# Index

AAG application server, 149  
Abstract syntax, 190  
Access characteristics, new, 16  
Access functions, 109  
Access lines, 21–22, 28–29  
Access Management Function (AMF), 138  
Access networks, 29–30  
Access-Resource Admission Control Function (A-RACF), 137  
Access transport functions, 109  
Accounting management (AM), 4, 111, 215, 242  
FCAPS, 140  
-network-related, 142  
-service-related, 143  
Adaptive Dynamic Backbone (ADB), 221  
Admission control  
NGN, 136  
RACS, 136  
Advanced encryption standard (AES), 79  
Advanced Television Systems Committee (ATSC), 60  
Advertising revenues, 98  
After sale phase, in the customer experience, 48  
-agentsInformation group, 224, 225  
Aggregation/backhaul networks, 22  
Aggregation layer, 37  
Aggregation networks, 29  
Aggregation technology, 30  
American National Standards Institute (ANSI), 53  
American National Standards process, 235  
Analogue information, coding and transmission of, 58–62  
Anmp: Ad-hoc Network Management Protocol, 213  
Anmp MIB, 223–224. See also  
Management Information Base (MIB)  
Anmp protocol, 220, 223  
Appeals process, for the standards development process, 234  
Application information table (AIT), 68  
Application plane requirements, to support NG services, 120  
Application Programming Interfaces (APIs), 3–4, 21, 117–118, 149  
standardized, 178  
Application servers (ASs), 33, 130, 145  
examples of, 146–149  
Applications functions, in Next Generation networks, 112  
Apps storefront, consumer- and business-oriented, 117–118  
Architectures  
-functional and physical, 213–214  
information, 216–228  
-logical, 214–216  
standardized, 35  
technology-neutral, 189  
ATSC-PSIP program decoding, 62–63  
ATSC-PSIP standard, 61–62  
Authentication, in NGN, 138  
Autonomic systems, 267–268  
B2B realization requirements, 143–144. See also Business to business (B2B)  
Backbone networks, 22, 31–32  
Back-end, 37–39  
Backhaul networks, 29  
Balance of interest, in the standards development process, 234  
Bandwidth, increased, 56–57  
Bandwidth value, 256
Base-line privacy interface plus (BPI+), 78
Bellcore, 232
Bio-ecosystems, 272
Bit transfer rate, 259
Body-embedded communications/computing, 116
Bound OCAP applications, 67
Bouquet Association Table (BAT), 61
Broadband Bluetooth, 104
“Broadband everywhere” strategy, 17
Broadband Forum, 123–124
Broadband multi-service, 16
Broadband PON (BPON), 103
Broadband remote access server (BRAS) functions, 22
Broadband technologies, fixed and mobile, 21
Broadband triple play, customer experience in, 47–51
Broadband, Wireless and Plain Old Telecommunications Services (BWPOTS), 253
Broadcast television, QoS for, 24–25
Business communications service, software-based, 114–115
Business Customer Premises Network (B-CPN), 10–11
Business ecosystems, 270–273
Businesses, next generation of, 126–127
Business interaction, requirements for, 196
Business management systems (BMSs), 2
Business models, new, 33–34
Business opportunities, finding, 18
Business-oriented apps storefront, 117–118
Business process framework, 159–163
Business service contracts, 195–200
Business service framework, 181
Business services, 167–170, 195–200
Business Support System (BSS) standard, 54
Business to business (B2B), 169. See also B2B realization requirements
Business view, 163–164, 196
CableCard, 72–73
Cable futures, 97–98
Cable industry, 53
Cable IP telephony, 84–96
CableLabs, 72, 73, 90
Cable modem CPE interface (CMCI), 79
Cable modems (CMs), 76–78, 80–81
Cable modem termination system (CMTS), 76
Cable MSOs, 55, 56, 96–97, 98
Cable operators, 98
Cable systems, 53
functional elements of, 54
Cable telephony, 83–96
Caching, 32
Call control application server, 146–147
Call detail record (CDR), 81
Call Session Control Function (CSCF), 129, 130, 134
CapEx/OpEx, control of, 152. See also Operating expenses (OpEx)
Capital expenditure (CapEx), 157
benefits of, 181
Cell phones
data derived from, 265
in 2020, 277, 279
Central device remote management, 33
Chief Technology Offices (CTOs), 157
China, innovation in, 257
Classifiers, 78
Cloud computing paradigm, 262, 266
Cluster heads, 217
Cluster maintenance, 220
Clusters, 220
CM transmitters, 76. See also Configuration Management (CM)
CMTS network side interface (CMTS-NSI), 79
Code generator, 202
Cognitive radios, 107
Collaboration agreements, 158
Combining ratio, 56, 57
Common Information Model (CIM), 165–166
Common Management Information Protocol (CMIP), 223
Common Management Information Service Element (CMISE), 232–233
Common Object Request Broker Architecture (CORBA), 233. See also CORBA management interfaces
Communication, to customer-facing entities, 43
Communications
in 2020, 274, 276–280
variety of devices available for, 270
in wireless ad hoc networks vs. Sensor networks, 211
Communications and computers (C&C) concept, xvi
Communications/computing, wearable, body-embedded, 116
Communications environment, future, 269
Communications industry, xvii
Communications management, future, 280
Communications networks, xvii
Community Antenna Television (CATV) system, 53
Computer industry, 272
Conditional access, 63
Conditional Access Table (CAT), 60
Configuration management (CM), 4, 110–111, 214, 242
FCAPS, 140
network-related, 142
service-related, 142
Configuration management database (CMDB), 166
Connectivity, 273
Connectivity Session Location Function (CLF), 138
Consumer-oriented apps storefront, 117–118
Content, focus on, 97–98
Content delivery network (CDN) architectures, 32
Content delivery network technologies, 30
Content distribution network techniques, 22
Content Encounter, 159
“Context aware” objects, 263
“Contextualization,” 258
Contextualized communications, 270, 277, 278
Contextualized personal information, 270
Contract assessment, 12
Contract methodology, 168
Contract nodes, linking, 204
Contract order, 197
Contracts
benefits of, 169
linked, 198, 199
NGOSS, 167–170
SLA, 12
Contract “scaffolding,” 205
Contract tooling, 203, 204
Contract variants, creating, 204
Control platform, 22
Converged/personalized/interactive multimedia services, 116–117
Convergence, 25, 101
CO-OP, 166, 167
Copper lines, 21, 28–29
CORBA management interfaces, 166. See also Common Object Request Broker Architecture (CORBA)
Core control, 33
Core transport functions, 109
Cost merits, IMS-related, 145
CPN network, 10–11
Craveur, Jean, xix, 15
Create connection (CRCX) message, 87–88
Cross-organization collaborations, 237
Cross-organization interactions, 238–239
Cultural islands, 9
Cultures, fragmentation of, 276
Customer care center (CCC) function, 41–42
Customer care centers (CCCs), 42, 44
Customer-centric approach, 18
Customer data function, 38
Customer equipment, 21
Customer experience in broadband triple play, 47–51
main phases in, 47–48
Customer front-end, 36
Customer journey, stages of, 49–51
Customer Network Gateway Configuration Function (CNGCF), 138
Customer platform, 39
Customer Premise Network (CPN), 6
Customer premises devices, 113
Customer premises equipment (CPE), 26–28
additional function in, 27
Customer relationship, online-driven, 34
Customer relationship management (CRM), 21, 34, 255–256. See also “360° CRM”

