVERVIEW	130

TOPIC	PAGE NO.
PRIMARY BUSINESS	131
FINANCIALS	131
BUSINESS STRATEGIES	131
New Product Development	131
DEVELOPMENTS	131
<i>TABLE 77 DEVELOPMENTS OF FREESCALE SEMICONDUCTOR INC.</i>	131
FSONA NETWORKS CORP.	132
OVERVIEW	132
PRIMARY BUSINESS	132
FINANCIALS	132
BUSINESS STRATEGIES	133
Building Supportive Relationship with Resellers through fSONA Partnership Program	133
Innovation through Technological Advances	133
DEVELOPMENTS	133
<i>TABLE 78 DEVELOPMENTS OF FSONA NETWORKS CORP</i>	133
FURUKAWA ELECTRIC CO LTD.	134
OVERVIEW	134
PRIMARY BUSINESS	134
FINANCIALS	134
BUSINESS STRATEGIES	134
Research and Development	134
DEVELOPMENTS	135
<i>TABLE 79 DEVELOPMENTS OF FURUKAWA ELECTRIC CO LTD.</i>	135
HUAWEI TECHNOLOGIES CO. LTD.	135
OVERVIEW	135
PRIMARY BUSINESS	135
FINANCIALS	135
BUSINESS STRATEGIES	136
Business Expansion	136
DEVELOPMENTS	136
<i>TABLE 80 DEVELOPMENTS OF HUAWEI TECHNOLOGIES CO. LTD.</i>	136
INTERNATIONAL BUSINESS MACHINES CORP. (IBM)	136
OVERVIEW	137
PRIMARY BUSINESS	137
FINANCIALS	137
BUSINESS STRATEGIES	137
Strategic Partnership	137
New Product Development	137
DEVELOPMENTS	138
<i>TABLE 81 DEVELOPMENTS OF IBM</i>	138
IBSENTELECOM LTD.	138
OVERVIEW	138
PRIMARY BUSINESS	139
FINANCIALS	139
BUSINESS STRATEGIES	139
DEVELOPMENTS	140
<i>TABLE 82 DEVELOPMENTS OF IBSENTELECOM</i>	140

TOPIC	PAGE NO.
INFINERA CORP.	140
OVERVIEW	140
PRIMARY BUSINESS	140
FINANCIALS	141
BUSINESS STRATEGIES	141
Product Expansion	141
Mergers and Acquisitions	141
DEVELOPMENTS	141
<i>TABLE 83 DEVELOPMENTS OF INFINERA CORP.</i>	141
JDS UNIPHASE CORP.	141
OVERVIEW	141
PRIMARY BUSINESS	142
FINANCIALS	142
BUSINESS STRATEGIES	142
New Product Development	142
DEVELOPMENTS	143
<i>TABLE 84 DEVELOPMENTS OF JDS UNIPHASE CORP.</i>	143
LIGHTPOINTE COMMUNICATIONS INC.	143
OVERVIEW	143
PRIMARY BUSINESS	144
FINANCIALS	144
BUSINESS STRATEGIES	144
DEVELOPMENTS	144
<i>TABLE 85 DEVELOPMENTS OF LIGHTPOINTE COMMUNICATIONS INC.</i>	144
MICROSOFT CORP.	145
OVERVIEW	145
PRIMARY BUSINESS	145
FINANCIALS	145
BUSINESS STRATEGIES	146
Business Expansion	146
DEVELOPMENTS	146
<i>TABLE 86 DEVELOPMENTS OF MICROSOFT CORP.</i>	146
MOTOROLA SOLUTIONS INC.	146
OVERVIEW	146
FINANCIALS	147
BUSINESS STRATEGIES	147
Expansion through Capital Investments	147
Joint Ventures	147
DEVELOPMENTS	147
<i>TABLE 87 DEVELOPMENTS OF MOTOROLA SOLUTIONS INC.</i>	147
NEC CORP.	148
OVERVIEW	148
PRIMARY BUSINESS	148
FINANCIALS	148
BUSINESS STRATEGIES	149
Product Innovation	149
DEVELOPMENTS	149

