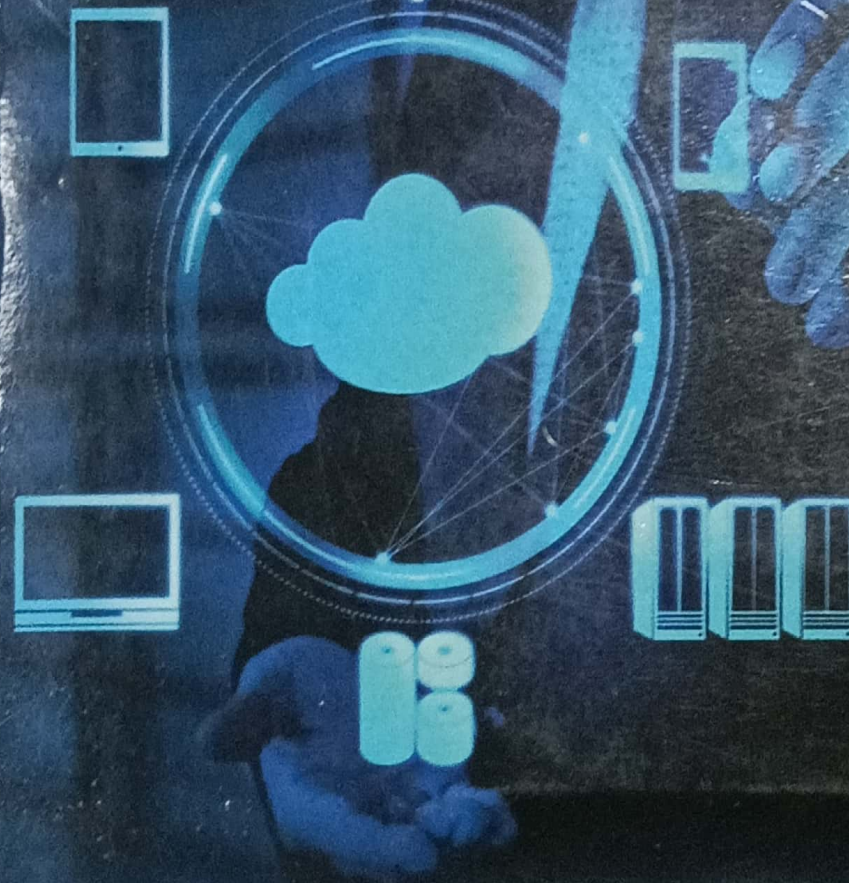


Second Edition


TECHSAR



Cloud Computing and Beyond

A Managerial Perspective

Sanjiva Shankar Dubey

82

1


dreamtech
PRESS

Distributed by:

WILEY

Contents

<i>Preface to the Second Edition</i>	vii
<i>Preface to the First Edition</i>	xi
<i>Acknowledgements</i>	xiii
1. Cloud Computing: What, Why, How, When.....	1
1.0 Introduction	1
1.1 What is Cloud Computing	3
1.2 Various Models of Cloud Computing	4
1.3 Evolution of Cloud Computing	5
1.4 Classification of Cloud based on Ownership	6
1.5 Managing Cloud Performance	8
1.6 Why Cloud Computing	10
1.7 Building Blocks of Cloud Computing	12
1.8 Challenges and Usage of Cloud	15
1.9 Preceding Technologies that have Helped Realising the Cloud Computing Dream	18
1.10 Virtualization Makes Cloud Computing Work	18
1.11 Critical Success Factors for Cloud Computing	22
1.12 Emerging Standards	22
1.13 Successful Examples of Cloud Implementations	24
<i>Summary</i>	24
<i>Review Questions</i>	25
<i>References and Further Reading</i>	26

2. Cloud Computing Architecture	27
2.0 Introduction	27
2.1 Architecture Defined	27
2.2 Cloud Architecture Essential Features	28
2.3 Layers of Cloud Architecture Implementation	30
2.4 Understanding Cloud Ecosystem	31
2.5 Cloud Architectural Components	34
2.6 Technology Landscape for Cloud Computing	37
2.7 IBM Smartcloud-Enterprise	37
2.8 Amazon Elastic Compute Cloud (EC2)	40
2.9 Microsoft Windows Azure	42
2.10 Google App Engine	43
2.11 Academic and Community Cloud Initiatives	43
2.12 Various Programming Languages and Tools Facilitating Cloud Platform	44
Summary	47
Review Questions	48
References and Further Reading	49
3. Underlying Technology for Cloud Computing	51
3.0 Introduction	51
3.1 Data Centre Virtualization	52
3.2 Network Virtualization	57
3.3 Cloud Service Management Technology	62
3.4 Cloud Business Management Technology	66
3.5 Cloud Access Technology	68
Summary	70
Review Questions	71
References and Further Reading	71