Data analyses, statistical, 265–266
Data banks, analyzing, 266
Database repository, 200, 201
Data encryption standard (DES), 79
Data hubs, 269
Data management, 260
Data Over Cable Service Interface
Specification (DOCSIS) standards, 60, 73–83. See also DOCSIS entries
Data storage, 259–260
Data synchronization, 269
DCS-proxy (DP), 90
Deep packet inspection (DPI) feature, 122
Defense Interest Group meetings, 159
Delivery phase, in the customer experience, 48
Deployment view, 164
Device management application server, 148
Device shift service, 8
Digital Living Network Alliance (DLNA), 127
Digital Shadow, 253
Digital storage, 259–260
Digital Storage Media—Command and
Control (DSM-CC), 64–66. See also
DSM-CC protocol
Digital subscriber line access multiplexers
(DSLAMs), 22, 24
unavailability of, 25
Digital subscriber lines (DSL), xv
Digital TV, 57–73
Digital TV Head-End, 70
Digital TV SI information, 60–61. See also
DTV infrastructures
Digital video broadcast-handheld (DVB-H), 116–117
Digital video broadcasting (DVB)
transmission standards, 57–58
Digital video recorder (DVR) functionality,
72
Direct messaging (DM), See DM entries
Disaster recovery planning (DRP), 45
Disjoined islands, system integration and
interoperability of, 8–9
Display technology, 263–265
Distributed call signaling, 90
architecture for, 91
Distributed Management Task Force
Common Information Model (DMTF
CIM), 165–166, 194–195
Distribution channels, multiplay/broadband, 49
DM notifier, 94, 95
DM server, 93, 94
DOCSIS 3.0, 77, 79, 82–83. See also Data
Over Cable Service Interface
Specification (DOCSIS) standards
DOCSIS cable modem start-up, 80–81
DOCSIS Data Link Layer, 76–79
DOCSIS IP detail records, 81–82
DOCSIS multicast operation, 80
DOCSIS Physical Layer, 74–76
DOCSIS Set-top Gateway (DSG), 54, 68, 69–70
DOCSIS versions, comparison of, 75, 76
DoD Architecture Framework (DoDAF), 191
Domains, third-party, 112–113
Domain specific languages (DSLs), 189–192, 193–194. See also
DSL-based solution
designing, 202–204
linking, 204
Downloadable Conditional Access System
(DCAS), 72
Downstream transmission convergence
(DTC) sublayer, 74–75
DSL-based solution. See also Domain
specific languages (DSLs)
building, 200–205
proposed content for, 200–201
DSM-CC protocol, 65, 68. See also Digital
Storage Media—Command and
Control (DSM-CC)
DSx messages, 77, 78
DTV infrastructures, 54. See also Digital
TV
Due process, in the standards development
process, 234
DVB-SI program decoding, 62
DVB-SI standard, 60–61
Dynamic bonding change request (DBC-
REQ) mechanism, 78
Dynamic Host Configuration Protocol
(DHCP), 30, 31, 80, 138
Dynamic line management (DLM), 28–29
Dynamic quality-of-service (D-QOS), 87
Early authentication encryption (EAE), 79
Eclipse, 192, 201–205
Eclipse Modeling Framework (EMF), 193
Eclipse plugin lifecycle management, 205
Eclipse tools, 193
Ecore, 193, 202
Ecosystems

business, 270–273

increasing the value of, 272

Edge functions, 109

Elementary stream (ES), 59

Element management systems (EMSs), 2, 243

Embedded MTA (E-MTA), 85

Embedded MTA (eMTA) start-up, 90–91

Embedded user equipment (E-UE), 93

EMS-OSS interfaces, 177–179

End-to-End Deployment and Interoperability Forum, 235

End-to-end PM functions, 8

End-to-end service management, 2, 9

End-to-end standards development, successful, 237

End-user functions, in Next Generation networks, 113

Energy consumption, technology evolution and, 254–255

Energy map, 215–216

Enhanced High Speed Packet Access (E-HSPA), 106

Enhanced Telecommunications Operations MAP (eTOM), 159–163, 195. See also eTOM entries

relationship to Infrastructure Technology Information Library, 162–163

Enhanced TV Binary Interchange Format (ETV-BIF) specification, 69

Enhanced TV (ETV)/interactive TV (iTV), 67–69

Enhanced video, in IPTV, 152

Enterprise UML model, 200

Entitlement control message (ECM), 62–63

Entitlement management message (EMM), 62–63

e-textiles, 262

Ethernet, long-haul managed, 103–104

Ethernet-based NG services, 121–122

Ethernet over Synchronous (EsS) Digital Hierarchy (SDH), 121–122

Ethernet PON (EPON), 103

Ethical issues, in technology usage, 125–126

cTOM levels, 160–162. See also Enhanced Telecommunications Operations MAP (eTOM)

cTOM standards, 241, 249

ETSI TISPAN standard, 136, 138, 182–183. See also European Telecommunications Standards Institute (ETSI); Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN)