TOPIC	PAGE NO.
<i>TABLE 88 DEVELOPMENTS OF NEC CORP.</i>	149
OCLARO INC.	149
OVERVIEW	149
PRIMARY BUSINESS	150
FINANCIALS	150
BUSINESS STRATEGIES	150
Strategic Partnership	150
DEVELOPMENTS	150
<i>TABLE 89 DEVELOPMENTS OF OCLARO INC.</i>	150
OPLINK COMMUNICATIONS INC.	151
OVERVIEW	151
PRIMARY BUSINESS	151
FINANCIALS	151
BUSINESS STRATEGIES	151
New Product Development	151
DEVELOPMENTS	152
<i>TABLE 90 DEVELOPMENTS OF OPLINK COMMUNICATIONS INC.</i>	152
SOURCE PHOTONICS INC.	152
OVERVIEW	152
PRIMARY BUSINESS	152
FINANCIALS	153
BUSINESS STRATEGIES	153
New Product Development	153
DEVELOPMENTS	153
<i>TABLE 91 DEVELOPMENTS OF SOURCE PHOTONICS INC.</i>	153
TRIQUINT SEMICONDUCTOR INC.	153
OVERVIEW	153
PRIMARY BUSINESS	154
FINANCIALS	154
BUSINESS STRATEGIES	154
Product Portfolio Expansion through Merger	154
New Product Development	154
DEVELOPMENTS	155
<i>TABLE 92 DEVELOPMENTS OF TRIQUINT SEMICONDUCTOR INC.</i>	155
UBIQUITI NETWORKS	155
OVERVIEW	155
PRIMARY BUSINESS	155
FINANCIALS	156
BUSINESS STRATEGIES	156
Focus on Leveraging R & D Activities across its Product Offerings	156
Strategic Partnership	156
DEVELOPMENTS	157
<i>TABLE 93 DEVELOPMENTS OF UBIQUITI NETWORKS, INC</i>	157
VERIZON COMMUNICATIONS INC.	157
OVERVIEW	157
PRIMARY BUSINESS	158
FINANCIALS	158

TOPIC	PAGE NO.
BUSINESS STRATEGIES	158
Focus on Research and Development	158
DEVELOPMENTS	159
<i>TABLE 94 DEVELOPMENTS OF VERIZON COMMUNICATIONS INC.</i>	159
WIRELESS EXCELLENCE LIMITED	159
OVERVIEW	159
PRIMARY BUSINESS	160
FINANCIALS	160
BUSINESS STRATEGIES	160
Focus on Leveraging Technical Expertise of Other Players through Partner Program	160
Sales Promotion through Trade Shows and Exhibition	160
DEVELOPMENTS	161
<i>TABLE 95 DEVELOPMENTS OF WIRELESS EXCELLENCE LIMITED</i>	161
ZTE CORP.	161
OVERVIEW	161
PRIMARY BUSINESS	162
FINANCIALS	162
BUSINESS STRATEGIES	162
Diversifying Product Portfolio through Innovation	162
Strategic Partnership	162
DEVELOPMENTS	163
<i>TABLE 96 DEVELOPMENTS OF ZTE CORP.</i>	163

LIST OF TABLES

TABLE HEADING	PAGE NO.
SUMMARY TABLE GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY COMPONENT TYPE, THROUGH 2020 (\$ MILLIONS)	7
TABLE 1 GLOBAL MARKET FOR PASSIVE OPTICAL NETWORKS BY TYPE, THROUGH 2020 (\$ MILLIONS)	26
TABLE 2 GLOBAL MARKET FOR PASSIVE OPTICAL NETWORKS FOR CLOUD COMPUTING, BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	27
TABLE 3 GLOBAL MARKET FOR PASSIVE OPTICAL NETWORKS FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	28
TABLE 4 GLOBAL MARKET FOR SONET/SDH FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	30
TABLE 5 GLOBAL MARKET FOR SONET/SDH FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	31
TABLE 6 GLOBAL MARKET FOR ETHERNET FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	32
TABLE 7 GLOBAL MARKET FOR ETHERNET FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	34
TABLE 8 GLOBAL MARKET FOR FIBER CHANNEL FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	35
TABLE 9 GLOBAL MARKET FOR FIBER CHANNEL FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	36
TABLE 10 GLOBAL MARKET FOR CWDM FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	38
TABLE 11 GLOBAL MARKET FOR CWDM FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	39
TABLE 12 GLOBAL MARKET FOR DWDM FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	40
TABLE 13 GLOBAL MARKET FOR DWDM FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	42
TABLE 14 GLOBAL MARKET FOR FTTX FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	43
TABLE 15 GLOBAL MARKET FOR FTTX FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	44
TABLE 16 GLOBAL MARKET FOR HMI FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)	50
TABLE 17 GLOBAL MARKET FOR HMI FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	52
TABLE 18 GLOBAL MARKET FOR DCS FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)	53
TABLE 19 GLOBAL MARKET FOR DCS FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	54
TABLE 20 GLOBAL MARKET FOR PLC FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)	56
TABLE 21 GLOBAL MARKET FOR PLC FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	57
TABLE 22 GLOBAL MARKET FOR SCADA FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)	58
TABLE 23 GLOBAL MARKET FOR SCADA FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	60
TABLE 24 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN LOGISTICS AND WAREHOUSING BY REGION, THROUGH 2020 (\$ MILLIONS)	65

