Contents

1	Cloud	ая Детукинеа	I
	1.1		2
	1.2	IaaS to HaaS	3
	1.3	The Cloud as a Way to Do Business	5
	1.4	Public, Hybrid and Private Cloud	7
	1.5	On-Premises vs. Off-Premises	8
	1.6	SAP NetWeaver in the Cloud	9
	1.7	History of the Cloud	9
	1.8	SAP's Cloud Strategy	0
	1.9	What White Papers Won't Tell You	1
		1.9.1 Data Security Against Eavesdropping	1
		1.9.2 Data Security Against Loss	2
		1.9.3 Performance	2
		1.9.4 Availability	3
		1.9.5 Future	3
		1.9.6 Complexity	3
		1.9.7 Legal Requirements	4
		1.9.8 Fallback Solution	5
	1.10	How Networking Changes	5
	1.11	Summary	6
2	From	n R/3 to S/4HANA	9
	2.1	SAP Business Suite	3
		2.1.1 SAP ERP/SAP ECC	3
		2.1.2 SAP CRM	5
		2.1.3 SAP SCM	7
		2.1.4 SAP SRM	8
		2.1.5 SAP PLM	9
		2.1.6 SAP CPM	9
		2.1.7 SAP GRC	0
			0
	2.2	SAP NetWeaver	
		2.2.1 SAP NetWeaver BW	
			2

xiii

		2.2.3	SAP Knowledge Warehouse	33
		2.2.4	SAP Mobile Platform	34
		2.2.5	SAP NetWeaver Master Data Management and	
			Governance	35
		2.2.6	SAP NetWeaver Process Orchestration	35
	2.3		ss Objects	36
	2.4	SAP S	olutions for Small and Medium Businesses	36
		2.4.1	SAP All-in-One	36
		2.4.2	SAP Business One	36
		2.4.3	SAP Business ByDesign	37
	2.5	SAP A	ppliances	37
		2.5.1	Duet and Alloy	38
		2.5.2	SAP High Performance Analytical Appliance	39
	2.6	Summa	ary	47
3	Serv	ice Leve	ls for SAP on Cloud	49
	3.1		vice Management Reference Model	51
	3.2		E Level Management	52
	3.3		mance Management	53
	٥.5	3.3.1	Response Time	53
	3.4		of Measure for SAP Applications	56
	J. 4	3.4.1	Predicting the System Load	57
		3.4.2	Can SAP Performance Be Guaranteed at All?	61
		3.4.3	Measurement Based Sizing	62
		3.4.4	SAPS-Meter	64
	3.5		Profiles	67
	5.5	3.5.1	Load Profiles of Transactional Solutions	68
		3.5.2	Load Profiles of Analytical Systems	69
		3.5.3	Load Profiles of Other SAP-Solutions	70
	3.6		bility Management	71
	5.0	3.6.1	How to Define Availability?	71
		3.6.2	How Many Resources Are Needed in Case of a	/ 1
		3.0.2	· · · · · · · · · · · · · · · · · · ·	72
		3.6.3	Disaster?	73
	27		How Much Stability Is Required?	
	3.7	Summa	ary	73
4	Secu	ring SAl	P on the Cloud	75
	4.1	The Cy	ber Security Threat Landscape	75
	4.2	Threats	s and Vulnerabilities	79
	4.3	Legal a	and Regulatory Aspects	81
	4.4	The Th	reat Centric Security Model	82
		4.4.1	Stage: Before, During, and After	82
		4.4.2	Environment: Network, Endpoint, Mobile, Virtual,	
			and Cloud	85
		4.4.3	Scope: Point-in-Time and Continuous	86

Contents xv

	4.5	Coourit	v Arabitaatura	87
	4.5	4.5.1	y Architecture	88
		4.5.2	Campus Zone	96
		4.5.3	Mobile Zone	96
		4.5.4	Data Center Zone	97
		4.5.5	Cloud Provider Zone	104
		4.5.6	Hybrid Cloud	107
	4.6		ing the Application Environment	113
	4.0	4.6.1	Hardening Red Hat Linux as a Guest Operating	
		4 6 0	System	113
		4.6.2	Hardening Microsoft Windows as a Guest Operating	
			System	114
		4.6.3	Hardening the Hypervisors	118
		4.6.4	SAP on Private Cloud: A Practical Example	118
	4.7	Summa	ary	119
5	Chan	ge and	Configuration Management	121
	5.1		ection to Change and Configuration Management	122
		5.1.1	Elements of the CCMS	122
	5.2	Manag	ing SAP Business Changes	124
		5.2.1	Change Management Drives the Business and IT	
			Lifecycle	125
		5.2.2	IT and Business Accountability and Alignment	125
	5.3	Manag	ing Technology Changes	125
		5.3.1	Understand the Configuration Management Process	126
		5.3.2	Manage Service Templates and Profiles	127
		5.3.3	Technical Sandbox	128
		5.3.4	Review the SAP Technology Stack and Tools	129
	5.4	Manag	ing Organizational Change	130
		5.4.1	SAP Service Operations Problem Areas	131
		5.4.2	Minimize Human Involvement	133
		5.4.3	Optimize Organizational Change Processes	134
		5.4.4	Plan for SAP Staffing Backup Before Disaster	
			Strikes	134
		5.4.5	Leverage Help Desk and Operations Support Teams	135
		5.4.6	Thoughtfully Outsource and Augment	136
		5.4.7	Mitigate Risk by Open Exchange of Real Life	
			Experience	136
		5.4.8	Increase IT's Process Discipline	137
	5.5	Summa	ary	138
6	SAP	and the	Internet of Things	139
	6.1		Internet of Things Already Here?: Some Real Life	
			oles	140
		6.1.1	Monitoring	140