EuroDOCSIS, 73, 75, 80

European Telecommunications Standards Institute (ETSI), 183. See also ETSI TISPAN standard

Event correlation, 10–11

Evolution Data Optimized (EVDO), 106

Evolved Social Networking Service (E-SNS), 118

Extended application information table (XAIT), 68

Extended Information Tables (EITs), 62

Extended NGN architecture, 132

Extensible Markup Language (XML), 170–174, 176

EyeRes, 274

Fargano, Michael, xix

Fault, Configuration, Accounting, Performance, and Security (FCAPS) operations, 3, 242

changes in, 4–5

requirements for, 140–141

Fault management (FM), 4, 110, 215, 242

FCAPS, 140

network-related, 142

service-related, 142–143

Faults, disaster, and overload (FDO) management, 124

Fiber accesses, 21–22

Fiber to the home (FTTH), xv, 29

Fiber to the premises (FTTP), 103

Field operation function, 41

“Find-bind and execute” paradigm, 168

Fixed access network transformation, 30–31

Fixed mobile convergence (FMC), 129. See also FMC service

Floor information management, 133

FMC service, IMS-based, 134. See also Fixed mobile convergence (FMC)

Focused Interoperability Forum, 235

Forum (Industry Forum), 234

Forum types, 245

Forward Data Channel (FDC), 64
FTTx options, 29
Fully qualified domain name (FQDN), 86
“Full routed” mode box, 31
Functional architectures, 213–214
Functional entities (FEs), 118–119
Functional frameworks, 241
Function distribution, 27

Gantt Chart, for project/program management, 238–239
Gate control, RACS, 136
Gateway functions, 109
Gateway GPRS Support Node (GGSN), 131
General network/service SDO/Forum, 239. See also Standards development organizations (SDOs)
General Standards Development/Coordination Framework, 236–239, 245
General standards development process, 233–239, 248–249
Generic Framing Procedure (GFP), 121, 122
Geographical clustering, 221
Gigabit Ethernet (GEth) technologies, 30
Gigabit PON (GPON), 103
Globally Executable MHP (GEM), 67
Global MSF Interoperability (GMI), 153
Global System for Mobile (GSM) infrastructures, 19
Global telecommunications industry, 1
Global vision, 23
“Glocal” innovation, 257–259
“Glocalization,” 258
Government Emergency Telecommunications Services (GETS), 5
Grand-separation, for pay-per-use service, 117
Graph-based clustering, 220–221
Graphical Modeling Framework (GMF), 193
Graphical user interface (GUI), 12. See also GUI editor
Guerilla, an Adaptive Management Architecture for Ad-hoc Networks, 213
Guerilla architecture, 218–219, 221, 222, 225

Guerrilla MIB (GMIB), 225. See also Management Information Base (MIB)
GUI editor, 203. See also Graphical user interface (GUI)