TABLE HEADING	PAGE NO.
TABLE 25 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN MILITARY APPLICATIONS BY REGION, THROUGH 2020 (\$ MILLIONS)	66
TABLE 26 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN HEALTHCARE BY REGION, THROUGH 2020 (\$ MILLIONS)	67
TABLE 27 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN INFORMATION TECHNOLOGY BY REGION, THROUGH 2020 (\$ MILLIONS)	69
TABLE 28 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN ENTERTAINMENT BY REGION, THROUGH 2020 (\$ MILLIONS)	70
TABLE 29 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN OTHERS SEGMENT BY REGION, THROUGH 2020 (\$ MILLIONS)	72
TABLE 30 GLOBAL MARKET FOR OPTICAL SENSORS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	77
TABLE 31 GLOBAL MARKET FOR OPTICAL SENSORS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)	78
TABLE 32 GLOBAL MARKET FOR CARRIER ETHERNET IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	79
TABLE 33 GLOBAL MARKET FOR OPTICAL TRANSCEIVERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	81
TABLE 34 GLOBAL MARKET FOR OPTICAL TRANSMITTERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	83
TABLE 35 GLOBAL MARKET FOR OPTICAL RESPONDERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	84
TABLE 36 GLOBAL MARKET FOR OPTICAL RECEIVERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	86
TABLE 37 GLOBAL MARKET FOR OPTICAL AMPLIFIERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	87
TABLE 38 GLOBAL MARKET FOR OPTICAL NETWORK TERMINALS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	89
TABLE 39 GLOBAL MARKET FOR OPTICAL LINE TERMINALS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	90
TABLE 40 NORTH AMERICAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SYSTEM, THROUGH 2020 (\$ MILLIONS)	94
TABLE 41 NORTH AMERICAN PASSIVE OPTICAL NETWORK MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)	94
TABLE 42 NORTH AMERICAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SOFTWARE CONTROL SYSTEMS, THROUGH 2020 (\$ MILLIONS)	95
TABLE 43 NORTH AMERICAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)	95
TABLE 44 NORTH AMERICAN OPTICAL SENSORS MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)	96
TABLE 45 NORTH AMERICAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	96

TABLE HEADING	PAGE NO.
TABLE 46 NORTH AMERICAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COUNTRY, THROUGH 2020 (\$ MILLIONS)	97
TABLE 47 EUROPEAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SYSTEM, THROUGH 2020 (\$ MILLIONS)	99
TABLE 48 EUROPEAN PASSIVE OPTICAL NETWORK MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)	99
TABLE 49 EUROPEAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SOFTWARE CONTROL SYSTEMS, THROUGH 2020 (\$ MILLIONS)	100
TABLE 50 EUROPEAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)	100
TABLE 51 EUROPEAN OPTICAL SENSORS MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)	101
TABLE 52 EUROPEAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	102
TABLE 53 EUROPEAN OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COUNTRY, THROUGH 2020 (\$ MILLIONS)	102
TABLE 54 ASIA-PACIFIC OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SYSTEM, THROUGH 2020 (\$ MILLIONS)	103
TABLE 55 ASIA-PACIFIC PASSIVE OPTICAL NETWORK MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)	104
TABLE 56 ASIA-PACIFIC OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SOFTWARE CONTROL SYSTEMS, THROUGH 2020 (\$ MILLIONS)	104
TABLE 57 ASIA-PACIFIC OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)	105
TABLE 58 ASIA-PACIFIC OPTICAL SENSORS MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)	106
TABLE 59 ASIA-PACIFIC OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	106
TABLE 60 ASIA-PACIFIC OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COUNTRY, THROUGH 2020 (\$ MILLIONS)	107
TABLE 61 REST OF THE WORLD OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SYSTEM, THROUGH 2020 (\$ MILLIONS)	107
TABLE 62 REST OF THE WORLD PASSIVE OPTICAL NETWORK MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)	108
TABLE 63 REST OF THE WORLD OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY SOFTWARE CONTROL SYSTEMS, THROUGH 2020 (\$ MILLIONS)	109
TABLE 64 REST OF THE WORLD OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY COMPONENT, THROUGH 2020 (\$ MILLIONS)	109
TABLE 65 REST OF THE WORLD OPTICAL SENSORS MARKET FOR CLOUD COMPUTING BY TYPE, THROUGH 2020 (\$ MILLIONS)	110
TABLE 66 REST OF THE WORLD OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY APPLICATION, THROUGH 2020 (\$ MILLIONS)	111
TABLE 67 REST OF THE WORLD OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY REGION, THROUGH 2020 (\$ MILLIONS)	111
TABLE 68 GLOBAL OPTICAL SYSTEMS AND COMPONENTRY MARKET, MARKET SHARE BY KEY PLAYERS, BY SYSTEM, 2014 (%)	114
TABLE 69 GLOBAL OPTICAL SYSTEMS AND COMPONENTRY MARKET, MARKET SHARE BY KEY PLAYERS, BY SOFTWARE CONTROL SYSTEMS, 2014 (%)	115
TABLE 70 DEVELOPMENTS OF ALCATEL LUCENT SA	121
TABLE 71 DEVELOPMENTS OF AVAGO TECHNOLOGIES LTD.	123
TABLE 72 DEVELOPMENTS OF BROADCOM CORP.	124

