

Contents

1	Introduction	1
	Theo Dimitrakos	
1.1	Motivation	1
1.2	The BEinGRID Project	4
1.2.1	The BEinGRID Matrix	5
1.3	Common Capabilities for SOI and Cloud Services	8
1.3.1	Life-Cycle Management of Virtual Organizations	9
1.3.2	Federated Identity and Access Management	11
1.3.3	Common Capabilities for Managing Software Licenses	17
1.3.4	Common Capabilities for Managing Service Level Agreements	18
1.3.5	Common Capabilities for Data Management	22
1.3.6	Common Capabilities for Data and Service Portals	23
1.4	An Example that Brings it all Together	25
1.5	About the Contents and Structure of this Book	28
	References	30
2	Approach Towards Technical Innovations for Service Oriented Infrastructures and Clouds	33
	Theo Dimitrakos, Angelo Gaeta, and Craig Thomson	
2.1	Introduction	33
2.2	High-Level Objectives	34
2.3	The Innovation Delivery Process	36
2.3.1	Elicitation of Common Technical Requirements	39
2.3.2	Thematic Areas	40
2.3.3	Prioritisation of Common Technical Requirements	43
2.3.4	Common Capabilities and Design Patterns	44
2.3.5	Generic Components: Reference Implementations of Common Capabilities	46
	References	47

3	Management of Virtual Organizations	49
	Nicola Capuano, Angelo Gaeta, Matteo Gaeta, Francesco Orciuoli, David Brossard, and Alex Gusmini	
3.1	Introduction	49
3.2	The Main Challenges	50
3.3	Technical Requirements	52
3.3.1	Secure Federation	52
3.3.2	Separation of Infrastructure Management Capabilities from Application Specific Ones	53
3.3.3	Automatic Resource and Service Discovery	53
3.4	Common Capabilities	53
3.4.1	VO Set Up	54
3.4.2	Creation of Instances in Service Oriented Distributed Infrastructures	56
3.4.3	Application Virtualization	58
3.4.4	Automatic Resource/Service Discovery	61
3.5	A Sample Scenario and Integrated View of the Components	63
3.5.1	VO Identification & Formation	65
3.5.2	VO Creation	67
3.5.3	VO Operation and Evolution	67
3.5.4	VO Dissolution	68
3.6	Lessons Learnt	68
3.7	Business Benefits	70
3.8	Conclusion	71
	References	72
4	Aspects of General Security & Trust	75
	David Brossard, Theo Dimitrakos, Angelo Gaeta, and Stéphane Mouton	
4.1	Introduction	75
4.2	The Overall Challenge	78
4.3	Business Motivation	80
4.4	Technical Requirements	81
4.4.1	Primary Security Requirements	82
4.4.2	Distributed Systems Security	83
4.4.3	Adaptive Enforcement	84
4.4.4	Data Protection & Infrastructure Security	84
4.4.5	SOA Security Governance	85
4.5	Common Capabilities	85
4.5.1	Overview	85
4.5.2	Identity Brokerage & Secure Federation Management	86
4.5.3	Access Control & Authorization	90
4.5.4	Secure Messaging Gateway	94
4.5.5	Security Observer	96
4.5.6	The SOI Governance Gateway (SOI-GGW)	98
4.6	Conclusion	100
	References	102

5 Management for Service Level Agreements 103
Igor Rosenberg, Antonio Conguista, and Roland Kuebert

5.1 The Overall Challenge 103

5.2 Technical Requirements 104

5.2.1 SLA Negotiation 105

5.2.2 SLA Optimisation of Resource Selection 106

5.2.3 SLA Evaluation 107

5.2.4 SLA Accounting 109

5.3 Common Capabilities 110

5.3.1 SLA Negotiation Capability 111

5.3.2 SLA Optimisation Capability 114

5.3.3 SLA Evaluation and Monitoring 116

5.4 Motivation 118

5.5 Conclusion 119

5.5.1 Lessons Learned 120

5.5.2 Recommendations 122

References 123

6 License Management 125
Christian Simmendinger, Yona Raekow, Ottmar Krämer-Fuhrmann, and
Domenic Jenz

6.1 Introduction 125

6.2 The Overall Challenge 125

6.3 Technical Requirements 126

6.3.1 Gridification of Currently Used License Management
Systems 126

6.3.2 Limited License Service Provider (LSP) Capability 127

6.4 Common Capabilities 128

6.4.1 LM Authorization 129

6.4.2 Extension of Job Description and Submission 132

6.4.3 Resource Management Extension 133

6.4.4 Encapsulation of License Server 134

6.4.5 Accounting and Billing 135

6.4.6 LM Monitor 136

6.5 Conclusion 137

6.5.1 Lessons Learnt 137

6.5.2 Recommendations 138

References 138

7 Data Management 141
Craig Thomson, Kostas Kavoussanakis, Mark Sawyer, George Beckett,
Michal Piotrowski, Mark Parsons, and Arthur Trew

7.1 Introduction 141

7.2 The Overall Challenge 142

7.3 Technical Requirements 143

7.3.1	Accessing Data from Different Locations	144
7.3.2	Accessing Heterogeneous Data	145
7.3.3	Respond to Changes of Data in a Database	146
7.4	Common Capabilities	147
7.4.1	Access to Remote Data Sources	147
7.4.2	Homogenise Data Sources	150
7.4.3	Synchronise Multiple Data Sources	152
7.5	Conclusion	156
7.5.1	Recommendations	156
	References	157
8	Portals for Service Oriented Infrastructures	159
	Efstathios Karanastasis, Theodora Varvarigou, and Piotr Grabowski	
8.1	Introduction	159
8.2	The Overall Challenge	160
8.3	Common Capabilities and Technical Requirements	161
8.3.1	User Management	162
8.3.2	Portals Security	165
8.3.3	File Management	169
8.3.4	Job Submission Monitoring and Control	172
8.4	Conclusion	176
	References	177
9	Bringing it all Together	179
	Angelo Gaeta, Theo Dimitrakos, David Brossard, Robert Piotter, Horst Schwichtenberg, André Gemünd, Efstathios Karanastasis, Igor Rosenberg, Ana Maria Juan Ferrer, and Craig Thomson	
9.1	Business Benefits and Innovations per Thematic Area	179
9.1.1	VO Management	179
9.1.2	SLA Management	181
9.1.3	License Management	183
9.1.4	Data Management	184
9.1.5	Security	185
9.1.6	Portals	188
9.2	Analysis of Technical Requirements	189
9.3	Overview of Common Technical Capabilities	192
9.4	Integration Scenarios	195
9.4.1	The Federated ASP Scenario	195
9.4.2	The Collaborative Engineering Scenario	203
	References	209