

# Contents

- 1 On the Way to the Pervasive Web . . . . . 1**
  - 1.1 The Net, a Tool for Everyone . . . . . 1
  - 1.2 The Inexorable Transformation of Internet Applications . . . . . 3
  - 1.3 The Application’s Mutiny . . . . . 5
  - 1.4 Everything on the Move . . . . . 9
  - 1.5 New Interaction Paradigms Emerge . . . . . 10
  - 1.6 The Scent of Pervasive Applications. . . . . 12
  - 1.7 The Billion Dollar Question . . . . . 13
  - References . . . . . 14
  
- 2 The Network, As We Know It . . . . . 15**
  - 2.1 The Multiple Facets of Networks . . . . . 15
  - 2.2 Networks from the Eyes of an Ordinary User . . . . . 16
  - 2.3 Invite a Programmer to Understand What’s in the Cloud . . . . . 18
  - 2.4 A Network Engineer to Turn a Switch into a Router . . . . . 20
  - 2.5 The Computer Science of a Router. . . . . 23
  - 2.6 Simple Math to Stabilize the Net . . . . . 27
  - 2.7 Life of a Commuter . . . . . 33
  - 2.8 The Three Fundamental Principles . . . . . 35
  - References . . . . . 38
  
- 3 Six Problems for the Service Provider. . . . . 39**
  - 3.1 The Net has Ossified . . . . . 39
  - 3.2 Problem 1: Not Truly Ubiquitous . . . . . 42
  - 3.3 Problem 2: The Unresponsive Net . . . . . 44
  - 3.4 Problem 3: Too Much, Too Stale Signaling. . . . . 44
  - 3.5 Problem 4: Lack of Parallelism . . . . . 46
  - 3.6 Problem 5: Data Agnosticism . . . . . 48
  - 3.7 Problem 6: Inadequate Net-Search Engine. . . . . 49
  - 3.8 Concluding Remarks. . . . . 50
  - References . . . . . 50

<b>4</b>	<b>Spontaneous Networks</b>	51
4.1	The Gift of Ubiquity	51
4.2	Spontaneous Connectivity	53
4.3	The Hidden-Terminal Problem	54
4.4	The Exposed-Terminal Problem	55
4.5	Preventive Measures to Avoid Collision	55
4.6	Path Discovery in a Volatile Networks	58
4.7	The KISS Approach	59
	References	62
<b>5</b>	<b>Reactive Networks</b>	65
5.1	Why Networks on Demand?	65
5.2	A Traffic-Free Network	66
5.3	Our First Path	66
5.4	Path Management	69
5.5	Our Second Path	73
5.6	Global Synchronization	73
5.7	Error Management	75
5.8	Remarks on Reactive Networks	77
	References	77
<b>6</b>	<b>Proactive Networks</b>	79
6.1	From Reactive to Responsive	79
6.2	Keep the Network Ready	80
6.3	How do I Find My Multipoint Relay?	81
6.4	Life of an OLSR Node	82
6.5	The Node's Information Repository	84
6.6	Shortest Path over the MPR Sub-topology	84
6.7	A Complete Example	85
6.8	How Proactive Can You Be?	87
6.9	The Power of Hybrid Protocols	90
	References	93
<b>7</b>	<b>Content-Aware Networks</b>	95
7.1	Routers Should Read the Content	95
7.2	A Network on Top of the Physical Network	96
7.3	Centralized Assignment of Node Identifiers	99
7.4	Centralized Entry Point Discovery	99
7.5	Multiple Bootstrap Servers	102
7.6	Decentralized Assignment of Node Identifiers	104
7.7	Entry Point Discovery via Underlying Links	104
7.8	Content is an Asset at the Edges	107
	References	108

<b>8</b>	<b>Distribution-Efficient Networks</b>	111
8.1	Publishing Goes Beyond Bootstrapping.	111
8.2	The Two Flavors of Virtual Networking	112
8.3	Creating Unstructured Neighborhoods.	113
8.4	Making Yourself Known in Unstructured Neighborhoods	116
8.5	Unstructured Resource Publishing	117
8.6	Secure a Role in Structure Worlds	121
8.7	Build Strict Formations.	122
8.8	Place Links and Resources into a Structured Ring	126
8.9	Data-Awareness via Protocol-Agnosticism.	129
	References	130
<b>9</b>	<b>Discovering Virtual Resources</b>	133
9.1	Four Ways to Reach a Resource	133
9.2	Assessment of Discovery Mechanisms	134
9.3	Containing the Proliferation of Discovery Messages.	134
9.4	Blind Discovery for Unstructured Networks	135
9.5	Informed Discovery in Unstructured Networks	138
9.6	Discovery in Loosely-Structured Networks	139
9.7	Deterministic Discovery in Structured Networks	142
	References	144
<b>10</b>	<b>A Peek at the Future Internet.</b>	145
10.1	The Fourth Networking Principle: Beyond Mere Connectivity	145
10.2	Internet of Things: Sense and Influence Your Environment.	146
10.3	Small, Large Networks	147
10.4	Manage the Autonomics	150
10.5	Dependable Networks.	150
10.6	The Fine Line Between Freedom, Security and Privacy	151
10.7	Energy-Efficient Networks	152
10.8	No Matter What, the Network will Remain Generative.	153
	References	154
	<b>Index</b>	157

Networks for Pervasive Services  
Six Ways to Upgrade the Internet  
Liotta, A.; Exarchakos, G.  
2011, XVIII, 162 p., Hardcover  
ISBN: 978-94-007-1472-4