

Index

- ;explicit parameter 357–9
- ;require parameter 357–9
- 100 (Trying) response 347, 363, 364
- 100rel mechanism 364
- 180 (Ringing) response 374, 381
- 183 (Session in Progress) response
 - callee identity 336
 - compression negotiation 362
 - ICID exchange 384
 - IMS example session 345–6
 - media authorization 384
 - media negotiation 363
 - provisional response reliability 364
 - resource reservation 374, 379
- 200 (OK) response
 - compression negotiation 299
 - GCID/ICID correlation 386
 - PRACK requests 348
 - REGISTER requests 268–9
 - registration 262, 307
 - registration-state information 307
 - resource reservation 379–80, 381
 - SA establishment 282, 284
 - IMS Voice Call Continuity 454–6
- 3G (third generation) systems 3, 10–3, 118, 125
- 3GPP *see* Third Generation Partnership Project
- 401 (Unauthorized) response
 - authentication 280, 282
 - port setting 286
 - SA establishment 280–2
 - Security-Server header 291, 292, 293
 - Sip-Sec-Agree 291
- 404 (Not Found) response 335
- 420 (Bad Extension) response 412
- a-line *see* attribute line
- AAR *see* AA-Request
- AA-Request (AAR) command 71, 73, 74
- ACA *see* Accounting Answer
- Accept-Contact header
 - IMS Voice Call Continuity 434
- Accept header 306
- access
 - control mechanisms 185–6
 - independence 21–2
 - IP version 4
 - networks 134–5
 - multi-access functionality 22
 - PoC user policy 164–5
 - points 422
 - registration 280–7, 300–1
 - security 121–5, 280–7
- Access Control List (ACL) 152
- Access Point Names (APNs) 69, 422
- accounting 76, 81–2
- Accounting Answer (ACA) 77, 81–2, 87
- Accounting Request (ACR) 77, 81–2, 87
- ACL *see* Access Control List
- ACR *see* Accounting Request
- ad hoc PoC groups 178, 179
- Address Of Record (AOR) 310, 312
- addresses 127–8, 386–7

- AKA *see* Authentication and Key Agreement
- ALG *see* Application Level Gateway
- Anonymous Communication Rejection (ACR) 235
- answer modes, PoC 182–6
- AOR *see* Address Of Record
- APNs *see* Access Point Names
- Application Level Gateway (ALG) 128–9
- Application Servers (ASs) 27–8
 - ISC 35
 - P-Asserted-Identity header 335
 - PoC 179
 - routing information 349–50, 418–20
 - service provision 91, 93–4
 - user profiles 90
- ASs *see* Application Servers
- assignment, S-CSCF 59–61
- attribute line (a-line) 392, 412
- Attribute Value Pairs (AVPs) 60, 71, 81–3
- audio streams, RTP/AVP 367–9
- authentication
 - Cx reference point 38
 - proxy authentication 126
 - re-authentication 282–4, 287, 317–9
 - registration 273–6, 278–9
 - SIP 273
 - see also* identification issues
- Authentication and Key Agreement (AKA) protocol 114, 115–6
- Authentication Vector (AV) 276–7
- authorization
 - bearer authorization 62–73
 - PoC groups 163–4
 - presence 147–9
 - rulesets 163–5
- AUTN *see* network authentication token
- auto-answer mode, PoC 182–5
- AV *see* Authentication Vector
- AVPs *see* Attribute Value Pairs

- Back-to-Back User Agent (B2BUA) 350, 426, 437, 449
- Bad Extension (420) response 412
- bandwidth modifiers 369–70
- barring
 - communication 172
 - PoC 188, 304
- bearer authorization 62–73
- bearer loss/recovery indication 74, 84
- bearer release function 84
- bearer traffic control mechanism 61–75
- BGCF *see* Breakout Gateway Control Function
- bidding-down attacks 124
- bidirectional streams 331
- billing systems 76–8
- bootstrapping 133–4
- branch parameters, Via header 340
- Breakout Gateway Control Function (BGCF) 95
- broadband
 - fixed 100
 - Internet access 22
- buddy lists 151, 154
- business aspects 152
- BYE request 387–8

- c-line *see* connection information line
- Cablelabs 11
- call anchoring, Voice Call Continuity 429–46
 - direction 429–31
- call flow 332
- Call Session Control Functions (CSCFs) 23, 273, 339
 - see also* Interrogating-CSCF; Proxy-CSCF; Serving-CSCF
- callee capabilities 294–7
- caller/callee identities 333–7
- Call-ID header 263
- calling line identification presentation (CLIP) 242
- call-statefull SIP proxies 347
- CAMEL *see* Customized Applications for Mobile network Enhanced Logic
- capabilities 60, 105–6
- CCCCF *see* Charging Collection Function
- CDF *see* Charging Data Function
- CDR *see* Charging Data Record
- Cell Global ID (CGI) 300
- cellular networks 175–93