xvi Contents

		6.1.2 Control	141
			141
		1	142
	6.2		142
	0.2	6.2.1 The Internet of Things is an Intra-technological	172
		\mathcal{E}	143
	6.3	•	143 144
	0.5		1 44 145
			145 146
		, , ,	146 146
		$\boldsymbol{\mathcal{E}}$	146 146
			146 146
	6.4		140 147
	0.4		147 148
	6.5		148
	6.6		140 151
			131
7	The	-	153
	7.1		154
	7.2		155
	7.3		156
		•	157
			158
	7.4		160
	7.5		161
		7.5.1 How to Adopt Hybrid Cloud?	162
	7.6	Conclusion	164
8	CAD	Solutions on Public Clouds	165
U	8.1		166
	0.1		167
			169
	8.2		170
	8.3	4.4	173
	0.5		174
			174
		8.3.3 Network: AWS Virtual Private Cloud and AWS Direct	1 / 7
			175
		8.3.4 Backup/Restore of SAP Applications on EC2	173
		• • • •	175
			175 176
		2	170
		e	177 177
		0.5.1 AWS SCIVICE LEVELS TOF SAP	1//

Contents xvii

	8.4	Microso	oft Azure Public Cloud for SAP	177
	8.5		oud Appliance Library (CAL)	178
	8.6		oject Monsoon	179
	8.7		ry	182
9	Duivo	to Cloud	d Infrastructures for SAP	185
,	9.1		andscapes	186
	9.1	9.1.1	SAP System Architecture	187
		9.1.1	Two-Tier Versus Three-Tier	188
	9.2		Architectures	189
	9.2	9.2.1	Multi-core and Multi-threading	190
		9.2.1	Inter Core Communication and Access to Main	170
		7.2.2	Memory	192
		9.2.3	Scale-Up Versus Scale-Out	194
		9.2.4	Rack Mount Versus Blade	196
		9.2.5	Memory: Fast but Volatile	196
	9.3		:: Hard and Other Disks	197
	7.5	9.3.1	Sizing for Throughput	198
		9.3.2	The Disk Is Dead: But Is SSD Already King?	200
	9.4		k	201
		9.4.1	User Network	201
		9.4.2	Server Network	202
		9.4.3	Storage Network	203
		9.4.4	Fibre Channel Over Ethernet	204
		9.4.5	iSCSI	205
	9.5		Computing	207
		9.5.1	Converged Network Adapters	208
		9.5.2	Port Extenders	209
		9.5.3	Fabric Extender	209
		9.5.4	Fabric Interconnects	209
		9.5.5	Unification and Virtualization	210
		9.5.6	Software-Based Fabric Extender	211
		9.5.7	Hardware-Based Fabric Extender	211
	9.6	Summa	ary	212
10	State	less Con	nputing	215
_	10.1		Profile Definition	218
		10.1.1	Unified Computing and VMware's vCenter	220
	10.2		Operation with Stateless Computing	22
		10.2.1	ID Pools	222
		10.2.2	Server Pools	223
		10.2.3	Application Centric Infrastructure	224
		10.2.4	Administrative Organization for SAP on Cloud	227
		-	$\boldsymbol{\varepsilon}$	

xviii Contents

	10.3		Data Center Facilities	228
		10.3.1	How Green Can Clouds Be?	229
	10.4	Summa	ry	231
11	Econ	omic and	d Legal Aspects of Cloud Computing	233
	11.1	Try and	l Error: Fast and Cheap	234
		11.1.1	Economic Risks and Other Considerations	234
		11.1.2	Legal Implications	235
	11.2	Econon	nic Myths, Realities, and Other Observations	235
		11.2.1	Innovative Cloud Platforms Do Not Necessarily	
			Cost Less	235
		11.2.2	Volume Discounts Rarely Drive Economies	
			of Scale	236
		11.2.3	The Cloud May Not Yield Greener IT for	
			Some Time	237
		11.2.4	Cloud Software Licensing Models Remain	
			Unchanged	237
		11.2.5	CapEx Versus OpEx May Myths	238
	11.3	Busines	ss Economics of the Cloud for SAP	238
		11.3.1	Macroeconomics and Other Market Drivers	239
		11.3.2	Business Risks, Functionality, Data Sensitivity,	
			and Role	240
		11.3.3	Developing Cloud Business Cases for SAP	241
	11.4	Techno	logy Economics and Considerations	242
		11.4.1	Demand, Supply, and the Buying Hierarchy	242
		11.4.2	Technology Attributes and Challenges	243
		11.4.3	Public Cloud Opportunities and Challenges	243
		11.4.4	Private Cloud Opportunities and Challenges	244
		11.4.5	Hybrid Cloud Opportunities and Challenges	244
	11.5	Organiz	zational Economics and Considerations	245
		11.5.1	The Business End-User Community	245
		11.5.2	Reinventing the Internal SAP IT Organization	245
		11.5.3	Organizational Process Discipline or Hardening	246
		11.5.4	Cloud Service Providers and Hosters	246
		11.5.5	Evaluating Organizational Readiness for Change	247
		11.5.6	An Effective Model for SAP IT Organizational	
		-	Change	247
		11.5.7	Organizational Skills and Staffing	249
	11.6		gal Landscape for SAP Cloud Computing	249
		11.6.1	Governance, Risk, Compliance, and Geographic	•
			Constraints	249
		11.6.2	Internal GRC Considerations	250

Contents xix

		Data and Security Considerations	
	11.6.5	Developing a Legally-Informed Cloud Economics	
		Plan	252
11.7	Summa	iry	253
About the	Authors	s 2	255
Index			259