Hand-held devices, wireless charging of, 115–116
Handtops, 3
Hard drives, 259
Hardware abstraction layer, 157–158
HD services, 58. See also High-definition (HD) broadcast services
HD television screens, 264
Heterogeneous information networks, xviii
HFC network maintenance, 56
HFC network upgrades, 56–57
HFC planning/inventory, 55–56
Hierarchical manager-agent communication architecture, 220
High-definition (HD) broadcast services, 65. See also HD entries
High-definition voice, 115
High-Speed Downlink Packet Access (HSDPA), 20
HomeGrid Forum, 124
Home networking drivers, 4
Home Networking (HNet) Forum, 123
Home network paradox, 27–28
Home networks (HNs), 26–28, 113 changes in, 4
Home Subscriber Server (HSS) database, 183
Home Subscriber Server/Subscription Locator Function (HSS/SLF), 130
Host digital terminal (HDT), 84
Hot spot identification, 11
Humane services, NG technology-based, 125
Human machine interfaces (HMIs), 104
Hybrid fiber-coaxial (HFC) network, 55–57
Icons, in 2020, 277–279
IEEE Network Management Series, 2
Implementation view, 164, 165
IMS architecture, 33. See also IP Multimedia Subsystem entries
IMS-based FMC service, 134
IMS-based IPTV architecture, 152–153
IMS-based IPTV service, 134–135
IMS-based NGNs, 135
IMS platforms, 187  
advantages of, 144–153  
IMS service control (ISC), 130–131  
IMS services, 133–135  
IMS standardization, 129  
In-band (IB) channels, 64  
Independent network providers, growth of, 267  
India, innovation in, 257  
Information, layered, 279–280  
Information age, xvii  
Information and communications technology (ICT), progress in, xv  
Information architectures, 216–228  
Information exchange, in 2020, 274  
Information security solutions, 123  
Information sharing, control of, 278  
Information System (IS), 33–40. See also IS entries  
Information technology (IT). See IT entries  
Information technology SDO/Forum, 240. See also Standards development organizations (SDOs)  
Infrastructures  
bottom-up, 258  
evolution of, 257  
fixed and mobile, 21  
Infrastructure Technology Information Library (ITIL), 162–163  
Innovation  
in business ecosystems, 271  
as a competitive differentiator, 275  
global-localization of, 257  
Innovative offers, quick introduction of, 33–34  
Innovators, as a success factor, 275  
Integrated development environments (IDE), 176  
Integrated receiver/decoder (IRD), 71–72  
Integrated Services Digital Network (ISDN), 20–21  
Intelligent Network, 268  
“Intention” detectors, 265  
Interface frameworks, 241  
International Standards Development Organization (SDO), 235. See also Standards development organizations (SDOs)  
Internet  
future of, 272–273  
management of, 255  
success of, 267  
in 2020, 274–276  
Internet access support, transformation to triple play support, 30–31  
Internet Engineering Task Force (IETF), 232–233  
Internet functionalities, 275  
Internet Group Management Protocol (IGMP) interaction, 24  
Internet Protocol (IP), 3, 58. See also IP entries  
in Next Generation networks, 113–114  
Internet Protocol Detail Records (IPDR), 80, 81–82, 98, 166, 167  
Internet Protocol Television (IPTV), 151. See also IPTV entries  
Internet Protocol version 4 (IPv4), 113–114, 121  
Internet Protocol version 6 (IPv6), 114, 121  
Internet with Things, 253  
Interrogating CSCF (I-CSCF), 132  
Inventory, HFC, 55–56  
IP-based multimedia services, 144. See also Internet Protocol (IP)  
IP-based NG services, 121–122  
IP-based packet-switched networks, 3  
IPDR Streaming Protocol (IPDR/SP), 81–82. See also Internet Protocol Detail Records (IPDR)  
IP Multimedia Subsystem (IMS), 22, 92, 101, 118–119. See also IMS entries  
OSS interaction with, 183–185  
IP Multimedia Subsystem (IMS)-based signaling, 3  
IP networks, 31  
IP packet loss, 26  
IPTV architectures, 151–152. See also Internet Protocol Television (IPTV)  
IPTV-GSI, 135  
IPTV platform, 33  
IPTV service, IMS-based, 134–135  
IS architecture, for triple/quadruple/multiple play business, 35. See also Information System (IS)  
IS equipment, 22  
IS infrastructures, designing for triple and quadruple play, 24–26
Islands, disjoined, 8–9
IS/network/service platform cooperation, 39–40
IS operation functions, roles and responsibilities of, 45–46
IS tools, for service management centers, 43–44
IT infrastructure, 21
IT platforms, in triple and quadruple play contexts, 44–45
ITU-T J.83 standard, 58
ITU-T standards, 135
ITU-T Telecommunications Management Network (TMN), 155–156
J2EE for Java 5 (JEE5), 171
Jacobs, David, xx, 53
Java Reference application server (JRI), 170–171
Kawakami, Keizo, xx, 129
Kenyoshi, Kaoru, xx, 129
Key exchange mechanism, 78–79
Key performance indicators (KPIs), 11, 43
Khasnabish, Bhumip, xx–xxi, 101
lacm group, 224–225, 226
Laptops, 3
Law/regulation standards, 232
Legacy OSS, 177–178
migration from, 182
Lifecycle management, 198–200
Link layer security, 78
Local Area Network (LAN), wireless, 208
Local loop unbundling (LLU), 48
Local operators, relationship with, 49
Local wireless drops, 269
Location application server, 148
Logical architectures, 214–216
Logical Link Control (LLC), 79
Logical management layers, 242
Lombard, Didier, 51
Long-haul managed Ethernet, 103–104
Long term evolution (LTE), 106, 264
Maintenance reduction, IMS-related, 144–145
Managed element, 186
Managed object classes, 225
Management within the ecosystem framework, 255–256
of NG services, 123–124
scope of, 240–241
of wireless ad hoc and sensor networks, 207–230
Management functional areas, 242
Management functions, in Next Generation networks, 110–112
Management information/models, structure of, 223–225
Management Information Base (MIB), 217.
See also Anmp MIB; Guerilla MIB (GMIB); RMON-MIB; SNMP MIBs
Management interfaces/protocols, 223
Management of Mobile Ad-hoc Networks: Information model and probe-based architecture, 213
Management SDO/Forum categories, 239–240, 249. See also Standards development organizations (SDOs)
Management standards frameworks and architecture in, 241–243, 249–250