- CGF *see* Charging Gateway Function
- CGI *see* Cell Global ID
- charging 18–9, 75–86
 - function addresses 386–7
 - identifiers 73, 74, 84–6
 - IMS example session 383–7
 - reference points 45
 - registration 301
- Charging Collection Function (CCF) 387
- Charging Data Function (CDF) 76–7, 81–2, 84, 86
- Charging Data Record (CDR) 76–7, 78, 81–2
- Charging Detail Records (CDRs) 202
- Charging Gateway Function (CGF) 76–8
- Charging Trigger Function (CTF) 77, 78
- chat alias 209–10
- chat conferences 198, 199
- chat IM sessions 207
- chat PoC groups 178, 180, 188
- Ciphering Key (CK) 274, 278
- Circuit Switched (CS) networks 47, 94–6
 - adaptation 108
- Circuit Switched Core Network (CS CN) 15
- Circuit Switched Domain Routing
 - Number (CSRN) 449
- CK *see* Ciphering Key
- class information, QoS 69, 70
- clients
 - IM 203
 - PoC 178, 182
- combinational services, IMS/CS 95–6
- Common Open Policy Service (COPS) 62
- Common Policy 153–6, 172
- communication 15, 18, 178–80
 - IM 203, 210–1
 - barring of 210–1
 - participant information 211
- communication barring (CB) 172, 235
- Communication Deflection (CD) 237
- communication diversion 172, 235, 236
- Communication Forwarding Busy (CSB) 237
- Communication Forwarding No Reply (CFNR) 237
- Communication Forwarding on Not Logged-in (CFNL) 237
- Communication Forwarding
 - Unconditional (CFU) 236
- Communication Hold (HOLD) 235, 238
- comp parameter, compression negotiation 297–9
- comp=SigComp parameter 297–9, 361
- compression 102–5, 297–9, 360–2
- Conference service (CONF) 235, 239
- conferencing 198, 199, 221–31
- confidentiality 124
- configuration 133–4
- connection information line (c-line) 367
- connectivity
 - IMS/CS 94–6
 - IP 16–7, 15
 - peer-to-peer 3–4, 8, 16, 197–8
- Contact header 262, 281, 295, 298, 306
- 'contact' sub-elements, registration 310
- Content-Length header 263
- contexts, PDP 421
- converged networks 4
- conversation history 166–8, 203, 211
 - deleting stored messages 213–8
 - retrieving stored messages 212–3
- COPS *see* Common Open Policy Service
- correlation, charging information 85
- Credit Control Request/Answer 82–4
- cross-certification 121
- CS *see* Circuit Switched
- CSCFs *see* Call Session Control
 - Functions
- CSCN *see* Circuit Switched Core Network
- CSeq header 365
- CSeq numbers 339–40
- CTF *see* Charging Trigger Function
- customer classes, media information 88
- Customized Applications for Mobile network Enhanced Logic (CAMEL) 27–8, 40, 108
- Cx reference point 35, 36–7
- data handling 38, 40
- data manipulation *see* group management

- data rate values 64, 66–7, 69
- databases 26–7
- de-registration 319–26
- default public user identity 303–4
- deferred delivery messaging 203, 213–5
- deferred messaging 168, 203, 213–5
- delivery report 218
- derived public user identity 53
- Device Management (DM), OMA 427
- Device Management Object (MO) 427–8
- Dh reference point 40
- DHCP *see* Dynamic Host Configuration Protocol
- DHCPv6 *see* Dynamic Host Configuration Protocol for IP Version 6
- dialogs 338–9, 347–9
- dial-out IM groups 207
- dial-out sessions, PoC 178–9, 188
- Diameter
 - AAR/RAR commands 72–4
 - ACA 77, 81–2, 87
 - ACR 77, 81–2, 87
 - AVPs 81
- direct debiting 79–80, 82
- discovery, P-CSCF discovery 57, 58–9
- Domain Name System (DNS) 58–9, 258, 264, 337
- Domain Selection Function 426
- Domain Transfer Function (DTF) 437
- DTMF *see* dual-tone multi-frequency tones
- dual stack operations 132–3
- dual-tone multi-frequency (DTMF) tones 367
- Dx reference point 38
- Dynamic Host Configuration Protocol (DHCP) 58–9, 258
- Dynamic Host Configuration Protocol for IP Version 6 (DHCPv6) 258–9
- dynamic presence 140, 142
- early IMS security 326–9
- ECF *see* Event Charging Function
- EDGE *see* Enhanced Data Rates for Global Evolution radio access
- emergency calls 300
- emergency sessions 100–2
 - CSCF 25–6, 100, 102
 - registration 101
 - setup 101–2
- Encapsulated/ing Security Payload (ESP) 124
- Enhanced Data Rates for Global Evolution (EDGE) radio access 10
- entry point, IMS 58–9
- errors, S-CSCF assignment 61
- ESP *see* Encapsulated/ing Security Payload
- establishment, sessions 181–3, 338–40, 373–4, 389–415
- European Telecommunications Standards Institute (ETSI) 10
- event attributes, registration 310–1
- event-based charging 76, 81–3
- Event Charging Function (ECF) 383
- event packages 101
- example session, IMS 331–423
- expected result (XRES) 274
- Expires header 306
- Explicit Communication Transfer (ECT) 235, 245–6
- feature tags 295
- filter criteria 89, 91–2, 271, 349–50
 - IMS Voice Call Continuity 452, 459–60
- Final Delivery Report 220
- first-party registration 263
- fixed networks 5–7, 94, 96, 98
- floor moderators 190
- flow identifiers 66, 68, 130
- flow-based charging 80, 84
- forking issues 58, 74, 105
- FQDN *see* Fully Qualified Domain Name
- From header 263, 272, 309, 333
- Fully Qualified Domain Name (FQDN) 258
- Gateway GPRS Support Node (GGSN) 16, 19, 24,, 26, 30, 32, 250, 253, 420–3