4. Cloud Business Models	73
4.0 Introduction	73
4.1 Cloud Computing is New IT	73
4.2 What is a Business Model?	75
4.3 Key Attributes for Cloud Computing Models	77
4.4 Cloud Business Potential	78
4.5 Understanding the Players in the Cloud Computing Arena	80
4.6 Cloud Computing Delivery Chain	81
4.7 Various Services in Cloud Implementation	82
4.9 Barriers to the Cloud Computing	87
4.11 Cloud Computing Complexities	90
4.12 Use of Cloud in Different Situations	90
4.13 Cloud Computing Cost Models	92
4.14 Cloud Based Pricing Model	93
4.15 Cloud Business Model for Independent Software Vendors	95
4.16 Cloud Commercial Terms	96
Summary	98
Review Questions	100
References and Further Reading	101
5. Adoption Planning for Cloud	103
5.0 Introduction	103
5.1 Stages of Cloud Adoption	103
5.3 Considerations for Adopting Cloud Model	108
5.4 Opportunities and Challenges of Cloud Adoption	113
Summary	115
Review Questions	116
References and Further Reading	116

6. Managing Cloud Computing Challenges	117
6.0 Introduction	117
6.1 Classes of Cloud Computing Challenges	118
6.2 Technological Challenges	119
6.3 Operational Challenges	121
6.4 Security, Data Privacy and Risk Management Challenges	124
6.5 Mitigating Cloud Computing Challenges	128
6.6 Process of Addressing Security and Implementation Cloud	131
6.7 Some Prominent Cloud Security Companies	133
<i>Summary</i>	136
<i>Review Questions</i>	137
<i>References and Further Reading</i>	137
7. Cloud Applications	139
7.0 Introduction	139
7.1 Major Applications Types	139
7.2 Applications Opportunities for SME Companies	147
7.3 Analytics on Cloud	148
7.4 Various Companies with the Products or Services in the Area of Cloud Computing	148
<i>Summary</i>	151
<i>Review Questions</i>	151
8. Cloud Computing: Emerging Standards and Governance Management	153
8.0 Introduction	153
8.1 Various Layers of Cloud Implementation and Corresponding Standards	154

8.2 Emerging Standards in Cloud Computing	154
8.3 Various Cloud Standard Development Organization (SDOs)	155
8.4 Cloud Governance: Best Practices and Recommendations	159
<i>Summary</i>	161
<i>Review Questions</i>	161
<i>References and Further Reading</i>	162
9. Green Cloud Computing	163
9.0 Introduction	163
9.1 IT Contribution Towards GHG Emission	165
9.2 Cloud Computing Also has Emission Challenges	166
9.3 Cloud Computing can Reduce GHG Emission	169
9.4 Green Cloud Computing Architecture	171
9.5 Green Initiatives by Cloud Service Providers	176
9.6 Is Green Cloud Infrastructure Profitable?	177
9.7 The Data Center Energy-efficient Network-aware Scheduling (DENS) Methodology	179
<i>Summary</i>	180
<i>Review Questions</i>	182
<i>References and Further Reading</i>	182
10. Cloud Data Security Management	183
10.0 Introduction	183
10.1 Cloud Computing Security Defined	184
10.2 Risks and Security Concerns of Cloud	185

10.3	Cloud Security Features Depend on Cloud Services Class	188
10.4	Cloud Computing does Offer Better Security	189
10.5	Security Design Principles for Cloud Computing	190
10.6	Managing Data Remanence	192
10.7	Industry Security Standards for Cloud Based Infrastructure	193
10.8	Cloud Security Concerns and Mitigation Strategies	194
10.9	Steps to Ensure Cloud Security	195
	<i>Summary</i>	200
	<i>Review Questions</i>	200
	<i>References and Further Reading</i>	201
11.	Beyond Cloud Computing	203
11.0	Introduction	203
11.1	Reconfigurable Computing	203
11.2	Massively Parallel Computing	205
11.3	Distributed Computing	208
11.4	Grid Computing	211
11.5	Mobile Computing	211
11.6	Ubiquitous Computing (Pervasive Computing)	213
11.7	Autonomic Computing	214
11.8	Wearable Computers	214
	<i>Summary</i>	217
	<i>Review Questions</i>	217
	<i>References and Further Reading</i>	218
12.	Cloud Opportunities: Business and Career	219
12.0	Introduction	219
12.1	Cloud Computing Market Opportunities	219
12.2	Understanding the Cloud Computing Market	220

12.3	Cloud Opportunities on Services or Product Continuum	222
12.4	Cloud Opportunities Around Customer/Industry Focus	226
12.5	Opportunities for Software Vendors	233
12.6	Opportunities for IT Services Companies	234
12.7	Opportunities for IT Professionals for Cloud Computing Job	235
	<i>Summary</i>	238
	<i>Review Questions</i>	238
	<i>References and Further Reading</i>	240
13.	Book Summary	241
	Appendices	249
A.	Case: Traffic Management using Cloud Computing	251
B.	Case: Smart Homes using Cloud Computing	253
C.	Cloud Readiness Assessment Questionnaire	256
D.	Cloud Computing Opportunities for Indian IT Services Companies	261
E.	Multiple-Choice Questions (MCQ)	268
	Placement Interview Questions (PIQ)	271
	MCQ Answers	272
	Index	273