history of, 232–233
principles and concepts in, 240–241
principles in, 249
Management standards development challenges and trends in, 251
key challenge for, 248
key lessons related to, 250
strategic framework for, 244–248, 250
Management-standards focused SDO/Forum, 240. See also Standards development organizations (SDOs)
Management system applications, examples of, 10–13
Manager-agent communication models, 217–223
“Manager-agent” model, 216–217
MANNA information architecture, 216, 219, 223, 225
MANNA: Management Architecture for wireless Sensor Networks, 213
MANNA object classes, 226–227
MAP messages, 76, 77. See also Enhanced Telecommunications Operations MAP (eTOM)
Markets, fragmentation of, 276
Mash-ups, 272
Master Guide Table (MGT), 61
Master Street Address Guide (MSAG), 56
M-Card, 72
MDSD approach, 194
Media Access Control (MAC) Sublayer, 76–78
Media control functions, 147–148
Media gateway (MG), 86
Media gateway controller (MGC), 86, 88
Media Gateway/Media Gateway Control Function (MGW/MGCF), 130
Media resource control application server, 147–148
Media terminal adapters (MTA), 84–90
Merger and acquisition (M&A) islands, 8–9
Messaging application server, 148
Metadata, 266
Meta-meta-model (M3), 190–191
Meta-model, 168, 169
Meta-Object Facility (MOF), 191, 194
Microprocessors, 261
Mission critical systems, xv
Misu, Toshiyuki, xxi, 129
Mobile Ad Hoc Networking (MANET), 106–107, 209
Mobile and Managed Peer-to-Peer (M2P2P) service, 115
Mobile Application Part (MAP). See MAP messages
Mobile Internet, for automotive and transportation, 117
Mobile Internet Protocol version 6 (MIPv6), 114
Mobile virtual network operators (MVNO), 96
Mobile Worldwide Inter-operability for Microwave Access (M-WiMax), 105
MOD Architecture Framework (MoDAF), 191
Model-driven architecture (MDA), 168, 193
Model-driven software design, 193–194
Modular-CMTS (M_CMTS), 83
Moral issues, in technology usage, 125–126
Motion Picture Experts Group (MPEG) standards, 58–60. See also MPEG entries
MPEG-2, 19–20. See also Motion Picture Experts Group (MPEG) standards
MPEG-2 decoder, 71
MPEG-2 Program Specific Information (PSI), 60
MPEG-2 system, 59–60
MPEG-2 transport stream, 59–60
MPEG-4, 20, 60
MTOSI APIs, 180. See also Multi-Technology Operations System Interface (MTOSI)
MTOSI case study, 170–175
“Multi-hop” communications, 209
Multimedia Home Platform (MHP) specification, 67
Multimedia Resource Function (MRF), 129–130
Multimedia services, converged/personalized/interactive, 116–117
Multiplay/broadband distribution channels, 49
Multi-play service offerings, defined, 48–49
Multiple-input multiple-output (MIMO) system, 106
Multiple play strategy, 18
Multiple-play technology, 52
Multi-protocol label switching (MPLS), 22, 121
Multi-service access nodes (MSANs), 22, 23, 29, 177
MultiService forum (MSF), 119–120
Multi-Technology Network Management (MTNM), 166–167
Multi-Technology Operations System Interface (MTOSI), 166–167. See also MTOSI entries
Mutualization, 25
National/Regional SDO, 235. See also Standards development organizations (SDOs)
NCS cable IP telephony, call set-up behavior of, 87–90
Network Access Configuration Function (NACF), 138
Network Address Translation (NAT), 93
Network attachment control functions, 110
Network Attachment Subsystem (NASS), 138–139
Network build, considerations for, 55
Network Control Signaling PacketCable 1.x, 85–90
Network Information Table (NIT), 61, 62
Network infrastructures
changes in, 3–4
designing for triple and quadruple play, 24–26
Networking paradigms, new, 268–270
Network interface device (NID), 83, 84
Network Interoperability Consultative Committee (NICC) standards, 168
Network/IS/service platform cooperation, 39–40
Network layer, 79–80
Network-level performance parameters, 122
Network management, 255
aspects and framework of, 212–213
importance of, 1
Network Management Forum (NMF), 233
Network management operation requirements, 141–142
Network Management Systems (NMSs), 2
Networks, value of, 16–17
Network-to-network interface (NNI), 108
Network topology, 215
Network upgrades, 56–57
New Generation Operations and Software Systems (NGOSS), 159, 183. See also Next Generation entries; NGOSS entries
New networking paradigms, 268–270
New services, development and introduction of, 145–149
New skills, in operations, 47
Next Generation (NG) devices, configuring, 123–124. See also NG entries
Next Generation management standards, 231–251
Next Generation networks (NGNs), xv–xvi, 1, 57, 108–114, 126, 155. See also NGN entries
applications functions in, 112
Internet Protocol in, 113–114
management functions in, 110–112
network and service management for, 139–144
positioning of SDP in, 145–146
QoS control and authentication for, 135–139
services implemented on, 150–153
Next Generation OSS architecture, 155–206
business benefit of, 179–181
Next Generation PON (NGPON), 103
Next Generation services, 114–121
billing, charging, and settlement of, 124
device configuration and management of, 123–124
faults, overloads, and disaster management of, 124
management of, 121–124
performance management of, 122–123
security management of, 123
Next Generation Society, 124–126
Next Generation technologies, 102–108
future works/trends in, 126–127
wireless, 104–107
NGN architectures, 2, 109. See also Next Generation networks (NGNs)
NGN legal restrictions requirements, 144
NGN management, requirements of, 139–140
NGN OSS function/information view reference model, 187
NGN OSS Service Object (NOSI) concept, 187–188
NGOSS contracts, 167–170. See also New Generation Operations and Software Systems (NGOSS)
NGOSS framework, 163, 165
NGOSS meta-model, 169
NGOSS principles, 188
NG services architectures, 118–120. See also Next Generation entries
NG technology-based humane services, 125
NG wireline devices, 103
Nodes
in wireless ad hoc networks, 209, 211
in wireless sensor networks, 210, 211
Nomadic Manager Module (NMM), 225
Nomadic managers, 217–219, 222
Non-IMS IPTV architecture, 151–152