- bearer traffic control 62–3 68–9, 72–3
- charging 85, 383
- early IMS security 326–7
- P-CSCF discovery 257
- registration 257
- roaming 249–50
- session establishment 338
- see also* General Packet Radio Service
- gateways
 - control functions 29
 - security domains 120
- GBA *see* Generic Bootstrapping Architecture
- GBR *see* Guaranteed Bit Rate
- GCID *see* GPRS Charging Identifier
- General Packet Radio Service (GPRS) 10, 420–3, 249, 253
 - charging 383
 - IP connectivity 16–7
 - IP versions 4/6 134–5
 - P-CSCF 23–4, 58–9, 257
 - resource reservation 381–2
 - roaming 19, 249–50
 - SGSN 32, 421
 - see also* Gateway GPRS Support Node
- Generic Bootstrapping Architecture (GBA) 125
- GGSN *see* Gateway GPRS Support Node
- Global System for Mobile Communications (GSM) 9, 10
- Globally Routable User Agent URI (GRUU) 304–5, 415–8
- Gm reference point 33–4
- GPRS *see* General Packet Radio Service
- GPRS Charging Identifier (GCID) 85–7, 383, 385–6
- GPRS-IMS-Bundled Authentication (GIBA) 326–9
- Gq reference point 62
- group advertisements 187–8
- Group Identity, IM 218
- group management 151–74
- group sessions 179–80
- GSM *see* Global System for Mobile Communications
- Guaranteed Bit Rate (GBR) 68
- Gx reference point 44–5, 69, 71, 75, 80, 84–5
- headers
 - caller/callee identities 333–7
 - GCID/ICID correlation 385–6
 - INVITE requests 339–41
 - provisional responses 364–5
 - REGISTER requests 261–2
 - routing information 338, 346
 - SDP offer/answer mechanism 379–81
 - user identities 306
 - see also* individual headers
- hist-settings 211
- Home Location Register (HLR) 26
- home networks 21, 119
- Home Subscriber Server (HSS) 26–7
 - authentication 273
 - early IMS security 328–9
 - reference points 35–7
 - registration 48, 261–2, 265, 272
 - routing 342
 - user identities 53
- HSS *see* Home Subscriber Server
- Hypertext Transfer Protocol (HTTP) 42, 125–6, 275
- ICID *see* IMS Charging Identifier
- I-CSCF *see* Interrogating-Call Session Control Function
- ID attribute 310
- identification issues
 - barring identities 304
 - caller/callee identities 333–7
 - charging identifiers 73, 74, 84–6, 301, 383–4
 - flow identifiers 66, 68, 130
 - GCID 85–7, 383, 385–6
 - ICID 85–7, 301, 383–4
 - identity modules 57
 - IMSI 53, 54
 - IOI 383–4
 - multiple users 49–50
 - private user identities 52–6, 273–4, 302–3
 - Public Identification 88

- identification issues (*Continued*)
 - public service identities 55, 418–20
 - trust domains 123
 - UICC cards without ISIM 303
 - user identities 26, 49–50, 51–6, 273–4, 301–16
 - see also* IP Multimedia Services Identity Module; public user identities
- identity minting 154
- IKE *see* Internet Key Exchange
- IM-SSF *see* Internet Protocol Multimedia Service Switching Function
- immediate messaging 195–7
- implicit registration 49–50
- IMS *see* Internet Protocol Multimedia Subsystem
- IMS Application Reference Identification (IARI) 295–7, 352
- IMS Charging Identifier (ICID) 85–7, 301, 383–4
- IMS communication service identification (ICSI) 234–5, 294–7, 352–60
- IMS Management Object (IMS MO) 255–6
- IMS-MGW *see* Internet Protocol Multimedia Subsystems Media Gateway
- IMS Service Control (ISC) 35, 202
- IMSI *see* International Mobile Subscriber Identifier
- Incoming Communication Barring (ICB) 235
- incoming sessions 183–6
- information
 - charging 76–8, 81, 85–6
 - media policies 88–9
 - service triggers 89–90
- initial filter criteria 89, 91–2
- Instant Messaging 198–9
- instant messenger (OMA)
 - barring of communication 210–1
 - chat alias 209–10
 - client 203
 - communication 203
 - conversation history function 212–3
 - creating messaging history 212
- Immediate Messaging 204–6
- participant information 211
- private message during session 209
- server 202–3
- session based messaging 206–8
- instant personal alerts 186–7, 188
- Integrated Services Digital Network (ISDN) 3
- Integrity Key (IK) 274, 278
- integrity protection 126, 279
- inter-domain scenarios, IP versions 4/6 133
- International Mobile Subscriber Identifier (IMSI) 53, 54
- Internet Assigned Number Authority (IANA) 256, 353
- Internet Protocol (IP)
 - connectivity 16–7, 15
 - GPRS 16, 134–5
 - IMS definition 4
 - policy control 17
 - SIP registration 253
 - version 4 16, 126–35
 - version 6 16, 126–35
- Internet Protocol Connectivity Access Networks 199
- Internet Protocol Multimedia Service Switching Function (IM-SSF) 27–8
- Internet Protocol Multimedia Routeing Number (IMRN) 430
- Internet Protocol Multimedia Subsystem (IMS) 3–4
 - architecture 15–46
 - concepts 47–135
 - example session 331–423
 - reference points 33–46
 - registration example 253–329
 - Terminating Request 432
 - Termination field set 432
- Internet Protocol Multimedia Subsystems Media Gateway (IMS-MGW) 29
- Internet Protocol security (IPsec)
 - IMS registration 255
 - SAs 280–7, 291, 292–3, 331
- Internet Relay Chat (IRC) 197–8

