

ANNA HAĆ

mobile telecommunications protocols

for data networks

 **WILEY**

Contents

Preface	ix
About the Author	xiii
1 Mobile Agent Platforms and Systems	1
1.1 Mobile Agent Platforms	1
1.1.1 Grasshopper	2
1.1.2 Aglets	2
1.1.3 Concordia	3
1.1.4 Voyager	3
1.1.5 Odyssey	3
1.2 Multiagent Systems	3
1.2.1 Agent-based load control strategies	5
1.3 Summary	9
Problems to Chapter 1	10
2 Mobile Agent-based Service Implementation, Middleware, and Configuration	11
2.1 Agent-based Service Implementation	11
2.2 Agent-based Middleware	17
2.3 Mobile Agent-based Service Configuration	23
2.4 Mobile Agent Implementation	28
2.5 Summary	29
Problems to Chapter 2	29
3 Wireless Local Area Networks	33
3.1 Virtual LANs	33
3.1.1 Workgroup management	35
3.1.2 Multicast groups	36
3.2 Wideband Wireless Local Access	37
3.2.1 Wideband wireless data access based on OFDM and dynamic packet assignment	37
3.2.2 Wireless services support in local multipoint distribution systems	39

3.2.3	Media Access Control (MAC) protocols for wideband wireless local access	41
3.2.4	IEEE 802.11	41
3.2.5	ETSI HIPERLAN	44
3.2.6	Dynamic slot assignment	46
3.3	Summary	50
	Problems to Chapter 3	51
4	Wireless Protocols	55
4.1	Wireless Protocol Requirements	56
4.2	MAC Protocol	56
4.3	Broadband Radio Access Integrated Network	58
4.4	Hybrid and Adaptive MAC Protocol	59
4.5	Adaptive Request Channel Multiple Access Protocol	60
4.6	Request/Acknowledgement Phase	61
4.7	Permission/Transmission Phase	62
4.8	Performance Analysis	65
4.9	Performance Measures	67
4.10	Summary	69
	Problems to Chapter 4	70
5	Protocols for Wireless Applications	73
5.1	Wireless Applications and Devices	73
5.2	Mobile Access	79
5.3	XML Protocol	80
5.4	Data Encapsulation and Evolvability	82
5.5	Wireless Application Protocol (WAP)	85
5.6	Summary	88
	Problems to Chapter 5	89
6	Network Architecture Supporting Wireless Applications	93
6.1	WAE Architecture	93
6.2	WTA Architecture	98
6.3	WAP Push Architecture	105
6.4	Summary	109
	Problems to Chapter 6	109
7	XML, RDF, and CC/PP	111
7.1	XML Document	111
7.2	Resource Description Framework (RDF)	114
7.3	CC/PP – User Side Framework for Content Negotiation	119
7.4	CC/PP Exchange Protocol based on the HTTP Extension Framework	129
7.5	Requirements for a CC/PP Framework, and the Architecture	132

7.6	Summary	135
	Problems to Chapter 7	135
8	Architecture of Wireless LANs	139
8.1	Radio Frequency Systems	140
8.2	Infrared Systems	141
8.3	Spread Spectrum Implementation	141
8.3.1	Direct sequence spread spectrum	141
8.3.2	Frequency hopping spread spectrum	142
8.3.3	WLAN industry standard	142
8.4	IEEE 802.11 WLAN Architecture	143
8.4.1	IEEE 802.11a and IEEE 802.11b	145
8.5	Bluetooth	146
8.5.1	Bluetooth architecture	147
8.5.2	Bluetooth applications	152
8.5.3	Bluetooth devices	154
8.6	Summary	157
	Problems to Chapter 8	158
9	Routing Protocols in Mobile and Wireless Networks	163
9.1	Table-driven Routing Protocols	164
9.1.1	Destination-sequenced distance-vector routing	164
9.1.2	The wireless routing protocol	166
9.1.3	Global state routing	166
9.1.4	Fisheye state routing	167
9.1.5	Hierarchical state routing	167
9.1.6	Zone-based hierarchical link state routing protocol	168
9.1.7	Cluster-head gateway switch routing protocol	168
9.2	On-demand Routing Protocols	169
9.2.1	Temporally ordered routing algorithm	169
9.2.2	Dynamic source routing protocol	171
9.2.3	Cluster-based routing protocol	173
9.2.4	<i>Ad hoc</i> on-demand distance-vector routing	174
9.2.5	Signal stability-based adaptive routing	175
9.2.6	Associativity-based routing	176
9.2.7	Optimized link state routing	177
9.2.8	Zone routing protocol	177
9.2.9	Virtual subnets protocol	178
9.3	Summary	179
	Problems to Chapter 9	179
10	Handoff in Mobile and Wireless Networks	181
10.1	Signaling Handoff Protocol in WATM Networks	184
10.2	Crossover Switch Discovery	185

10.3	Rerouting Methods	187
10.4	Optimized COS Discovery through Connection Grouping	188
10.5	Schedule-assisted Handoffs	189
10.6	Handoff in Low Earth Orbit (LEO) Satellite Networks	189
10.7	Predictive Reservation Policy	190
10.8	Chaining Approaches	191
	10.8.1 Hop-limited handoff scheme	191
	10.8.2 Chaining followed by make-break	191
10.9	Analysis of Chaining Handoff Approaches	193
10.10	Summary	194
	Problems to Chapter 10	194
11	Signaling Traffic in Wireless ATM Networks	197
11.1	A Model of WATM Network	197
11.2	Chain Routing Algorithm	199
11.3	Implementation of the Handoff Scheme	202
11.4	Analysis of the Chain Routing Algorithm	203
	11.4.1 Comparison of chain routing algorithm with hop-limited method	203
	11.4.2 Analysis of the signaling traffic cost	205
	11.4.3 Handoff latency	207
11.5	Summary	210
	Problems to Chapter 11	210
12	Two-phase Combined QoS-based Handoff Scheme	213
12.1	Wireless ATM Architecture	214
12.2	Mobility Support in Wireless ATM	217
12.3	Comparison of Rerouting Schemes	222
12.4	Maintaining the Cell Sequence During Path Optimization	224
12.5	Combined QoS-based Path Optimization Scheme	227
12.6	Summary	230
	Problems to Chapter 12	230
	References	233
	Index	239