Non-NGN IPTV architecture, 151
Normal play time (NPT), 65
Object Constraint Language (OCL), 194
Object Management Group (OMG), 189–191
Object-Oriented (OO) class, 187
OCAP middleware, 68
Off-net call, 88–90
OLED technology, 276
OMG UML specification, 191
1-to-n communication, message duplication and transmission in, 133–134
Online content, 98
“Online customer centric” vision, 36
On-net call, 87–88
OOB FDC control information, 69. See also Out-Of-Band (OOB) channels
Open Cable Applications Platform (OCAP), 67
Open Mobile Alliance Device Management (OMA-DM), 93–95
Open service environment (OSE), 130–131
Open-source tool environments, 201–205
Open Systems Interconnection (OSI), 225
Operating cost reduction, IMS-related, 144–145
Operating expenses (OpEx), 157. See also CapEx/OpEx benefits of, 181 control of, 47
Operating model, 40
Operational challenge, of triple/quadruple play services, 40–47
Operational expenditure (OpEx). See Operating expenses (OpEx)
Operational Support System (OSS) standard, 54
Operations, new skills in, 47
Operations support systems (OSSs), 11. See also OSS entries interaction with IMS and subscriber management, 183–187 upgrading or transforming, 47
Operations support systems architecture. See also Next Generation OSS architecture; OSS entries importance of standards to, 156–158 information framework of, 163–165 Next Generation, 155 Telemanagement Forum for, 158–159
Optical fiber, 108
Optical memories, 259
Order management/delivery, 39
Organizational challenge, of triple/quadruple play, 51
Organization for the Advancement of Structured Information Standards (Oasis), 169
Orobec, Steve, xxi
Orthogonal frequency division multiplexing (OFDM), 104–105
Orthogonal frequency-division multiple access (OFDMA, O-FDMA), 106, 117
OSGi standard, 205
OSS/EMS/network interoperability reference model, 244. See also Operations support systems entries
OSS/J, 166, 167
OSS network management, 179
OSS standardization, 156
OSS standards, 205
OSS transition strategies, 181–182 “OSS Vision,” 184–185 Out-Of-Band (OOB) channels, 64. See also OOB FDC control information
Packet-based transmission, 98
PacketCable 1.0, 85
PacketCable 1.5, 85
PacketCable 2.0, 91–96, 98
PacketCable 2.0 QoS interface descriptions, 97
PacketCable Application Manager (PAM), 96
PacketCable Multi Media (PCMM) specification, 78
Packet Data Gateway (PDG), 134
Packetized elementary stream (PES), 59
Packet loss rate, 26
Packet transfer, NGN, 135–136
Parlay API, 149
Parlay-X, 149
Passive optical network (PON) fiber, 103 Patent policy, 234
Pay-per-use service, grand-separation for, 117
Performance increase, 256
Performance management (PM), 4, 111, 215, 242
FCAPS, 141
network-related, 142
of NG services, 122–123
service-related, 142–143
Performance Management System (PMS) applications, 10–13 Periodic clustering algorithm, 222
Personal computers (PCs), 2–3
Personalized communications, 278
Personal Video Recorder (PVR) functionality, 72 Person-to-service (embedding data) communications, 270
Photonics technologies, 103
Physical architectures, 213–214
Physical media-dependent (PMD) sublayer, 74–75
Physical Termination Point (PTP), 167
Place shift service, 8
Plain Old Java Object (POJO), 171
Planning, HFC, 55–56
Planning and engineering systems, SMS
  Integration with, 13
Platform Independent Model (PIM), 193, 194
Platform Specific Model (PSM), 194
Players, increase of, 257
Plevyak, Thomas, xxi–xxii, 1
“Plug and play” equipment, 26–27
Plug-ins, 272
Point of Deployment Module/CableCard, 72–73
Point-to-point protocol (PPP), 30
Policy and Charging Rules Function (PCRF), 96
Polymer memories, 259
Power line transmission (PLT), 27
powerUsage group, 223–224
Presence application server, 147
“Printed electronics,” 261, 262
Private data, 60
Probes, 218
Processing evolution, 261–262
Process repository, 200, 201
Product, defined, 163
Profile Database Function (PDBF), 138
Program Allocation Table (PAT), 60
Program Map Table (PMT), 60
Program stream, 59
Project execution, 238–239
Project/program management Gantt Chart, 238–239
Protocol independent information modeling, 241
Provisioning function, 41
Proxy CSCF (P-CSCF), 131–132
PSTN emulation, 84. See also Public switched telephone network (PSTN)
PSTN simulation, 84
Public service answering points (PSAP), 56
Public switched telephone network (PSTN), 19. See also PSTN entries
Push Proxy Gateway, 94
Push to Talk over Cellular (PoC) service, 133–134, 150
Push to X, 150–151
QAM channel, 71. See also Quadrature amplitude modulation (QAM)
QoS control, in NGN, 135–136. See also Quality of Service (QoS)
QoS management, 2
QoS reference model, 96
QoS requirements, 6
QoS session call set-up quality parameters, 26
QoS transport quality parameters, 26
Quadrature amplitude modulation (QAM), 58, 74. See also QAM channel
Quadruple play. See Triple/quadruple play entries
Quality-of-Experience (QoE) metrics, 2
Quality of Service (QoS), 5, 11, 25–26. See also QoS entries
  for broadcast television, 24–25
Query View Transform (QVT) language, 194
RACS function blocks, 137. See also Resource and Admission Control Subsystem (RACS)
Radio Frequency Identification (RFID) technology, 263
Rating Region Table (RRT), 62
Real Time Protocol (RTP), 84
Real-time service monitoring function, 42
Real time streaming protocol (RTSP), 65
Real-time Transport Control Protocol (RTCP), 133
Regulatory changes, 5
Regulatory/legal issues, 19
Regulatory responsibilities MSO, 56
Representational state transfer (REST), 176–177
Research, sensor-related, 263
Residential gateways (RGWs), 16, 27
Resource and admission control functions, 110
Resource and Admission Control Subsystem (RACS), 136–137
Resource control, 33
Resource domain, 165, 167, 182
Resource reservation, RACS, 136
Return Data Channel (RDC), 64
RMON-MIB, 224. See also Management Information Base (MIB)
Roomba, as an example of an autonomic system, 267–268
Running Status Table (RST), 61
Run phase, in the customer experience, 48
Runtime code generations, 192
Runtime prototypes, 205