- Inter-Operator Identifier (IOI) parameter 383–4
- Interrogating-Call Session Control
 - Function (I-CSCF) 23, 436
 - CS users 95
 - databases 26, 27
 - PSI routing 419
 - reference points 34–7
 - registration 48, 255, 264, 273, 255
 - routing information 337, 342–4
 - S-CSCF assignment 60–1
 - session initiation 50
- interworking functions 29
- intra-domain scenarios, IP versions 4/6 133
- INVITE requests
 - application servers 350–1
 - callee identity 335, 336
 - compression negotiation 360–1
 - conferencing 224
 - emergency calls 102
 - ICID exchange 384
 - IMS Voice Call Continuity 433–4
 - P-Asserted-Identity header 335
 - PoC session establishment models 181–3
 - public user identities 333
 - registration 255
 - re-transmission 347
 - roaming 331
 - routing 337–41
 - SDP 434–5
 - SDP offer/answer model 366
 - service provision 91–2
 - session establishment 389–90
 - session initiation 50–1
 - SIP 214, 253, 437, 438–40
 - transactions 340–1
 - VCC 111
- IOI *see* Inter-Operator Identifier
- IP *see* Internet Protocol
- IP Multimedia Services Identity Module (ISIM) 57
 - AKA 115–6
 - authentication 274, 278
 - SIP registration 261
 - user identities 302–3
- IPsec *see* Internet Protocol security
- Iq reference point 45
- IRC *see* Internet Relay Chat
- ISAKMP *see* Internet Security Association and Key Management Protocol
- ISC *see* IMS Service Control reference point
- ISDN *see* Integrated Services Digital Network
- ISIM *see* IP Multimedia Services Identity Module
- Iu interface 10
- I-WLAN 426
- Ix reference point 45
- join-in messaging sessions 206–7
- keys 115–6, 120–1, 124–5
- Large Message Mode 203, 206, 219–20
- layered design, 3GPP 21–2
- Local Connection Addresses field set 432
- local dialling plans 98–9
- Local IMS Resources field set 432
- location 35–8, 300–1
- Location Info Answer (LIA) 436–7
- LPDP *see* Local Policy Decision Point
- m-line *see* media line
- Ma reference point 35
- Management Object, Device Management 427–8
- manual answers 183–5
- Maximum Bit Rate (MBR) 68
- media
 - authorization 38, 381–2
 - charging components 18–9
 - m-lines 367, 367, 377, 395
 - negotiation 181–2, 362–73
 - parameter negotiation 181–2
 - PDP contexts 373–83
 - policing 382
 - policy information 88–9
 - streams 332, 367–74

- Media Gateway Control Function (MGCF) 94–6, 431–3
- MEGACO *see* Media Gateway Control Protocol
- MESSAGE method 195, 187–8
 - SIP 199–201, 212, 218–9
- Message Session Relay Protocol (MSRP) 198
 - instant messaging 217–8
 - Switch 199
- Message Waiting Indication (MWI) 235, 240–1
- messages
 - SIP 195, 188–9, 332
 - TBCP 190–1
- messaging 7, 195–220, 390
 - history 212
 - immediate 195–7
 - session-based 197–8
 - interworking 198–201
 - instant, by OMA 201–2
- Mg reference point 43
- MGCF *see* Media Gateway Control Function
- MGW 431–3
- Mi reference point 42
- MID *see* Media Stream Identification
- MIME *see* Multipurpose Internet Mail Extension
- Mj reference point 43
- Mk reference point 43
- Ml reference point 45
- Mm reference point 43
- MMD *see* Multimedia Domain
- MMS *see* Multimedia Messaging Service
- Mn reference point 44
- mobile networks 5–7, 96–7
- Mobile Station ISDN (MSISDN) 25, 57, 105–6, 428
- Mp reference point 43–4
- MPV *see* Music Photo Video
- Mr reference point 43
- MRFC *see* Multimedia Resource Function Controller
- MRFP *see* Multimedia Resource Function Processor
- MSISDN *see* Mobile Station ISDN
- MSRP *see* Message Session Relay Protocol
- multi-access functionality 22
- Multimedia Domain (MMD) 11, 126
- Multimedia Messaging Service (MMS) 197, 198
- Multimedia Resource Function Controller (MRFC) 27–8, 43
- Multimedia Resource Function Processor (MRFP) 27–8
- multimedia telephony 233–46
 - service management 171–4
 - SIP 234
 - supplementary services 235–46
- multiparty conference (MPTY) 239
- multiple devices, single user identity 57–8
- multiple terminals 294
 - registration 315–6
- multiple user identities, registration 49–50
- Multipurpose Internet Mail Extension (MIME) 198
 - group advertisement 187
 - group management 156
 - participant information 189
 - session-based messaging 197–8
- Music Photo Video (MPV) video stream encoding 367
- Mx reference point 45

- NAS *see* Network Access Server
- NATs *see* Network Address Translators
- NDS *see* Network Domain Security
- Network Address Translators (NATs) 126–31
 - network authentication token (AUTN) 274
- Network Domain Security (NDS) 114, 118–21
 - network-initiated de-registration 325–6
 - network-initiated re-authentication 317–9
 - network-initiated session release 389
 - network interworking 20