TABLE HEADING	PAGE NO.
TABLE 73 DEVELOPMENTS OF CIENA CORP.	126
TABLE 74 DEVELOPMENTS OF CISCO SYSTEMS INC.	127
TABLE 75 DEVELOPMENTS OF EMCORE CORP.	129
TABLE 76 DEVELOPMENTS OF FINISAR CORP.	130
TABLE 77 DEVELOPMENTS OF FREESCALE SEMICONDUCTOR INC.	131
TABLE 78 DEVELOPMENTS OF FSONA NETWORKS CORP	133
TABLE 79 DEVELOPMENTS OF FURUKAWA ELECTRIC CO LTD.	135
TABLE 80 DEVELOPMENTS OF HUAWEI TECHNOLOGIES CO. LTD.	136
TABLE 81 DEVELOPMENTS OF IBM	138
TABLE 82 DEVELOPMENTS OF IBSENTELECOM	140
TABLE 83 DEVELOPMENTS OF INFINERA CORP.	141
TABLE 84 DEVELOPMENTS OF JDS UNIPHASE CORP.	143
TABLE 85 DEVELOPMENTS OF LIGHTPOINTE COMMUNICATIONS INC.	144
TABLE 86 DEVELOPMENTS OF MICROSOFT CORP.	146
TABLE 87 DEVELOPMENTS OF MOTOROLA SOLUTIONS INC.	147
TABLE 88 DEVELOPMENTS OF NEC CORP.	149
TABLE 89 DEVELOPMENTS OF OCLARO INC.	150
TABLE 90 DEVELOPMENTS OF OPLINK COMMUNICATIONS INC.	152
TABLE 91 DEVELOPMENTS OF SOURCE PHOTONICS INC.	153
TABLE 92 DEVELOPMENTS OF TRIQUINT SEMICONDUCTOR INC.	155
TABLE 93 DEVELOPMENTS OF UBIQUITI NETWORKS, INC	157
TABLE 94 DEVELOPMENTS OF VERIZON COMMUNICATIONS INC.	159
TABLE 95 DEVELOPMENTS OF WIRELESS EXCELLENCE LIMITED	161
TABLE 96 DEVELOPMENTS OF ZTE CORP.	163