Sahin, Veli, xxii, 1
Sale phase, in the customer experience, 47
Saracco, Roberto, xxii–xxiii, 253
Satellite access, 21
Satellite networks, 209
S-Card, 72
SDO/Forums, 232, 234, 243. See also Standards development organizations (SDOs)
mapping to general standards organization type and management standards, 246–247
SDO/Forum Types, 235–236
SDP architecture, Push to X on, 150. See also Service delivery platforms (SDPs)
Security management (SM), 4, 5, 111–112, 215, 242
FCAPS, 141
network-related, 142
of NG services, 123
service-related, 142–143
Self-organizing networks, 214–215
Sensor evolution, 262–263
Sensor Information Networking Architecture (SINA), 228
Sensor Management Protocol (SMP), 228
Sensor Query and Data Dissemination Protocol (SQDDP), 228
Sensor Query and Tasking Language (SQTL), 228
“Separation of concerns” principle, 203, 241
Server NG technologies, 107–108
Service, defined, 163. See also Services
Service and contract assurance, 12
Service and network platforms, 38
Service and resource control, 33
Service assessment, 12
Service Authentication function, 133
Service aware networks, 5–7
Service continuity, QoS parameters linked to, 25
Service control functions, 110
Service delivery, quick, 153
Service delivery platforms (SDPs), 3–4, 144. See also SDP architecture features of, 146
roles of, 145–149
Service deployment speed, 20
Service Description Table (SDT), 61
Service development, future milestones in, 20
Service enhancement requirements, 143
Service flows, DOCSIS, 77
Service impact analysis tools, 43
Service Level Agreements (SLAs), xv, 197
Service level objectives (SLO), 46
Service maintenance function, 42–43
Service management, 43
Service management center (SMC) function, 40, 42–43
Service management centers, IS tools for, 43–44
Service Management Layer (SML), xvii, 2
Service management operation requirements, 142–143
Service management system interworking, 7
Service management systems (SMSs), 2, 5.
See also SMS entries integration with planning and engineering systems, 13
Service operations center (SOC), 12
Service-Oriented Architecture (SOA), 169, 195, 183, 188
Service pilots, 47
Service platform/IS/network cooperation, 39–40
Service platforms, 22, 33
in triple and quadruple play contexts, 44–45
Service Policy Decision Function (SPDF), 137
Service provider OSS, 165, 195–196
Service providers (SPs), 2–7. See also SP environment standards and, 156–157
Service quality analysis function, 42
Services, 269
creation of, 276
layered, 279–280
Next Generation, 114–121, 126–127
Service stratum, of Next Generation networks, 110
Service user profiles, 110
Serving-call session control function (S-CSCF), 92, 130–131
Session Description Protocol (SDP), 84
Session Initiation Protocol (SIP), 90, 92, 144–145
Set-top box (STB), 60
TV programming reception by, 71–72
Shared Information/Data (SID) model, 163–166, 167–168, 191
SID Product and Service domains, 165
Signaling gateway (SG), 86
Simple Network Management Protocol (SNMP), 80, 223
Simple Object Access Protocol (SOAP), 176. See also SOAP packet
Single carrier FDMA (SC-FDMA), 106
Skill centers (SkC), 41
SLA contractual performance, 12
Smart materials, 264–265
SMC service pilots, 47. See also Service management center entries
SMS actions, hot spot identification and, 11. See also Service management systems (SMSs)
SMS applications, 10–13
SNMP MIBs, 223, 225. See also Management Information Base (MIB)
SOAP packet, 174. See also Simple Object Access Protocol (SOAP)
Social networking services, 118
Social networks, in 2020, 275, 276
Society of Cable Telecommunications Engineers (SCTE), 53
standards of, 64
“Soft Telco,” 157
Software as a Service (SaaS), xvi
Software-based business communications service, 114–115
Software design, model-driven, 193–194
Solid state memories, 259
Source-specific multicast (SSM), 83
Specific network/service SDO/Forum, 239–240. See also Standards development organizations (SDOs)
SP environment, 181. See also Service providers (SPs)
Stand-alone user equipment, 93
Standardization
ETV, 67
among operators, 52
Standardization organizations, 134–135
Standards
general drivers for, 232
interest level in, 244
OSSAI, 156–158
real network implementation of, 177–179
relationship between, 199
structured approach to, 241
Standards bodies, 158–159
Standards development
“back-game” for, 245
“front-game” for, 244–245
strategic human side of, 245–248, 250
Standards development guidance, 235
Standards development organizations (SDOs), 22, 233–234
Standards development process, key attributes of, 233, 234–235, 248
Standards development resources, 251
Standards drivers, 248
Standards engagement determination, strategic questions for, 244–245
Standards models, 189, 194–195
Standards work, strategic progression of, 245, 250
Statistical data analyses, 265–266
“Sticker” communication paradigm, 270
Strategic NGN management standards development, key lessons related to, 250
Strategic questions, for standards engagement determination, 244–245
Strategic standards development, 231–251
Subscriber Accounting Management Interface Specification (SAMIS), 82
Subscriber management (SuM), OSS interaction with, 185–186
Subscriber management system (SMS), 63
Subscription Management model, 165
“Supervisor/agency” model, 217
Support object classes, 225
Switched Digital Video (SDV), 65–66 implementations of, 66
Switched digital video system, 66
Synchronous Optical NETwork (SONET), 121, 122
Sync Markup Language (SyncML), 93–94
System implementation guidelines, 238
System requirements, 237
Systems analysis, 237
Systems design, 237–238
System Time Table (STT), 62
System view, 164, 196
T1M1, 232–233
Task Assignment and Data Advertisement Protocol (TADAP), 228
Tasks, in the business service framework, 196
Technical management center (TMC) function, 40–47
Technical tool box, 21–23
Technologies
   Next Generation, 102–108
   wireline NG, 102–104
Technology evolution, 254–257, 258–259
   pace of, 256
Technology islands, 9
Technology-neutral architectures, designing, 189