- network nodes 55, 56
- Network Time Protocol (NTP) 367
- network-to-network interface (NNI) 431
- Next Generation Network (NGN) 11
- Not Found (404) response 335
- Notify Released Bearer field set 432
- NOTIFY requests
 - group management 156
 - network-initiated re-authentication 318
 - presence 145–6, 148–9
 - registration-state information 307–8, 309–10, 311
 - user-initiated de-registration 325–6
- NTP *see* Network Time Protocol
- O-Asserted-Identity header 433
- o-line, SDP 366, 371
- OCS (Online Charging System) 76–7, 79–80, 82–4
- offer/answer model *see* SDP offer/answer model
- offline charging 18, 77–9, 81–2
- OK response *see* 200 (OK) response
- OMA *see* Open Mobile Alliance
- online charging 18, 76, 79–80, 82–4
- Open Mobile Alliance (OMA) 142, 175, 177–8, 188, 159–60
 - IM Immediate Messaging 204–6
 - IM session based messaging 206–8
 - instant messaging 199, 201–20
 - SIMPLE IM 199
- Open Service Architecture (OSA) 10, 27–8
- Originating Identification Presentation (OIP) 235, 242–3
- Originating Identification Restriction (OIR) 235, 243–4
- Originating Identification Services (OIR) 172
- OSA *see* Open Service Architecture
- Outcoming Communication Barring (OCB) 235
- out-of-band provisioning mechanisms 134
- P-Access-Network-Info 300
- P-Asserted Identity headers 334–5, 336–7
- P-Asserted-Service header 434
- P-Associated URI header 303–4
- P-Called-Party-ID header 336
- P-Charging-Function-Address header 386
- P-Charging-Vector header 301, 385–6, 434
- P-CSCF *see* Proxy-Call Session Control Function
- P-Preferred-Identity 333, 334
- Packet Data Protocol (PDP) 254, 255, 257, 421–3
- packet-switched networks 4, 6, 9
- page-mode messaging 185–7, 218–9
- Pager Mode 203
- parallel forking 58
- parallel services, IMS/CS 107
- participant information, PoC 189
- Path header 261, 262, 270–1
- payload types 367–9
- PDF *see* Policy Decision Function
- PDP *see* Packet Data Protocol; Policy Decision Point
- peer-to-peer connectivity 3–4, 8, 16, 197–8
- PEPs *see* Policy Enforcement Points
- personal alerts 186–7, 188
- PIB *see* Policy Information Base
- PoC *see* Push to talk over Cellular
- policy control, IP 17
- Policy Decision Function (PDF)
 - bearer authorization 62–3
 - charging 85
 - P-CSCF 23–4
 - support functions 30
- Policy Decision Point (PDP)
 - bearer authorization 64, 68–9, 72–3
 - charging 85, 383
 - media contexts 367, 369, 370–3
 - session establishment 390
 - user-initiated session release 388
- policy information, media 88–9
- port setting 285–8
- PRACK requests
 - compression negotiation 361–2
 - provisional response reliability 365
 - routing 348

- PRACK requests (*Continued*)
 - SDP offer/answer model 370, 379
- pre-arranged PoC sessions 178, 179, 188
- preconditions
 - resource reservation 374–9
 - session establishment 390
 - session set-up fallback 374
- Preferred Domain 428, 429
- pre-reserved resources, session
 - establishment 390
- presence 139–49, 151, 152, 153–4
 - architecture 142–4
 - authorization 149
 - contributing to business 140–1
 - definition 141–2
 - dynamic 140, 142
 - publishing 144–5
 - services 140
 - subscribing 145–7
 - user groups 139
 - watcher information 147–9
- presentity 143–6, 149
- privacy 123
- private message during IM session 209
- private user identities 52–6, 273–4, 302–3
- protocol version line (v-line) 366
- protocols *see* individual protocols
- provisional responses 364–5
- Proxy-Call Session Control Function (P-CSCF) 23–4, 30, 100, 101, 249
 - access information 300
 - authentication 274–5, 276, 278–9
 - bearer loss/recovery 74
 - charging-related information 384–386
 - compression negotiation 297–9, 360–2
 - discovery 47, 257–60
 - early IMS security, 327, 328
 - Gq reference point 62
 - IP versions 4/6 133–4
 - key management 124–5
 - location information 300
 - network-initiated session release 388
 - P-Asserted-Identity header 335, 336
 - port setting 285–7
 - re-authentication 282–4
 - reference points 33–5, 45
- REGISTER requests 263–4, 270–1, 292–3
 - registration 48–9, 255, 253
 - roaming 249–50, 331
 - routing information 340–2, 344–7
 - session initiation 50–1
 - Sip-Sec-Agree 289–94
- SUBSCRIBE requests 306–9
 - user identities 302
- Proxy-Require header 291, 292, 293
- PSIs *see* Public Service Identities
- PSTN *see* Public Switched Telephone Network
- PUA *see* Presence User Agent
- Public Identification 88
- Public Safety Answering Point (PSAP) 100
- Public Service Identities (PSIs) 55
 - routing of 418–20
- Public Switched Telephone Network (PSTN) 3
 - public user identities 50–6
 - default identity 303–4
 - P-Called-Party-ID header 336
 - registration 255, 261, 302–3
 - roaming 250
- PUBLISH method 192–3
 - SIP 215
- publishing presence 144–5
- Push to talk over Cellular (PoC) 175–93
 - features 178–89
 - functional distribution 179
 - group management 152, 159–60, 162–5
 - PoC groups 162–5
 - server 178, 179–85, 187
 - service settings 192–3
 - user access policy 164–5
 - user plane 189–92
 - XDM 159, 163–5
 - XDMS 160, 163, 176, 185
- P-Visited-Network-ID 300
- QoS *see* Quality of Service
- quality feedback, PoC 189, 191–2