LIST OF FIGURES

FIGURE TITLE	PAGE NO.
SUMMARY FIGURE GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY COMPONENT TYPE, 2014-2020 (\$ MILLIONS)	8
FIGURE 1 VALUE CHAIN OF OPTICAL SYSTEMS AND COMPONENTS FOR CLOUD	11
FIGURE 2 OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING, BY SYSTEM	20
FIGURE 3 NUMBER OF HOUSEHOLDS IN THE EUROPEAN REGION FTTH, 2007-2017 (THOUSANDS)	21
FIGURE 4 ADVANCEMENTS IN PASSIVE OPTICAL NETWORKING	24
FIGURE 5 ECONOMIES WITH HIGHEST PENETRATION RATE OF FIBER-TO-HOME/BUILDING SUBSCRIBERS (%)	25
FIGURE 6 GLOBAL MARKET FOR PASSIVE OPTICAL NETWORKS FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	27
FIGURE 7 GLOBAL MARKET FOR PASSIVE OPTICAL NETWORKS FOR CLOUD COMPUTING, BY REGION, 2014-2020 (\$ MILLIONS)	28
FIGURE 8 GLOBAL MARKET FOR SONET/SDH FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	30
FIGURE 9 GLOBAL MARKET FOR SONET/SDH FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)	31
FIGURE 10 GLOBAL MARKET FOR ETHERNET FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	32
FIGURE 11 GLOBAL MARKET FOR ETHERNET FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)	34
FIGURE 12 GLOBAL MARKET FOR FIBER CHANNEL FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	35
FIGURE 13 GLOBAL MARKET FOR FIBER CHANNEL FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)	37
FIGURE 14 GLOBAL MARKET FOR CWDM FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	38
FIGURE 15 GLOBAL MARKET FOR CWDM FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)	39
FIGURE 16 GLOBAL MARKET FOR DWDM FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	40
FIGURE 17 GLOBAL MARKET FOR DWDM FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)	42
FIGURE 18 GLOBAL MARKET FOR FTTX FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	43
FIGURE 19 GLOBAL MARKET FOR FTTX FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)	45
FIGURE 20 OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING, BY SOFTWARE CONTROL SYSTEMS	47
FIGURE 21 GLOBAL MARKET FOR HMI FOR CLOUD COMPUTING BY COMPONENT, 2014-2020 (\$ MILLIONS)	51
FIGURE 22 GLOBAL MARKET FOR HMI FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)	52
FIGURE 23 GLOBAL MARKET FOR DCS FOR CLOUD COMPUTING BY COMPONENT, 2014-2020 (\$ MILLIONS)	53
FIGURE 24 GLOBAL MARKET FOR DCS FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)	55
FIGURE 25 GLOBAL MARKET FOR PLC FOR CLOUD COMPUTING BY COMPONENT, 2014-2020 (\$ MILLIONS)	56

FIGURE TITLE	PAGE NO.
FIGURE 26 GLOBAL MARKET FOR PLC FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)	57
FIGURE 27 GLOBAL MARKET FOR SCADA FOR CLOUD COMPUTING BY COMPONENTRY, 2014-2020 (\$ MILLIONS)	59
FIGURE 28 GLOBAL MARKET FOR SCADA FOR CLOUD COMPUTING BY REGION, 2014-2020 (\$ MILLIONS)	60
FIGURE 29 OPTICAL SYSTEMS AND COMPONENTRY MARKET BY APPLICATION	62
FIGURE 30 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN LOGISTICS AND WAREHOUSING BY REGION, 2014-2020 (\$ MILLIONS)	65
FIGURE 31 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN MILITARY APPLICATIONS BY REGION, 2014-2020 (\$ MILLIONS)	66
FIGURE 32 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN HEALTHCARE BY REGION, 2014-2020 (\$ MILLIONS)	67
FIGURE 33 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN INFORMATION TECHNOLOGY BY REGION, 2014-2020 (\$ MILLIONS)	69
FIGURE 34 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN ENTERTAINMENT BY REGION, 2014-2020 (\$ MILLIONS)	70
FIGURE 35 GLOBAL MARKET FOR OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING IN OTHERS SEGMENT BY REGION, 2014-2020 (\$ MILLIONS)	72
FIGURE 36 OPTICAL SYSTEMS AND COMPONENTRY MARKET BY COMPONENTS	74
FIGURE 37 GLOBAL MARKET FOR OPTICAL SENSORS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	77
FIGURE 38 GLOBAL MARKET FOR OPTICAL SENSORS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY TYPE, 2014-2020 (\$ MILLIONS)	78
FIGURE 39 GLOBAL MARKET FOR CARRIER ETHERNET IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING, BY APPLICATION, 2014-2020 (\$ MILLIONS)	79
FIGURE 40 GLOBAL MARKET FOR OPTICAL TRANSCEIVERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	81
FIGURE 41 GLOBAL MARKET FOR OPTICAL TRANSMITTERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	83
FIGURE 42 GLOBAL MARKET FOR OPTICAL RESPONDERS IN OPTICAL SYSTEM AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	84
FIGURE 43 GLOBAL MARKET FOR OPTICAL RECEIVERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	86
FIGURE 44 GLOBAL MARKET FOR OPTICAL AMPLIFIERS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	87
FIGURE 45 GLOBAL MARKET FOR OPTICAL NETWORK TERMINALS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	89
FIGURE 46 GLOBAL MARKET FOR OPTICAL LINE TERMINALS IN OPTICAL SYSTEMS AND COMPONENTRY FOR CLOUD COMPUTING BY APPLICATION, 2014-2020 (\$ MILLIONS)	90
FIGURE 47 OPTICAL SYSTEMS AND COMPONENTRY MARKET FOR CLOUD COMPUTING BY REGION	93
FIGURE 48 PORTER'S FIVE FORCES FOR FREE-SPACE OPTICAL COMMUNICATION	116