Technology transformation, 125
Technology usage, ethical and moral issues in, 125–126
Technology/usage revolutions, 16
Telco Information System (IS), 33–40
Telecom Act of 1996, 72
Telecom engineers, 267
Telecommunication operators, 51. See also Telecom operators
Telecommunications, 126
Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN), 183. See also TISPAN entries
goal of, 184
Telecommunications infrastructures, evolution of, 257
Telecommunications Management Network (TMN) framework, 212. See also TMN architecture
Telecommunications Management Network model, xvii
Telecommunications Management Network standards, 249
Telecommunications networks/services management, forecast of, 253–280
Telecommunications operations, importance of, 1
Telecom operators, 273. See also Telecommunication operators
   challenges facing, 17–18
   economic, service, and commercial challenges of, 18–20
   technical challenge facing, 17–18, 20–40
   triple/quadruple play for, 15–18
Telecoms Application Map (TAM), 198
TeleManagement Forum (TMF, TM Forum), 200, 240. See also TMF entries; TM Forum Interface Program (TIP)
   for OSS architecture, 158–159
   “Telepresence,” 258
Television, three-dimensional, 116
10 Gigabit Ethernet PON (10G-EPON), 103
The Open Group Architecture Framework (ToGAF), 192
Third Generation Partnership Project (3GPP) IP Multimedia Subsystem (IMS) architecture, 118. See also 3GPP entries
3rd Generation Partnership Project (3GPP) IP Multimedia Subsystem (IMS) specification, 92, 93
3rd Party Call Control (3PCC), 147
Third-party domains, 112–113
Three-dimensional television (3D-TV), 116
3GPP IMS model, 183, 184, 185–186, 194–195. See also Third Generation Partnership Project entries
3GPP NRM, 186
3GPP Website, 119
3G radio access network (RAN), 20
   “360° CRM,” 38
Time and Date Table (TDT), 61
Time-division multiplexing (TDM), 3, 86
Time shift service, 8
Time to market, IMS-related, 145
TIP model, 191. See also TM Forum Interface Program (TIP)
TIP team, 167
TISPAN model, 194–195. See also Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN)
TISPAN vision document, 188
TISPAN WG-8, 183
TMF608 data model, 166, 178, 179. See also TeleManagement Forum (TMF, TM Forum)
TMF NGOSS, 188
TM Forum Interface Program (TIP), 166–167. See also TeleManagement Forum (TMF, TM Forum); TIP entries
TMN architecture, 241–243. See also Telecommunications Management Network entries
Topology, of wireless ad hoc networks vs. Sensor networks, 211
topology Maintenance group, 224
Transparency, 234
Transportation, Mobile Internet for, 117
Transport control functions, 109
Transport plane requirements, to support NG services, 120–121
Transport stratum, in next generation networks, 108–110
Transport stream, 59
Transport user profiles, 110
Tree editor, 203
Triple play services, 5–6
true nature of, 20
Triple play support, transformation to, 30–31
Triple/quadruple/multiple play business, IS architecture for, 35
Triple/quadruple play
designing network and is infrastructures for, 24–26
operating IT and service platforms in, 44–45
organizational challenge of, 51
overall architecture supporting, 23–24
Triple/quadruple play sales, phases in, 47–48
Triple/quadruple play service offer requirements, 19–20
Triple/quadruple play services
cable perspective on, 53–100
management of, 15–52
operational challenge for, 40–47
quality problems with, 18
Triple/quadruple play tool box, 21–23
Triple shift service, 7–8
Trivial File Transfer Protocol (TFTP), 80
Tru2way, 65, 67
Trunk Gateway Control Protocol (TGCP), 86
TT Service Management Forum (iTSMF), 162, 163
TV-middleware, 67
UE Provisioning specification, 93
Ulema, Mehmet, xxii, 207
Ultra Mobile Broadband (UMB), 106
UML meta-model, 190. See also Unified Modeling Language (UML)
UML specification, 189–192
Unbound OCAP applications, 67
Unbundled-local loop (ULL), 30
Unified Modeling Language (UML), 163, 164–165, 236. See also UML entries
Uniform Resource Locator (URL), 176
Universal Description, Discovery and Integration (UDDI), 168
Upstream channel descriptor (UCD), 80
User Access Authorization Function (UAAF), 138
User equipment (UE), 92–96
User-generated content (UGC), 3, 15
User interface, enhancing the quality of, 36
User profile management application server, 149
User-to-network interface (UNI), 108
Value-added service, management challenges for, 7–8
Value chains, 51
modeling, 271
Vehicles, Mobile Internet for, 117
Video on demand (VoD), 65
Virtual Channel Table (VCT), 61
Virtual concatenation (VCAT), 121, 122
Virtualization, 107–108
“Virtual visits” service, xvi
Voice over Internet Protocol (VoIP), 5–6, 84. See also VoIP entries
packet loss and, 26
Voice-over-IP (VOIP) services, 157
VoIP networks, 88
VoIP QoS KPI dependencies, 11
VoIP service quality, 25
Wavelength-division multiplexed PON (WDM-PON), 103
Wearable, body-embedded communications/computing, 116
Web 2.0 paradigm, 258
Web-based graphical user interface (GUI), 12
Web Service Definition Language (WSDL), 171, 176
Web services
scale-ability of, 170
XML-based, 174
Wi-Fi, personalized and extended, 104–105
Wi-Fi alliance, 105
Wi-Fi communications, 105
Wireless, 96–97
evolution of, 268
Wireless ad hoc networks
applications for, 209–210, 229
management aspects and framework of, 212–213
management of, 207–230
overview of, 209–210
versus wireless sensor networks, 211
Wireless cellular networks, 208
Wireless charging, of hand-held devices, 115–116
Wireless drops, 269
Wireless fixed networks, 209
Wireless Identification and Sensing Platform (WISP), 263
Wireless Mesh Networking (WMN), 107
Wireless NG technologies, 104–107
Wireless/optical networks, as a supporting infrastructure, 266
Wireless sensor networks
applications for, 210–211, 229
management aspects and framework of, 212–213
management of, 207–230
overview of, 210–211
protocol architecture for, 228
Wireline NG technologies, 102–104
Work Initiation Forum, 235
WS-* based standards, 176
xDSL techniques, 28
XMI interchange format, 192
Zachman Framework, 159–160
Zachman viewpoints, 160
ZigBee, 104