- Quality of Service (QoS) 17
 - bearer authorization 62–73
 - Packet Data Control 421
 - preconditions mechanism 376–7, 378–9
 - UMTS 63–4, 66, 67–9
- radio access, W/TD-CDMA 9–10
- radio services 175
 - see also* General Packet Radio Service
- RADIUS 326
- random challenge (RAND) 274
- Real-time Transport Control Protocol (RTCP) 66–7, 69, 175, 191–2
- Real-time Transport Protocol (RTP) 17, 175, 191–2, 338
- re-authentication 282–4, 287, 318–9
- Re-Auth-Request (RAR) command 71, 73, 74, 75
- Receiver Reports (RRs) 191–2
- Record-Route header
 - 183 (Session in Progress) response 346
 - comp parameter 298
 - IMS Voice Call Continuity 449
 - INVITE requests 341–2
 - REGISTER requests 261
 - routing 338
- REFER, SIP 215
- reference points 33–46, 80–6, 176
- ‘reginfo’ element, registration 311
- REGISTER requests
 - authentication 275
 - compression negotiation 298–9
 - early IMS security 326–9
 - IPsec SAs 292–3
 - P-CSCF 263–4, 270–1, 290–1
 - registration 255, 260–73, 253
 - SA establishment 280–2
 - Sip-Sec-Agree-related headers 291–3
 - user-initiated de-registration 325–6
- registration 48–9
 - access 280–7, 300
 - authentication 273–9
 - charging-related information 301
 - compression negotiation 297–9
 - de-registration 319–26
 - early IMS security 326–9
 - emergency 101
 - IMS example 253–329
 - location information 37, 300–1
 - P-CSCF discovery 256
 - re-authentication 318–9
 - re-registration 317–9
 - S-CSCF 48–9, 60, 253–5, 264–8, 319–22
 - security 279–87
 - signalling PDP contexts 256–7
 - SIP 253–329
 - state information 262, 285, 302, 305–16
 - transport protocols 259–60
 - user identities 253, 259, 301–16
- reliability, provisional responses 364–5
- request URI 335–6
- Require header 290, 291, 292
- re-registration 317–9
- Reserve Value field set 432
- resource lists 152
- resource reservation 17, 373–83, 390
- restricted/unrestricted chat PoC groups 180
- retrieval
 - Cx reference point 38
 - stored messages 212–3
- Rf reference point 80, 81–2
- Ringing (180) response 374–5, 379, 381
- RLS (Resource List Server) 156
- Ro reference point 82–4
- roaming 16, 19–20, 98, 235, 249–50, 331
- Route header
 - compression negotiation 299
 - INVITE requests 339–41
 - REGISTER requests 261, 264, 269, 271–2
 - SUBSCRIBE requests 306
- routing 260–73, 285, 337–60, 418–20
- RRs *see* Receiver Reports; Resource Records
- RTCP *see* Real-time Transport Control Protocol
- RTP Audio and Visual Profile (RTP/AVP) 367–9

- RTP Control Protocol 369
- RTP *see* Real-time Transport Protocol
- rulesets 163–5, 169
 - see also* authorization
- Rx reference point 80, 84

- SAD *see* Security Association Database
- SAs *see* Security Associations
- SBLP *see* Service-Based Local Policy
- S-CSCF *see* Serving-Call Session Control Function
- SCTP *see* Stream Control Transmission Protocol
- SDP offer/answer model
 - media negotiation 363, 365–71
 - PRACK requests 372, 381
 - resource reservation 373–80
- SDP *see* Session Description Protocol
- secret keys, AKA 115–6
- security aspects
 - authentication 279
 - communication 18
 - early IMS security 326–9
 - NDS domains 118–21
 - services 113–26
 - SIP 289–94
 - Sip-Sec-Agree 289–94
 - see also* Internet Protocol security
- Security Associations (SAs)
 - access security 279–89
 - IPsec 279–89, 291, 292–3, 331
 - key management 120–1
 - Sip-Sec-Agree 292–3
- Security Client header 291, 292–3
- Security Gateway (SEG) 30, 120–1
- Security-Server header 293
- Security-Verify header 293
- SEG *see* Security Gateway
- Sender Reports (SRs) 191–2
- sequence number (SQN) 274
- sequential forking 58
- servers
 - IM 202–3
 - PoC 178, 179–85, 187
 - presence 146
 - Resource List Server 156
 - XDMS 176, 185
 - see also* Application Servers; Home Subscriber Server
- service
 - control model 20–1
 - functions 27–8
 - PoC settings 192–3
 - profiles 24–5, 86
 - provision 90–4
 - settings, IM 215–7
 - triggering information 89–90
 - see also* Quality of Service
- Service-Based Local Policy (SBLP) 62
 - see also* Internet Protocol
- service management
 - multimedia telephony 171–4
- Service-Route header 261, 262, 273
- Service Trigger Point 91, 353
- services
 - IMS examples 7–9
 - presence 139–40, 142–4
 - security 113–26
- Serving-Call Session Control Function (S-CSCF) 24–5, 100
 - 100 (Trying) response 347
 - access information 300
 - AS selection 93
 - assignment 59–61
 - authentication 273–8, 317–8
 - callee identity 335–6
 - charging-related information 385–7
 - CS users 94–5
 - de-registration 319–22
 - early IMS security 328–9
 - filter criteria 349–50, 352
 - IMS Voice Call Continuity 447
 - location information 300
 - media policy information 88–9
 - network-initiated re-authentication 317–8
 - network-initiated session release 389
 - NOTIFY requests 307–8, 309
 - P-Asserted-Identity header 335–6
 - PSI routing 418–20
 - reference points 34–5, 43
 - REGISTER requests 269–72

- registration 48–9, 255, 266–72, 255
- roaming 331
- routing 337–8, 341–4, 418–20
- SA establishment 282
- service-triggering information 89
- session initiation 50
- SUBSCRIBE requests 306–7
- user identities 52–6
- Serving GPRS Support Node (SGSN) 16, 19, 26, 32, 421
- session-based messaging 197–8
- Session Description Protocol (SDP)
 - CSCF 23
 - roaming 331
 - see also* SDP offer/answer model
- session establishment 181–3, 338–40, 373–4, 389–415
- Session Identity, IM 218
- Session in Progress response *see* 183
 - (Session in Progress) response
- Session Initiation Protocol (SIP) 6, 10–1
 - access security 121–5
 - authentication 273
 - charging arrangements 76
 - compression 102–5
 - conferencing 221
 - CSCF 23
 - dialogs 338
 - IP policy control 17
 - MESSAGE method 195, 186–7
 - messages 195, 187–8, 332
 - presence 139
 - PUBLISH method 192–3
 - reference points 33–46
 - registration 48–9, 255, 260–74
 - resource lists 156–9
 - roaming 331
 - routing 260–73
 - session establishment 373–4
 - SIP AS 27–8
 - Sip-Sec-Agree 289–94
 - transactions 340
 - transport protocols 259–60
 - UE 289–94, 390–1
 - see also* INVITE requests; SIP URI; SUBSCRIBE requests
- session mode messaging 203, 219–20
- sessions
 - charging arrangements 81–4
 - communication networks 15
 - emergency sessions 25–6, 102–3
 - establishment 181–3, 338–40, 373–4, 389–415
 - IMS example 331–423
 - initiation procedures 50–1
 - messaging 185–7
 - multimedia components 77
 - release 387–9
 - see also* Session Initiation Protocol
- SGSN *see* Serving GPRS Support Node
- SGW *see* Signalling Gateway
- Sh reference point 39
- Shared Group XDMS 168–70
- Shared List XDMS 168, 170
- Shared Policy XDMS 168, 170–1
- Shared Profile XDMS 168, 171
- shared secrets 278
- Si reference point 40–2
- Signalling Compression (SigComp) 103, 297–9
- Signalling Gateway (SGW) 29
- signalling PDP context establishment 257
- simultaneous PoC sessions 180–1
- SIP Security Mechanism Agreement (Sip-Sec-Agree) 289–94
- SIP *see* Session Initiation Protocol
- SIP Uniform Resource Identifier (SIP URI)
 - conferencing 221
 - IMS/CS connectivity 94
 - registration 250
 - roaming 250
 - user identities 51
- Sip-Sec-Agree *see* SIP Security Mechanism Agreement
- SLF *see* Subscription Locator Function
- s-line, SDP 367
- SMS 198–9
- Spec(T), trust domains 122–3
- SQN *see* sequence number
- SRs *see* Sender Reports
- SRV RRs *see* service records

- SS7 ISUP (Signalling System Number 7 ISDN User Part) 430
- standalone transactions 349
- state attribute, registration 310
- status, presence 139
- SUBSCRIBE requests
 - conferencing 228
 - group management 156–7
 - offline charging 76, 77
 - P-CSCF 305–9
 - presence 145–7
 - Push to talk over Cellular 189
 - registration 308–9
 - SIP 211
- Subscription Locator Function (SLF) 26–7, 342
- Subscription/Notification procedures 40
- Subscription-State header 309
- support functions, IMS 30
- Supported header 364

- Talk Burst Control Protocol (TBCP) 190–1
- talk bursts 179, 189–91
- TBCP *see* Talk Burst Control Protocol
- TCP *see* Transmission Control Protocol
- TD-CDMA *see* Time Division/Code Division Multiple Access
- tel URI *see* telephone Uniform Resource Identifier
- tel URL *see* telephone Uniform Resource Locator
- telephone event representation 368
- telephone networks 3–4
- telephone Uniform Resource Locator (tel URL) 51, 52, 55, 94, 105, 441–5
- Telephony Application Server (TAS) 234–5, 353
- temporary public user identity 54–6
- Terminating Identification Presentation (TIP) 173, 235, 244
- Terminating Identification Restriction (TIR) 173, 235, 244–5
- THIG *see* Topology Hiding Inter-network Gateway
- Third Generation Partnership Project (3GPP)
 - layered design 21–2
 - messaging 198–201
 - Release 4 10
 - Release 5 10–1, 21, 40, 62, 76, 80, 372
 - Release 6 10–1, 21–2, 40, 62, 68, 80, 119, 127
 - Release 7 12–3, 22, 62, 71–2, 97, 99, 100, 107, 113
 - Release 8 13, 22
 - Release 9 9
 - service development 21
 - XCAP 156–9
- third generation systems *see* 3G
- third-party registration 271–2
- tightly coupled conferences 221
- Time Division/Code Division Multiple Access (TD-CDMA) 9
- TISPAN 11–2, 96, 97
- t-line, SDP 367
- TLS *see* Transport Layer Security
- To header
 - caller/callee identities 333
 - IMS Voice Call Continuity 433
 - NOTIFY requests 309
 - REGISTER requests 262
 - SUBSCRIBE requests 306
 - third-party registration 272
- Topology Hiding Inter-network Gateway (THIG) 31
- traffic classes 67–9
- traffic control mechanism 61–75
- transactions, routing 338–40
- transit networks 96–7
- translation, addresses 127–8
- Transmission Control Protocol (TCP) 198, 259, 288
- transport protocols, SIP 259–60
- trigger points 89–90
- trust domains 122–3, 335
- Trying (100) response 347, 363, 364
- TU *see* transaction user
- tunnelling mechanisms 134–5

- UA *see* User Agent
- UAC *see* User Agent Client

- UAS *see* User Agent Server
- UDP *see* User Datagram Protocol
- UDVM *see* Universal Decompressor
Virtual Machine
- UE *see* User Equipment
- UICC *see* Universal Integrated Circuit
Card
- UMTS *see* Universal Mobile
Telecommunications System
- UMTS Terrestrial Radio Access Network
(UTRAN) 10
- Unauthorized response *see* 401
(Unauthorized) response
- Uniform Resource Identifier (URI)
 - conferencing 223, 224, 225–6
 - P-Asserted-Identity header 335–6
 - P-Called-Party ID header 336
 - public user identities 333
 - registration 301–16
 - request URI 336
 - resource lists 152, 153
 - see also* SIP(S) Uniform Resource
Identifier
- Uniform Resource Name (URN) 101–2
- unit reservation, online charging 79–80,
83
- Universal Integrated Circuit Card (UICC)
57, 114–5
- Universal Mobile Telecommunications
System (UMTS)
 - AKA 114, 115–6
 - IP connectivity 16
 - QoS 62, 63, 68–9
- Universal Subscriber Identity Module
(USIM) 57, 303
- unregistered users 60
- unsupported media types 382
- UPDATE requests 379–81, 385–6
- URI *see* Uniform Resource Identifier
- User Agent Server (UAS) 437
- User Data Answer (UDA) 440
- User Datagram Protocol (UDP) 259, 264,
288
- User Equipment (UE) 202
 - authentication 274–5
 - authorization 68–9
 - capability exchange 105–6
 - compression negotiation 297–9, 360–2
 - CSCF 23
 - early IMS security 327–8
 - GPRS 420–3
 - IP connectivity 16–7
 - P-CSCF discovery 58–9
 - P-Preferred Identity 333, 334
 - port setting 285–8
 - pre-reserved resources 390
 - QoS 17
 - re-authentication 282–4
 - registration 48–50, 253, 255
 - resource reservation 373
 - roaming 331
 - routing 338, 340–1, 344–8
 - S-CSCF 24–5
 - SDP offer/answer model 363
 - secure communications 18
 - session initiation 50–1
 - SIP 289–94, 390
 - standalone transactions 349
 - SUBSCRIBE requests 305–8
 - user identities 51–6, 302–3,
303–4
 - user-initiated de-registration 325–6
 - user-initiated re-registration 317
 - user-initiated session release 387–8
- user-plane
 - IM 217–8
 - PoC 189–92
- users
 - data handling procedures 35
 - identities 26, 49–50, 51–6, 272,
301–16
 - PoC access policy 164–5
 - presence 139–40
 - privacy 123
 - profiles 86–90
- USIM *see* Universal Subscriber Identity
Module
- Ut interface 125
- Ut reference point 46
- UTRAN *see* UMTS Terrestrial Radio
Access Network

- VCC *see* Voice Call Continuity
- Via header
 - branch parameter 340
 - comp parameter 298
 - IMS Voice Call Continuity 434, 448, 454
 - INVITE requests 344–5
 - REGISTER requests 261, 263, 264
 - routing information 340
 - UDP/TCP routing 288
- Visited Mobile Switching Centre (VMSC) 110, 429
- video streams, RTP/AVP 367–9
- video-sharing 105–7
- visited networks 21, 99–100
- v-line *see* protocol version line
- Voice Call Continuity 107–13
 - Applications Server (VCC-AS) 425–6, 447–9
 - call anchoring 429–46
 - Communication Continuity
 - Configuration Parameters 427–9
 - Domain Transfer Number 428
 - domain transfer procedure 111–2, 457–62, 465–8
 - Domain Transfer URI 428
 - example 425–69
 - functionality 108
 - initial call 429–57
 - related standards 468–9
 - session initiation and termination 108–11
 - supplementary services 113
 - video 463–5
 - voice over IP (VoIP) 107–8, 132
- watcher information event template
 - package (winfo) 147–9
- watchers, presence 143, 147–9
- WCDMA *see* Wideband Code Division Multiple Access
- web pages 151
- Wideband Code Division Multiple Access (WCDMA) 10
- winfo *see* watcher information event template package
- Wireless Local Area Network (WLAN) 6, 11, 22, 107–8, 111
- WLAN *see* Wireless Local Area Network
- worst case scenarios, media policing 382
- WWW-Authenticate header 277–8
- XCAP *see* XML Configuration Access Protocol
- XDM *see* XML Document Management
- XDMS *see* XML Document Management Server
- XML Configuration Access Protocol (XCAP) 153, 156–9
- XML Document Management (XDM) 153, 159–61
- XML Document Management Server (XDMS) 159–62, 165–8, 176, 185, 202
- XRES *see* expected result
- Za/b interfaces 118