
Contents

Preface	ix
Chapter 1. Introduction to Project Management	1
1.1. Introduction.	1
1.2. Project management.	2
1.3. Project management methods and tools	3
1.3.1. Gantt diagram	5
1.3.2. RACI (Responsible, Accountable, Consulted, Informed) matrix	5
1.3.3. The concept of specifications.	6
1.4. Chapter summary	8
Chapter 2. Simulating Network Architectures with GNS3	9
2.1. Introduction.	9
2.2. Definition	10
2.3. Introduction to GNS3	11
2.3.1. Functionalities of GNS3.	12
2.3.2. Limitations.	12
2.3.3. GNS3 installation	12
2.3.4. Getting started with GNS3	13
2.4. Chapter summary	25
Chapter 3. Green IT	27
3.1. Introduction.	27
3.2. Introduction of concept	28
3.3. Green IT trigger factors.	29
3.4. Benefits of Green IT	29
3.5. The lifecycle of ICTs	30

3.6. Mechanisms and technical solutions for the implementation of a Green IT infrastructure	31
3.7. Green IT labels and standards	33
3.8. Some examples of Eco-ICTs.	34
3.9. Chapter summary	36
Chapter 4. Design of Network Infrastructures	37
4.1. Introduction.	37
4.2. The founding principles of networks	38
4.2.1. Definition and preliminaries	38
4.2.2. Classification of digital data networks	39
4.2.3. Components of a network	40
4.2.4. Measuring network performance.	45
4.2.5. Concepts of collision domain/broadcast domain and VLANs.	47
4.3. Methods and models of IT network design	48
4.3.1. Principles of structured engineering	48
4.4. Assessment of needs and choice of equipment	54
4.5. Chapter summary	56
Chapter 5. Network Services	57
5.1. Introduction.	57
5.2. DHCP service	58
5.2.1. Introduction	58
5.2.2. Operating principle	58
5.2.3. Renewal of lease	62
5.2.4. The concept of a DHCP relay.	62
5.3. DNS service	63
5.3.1. Introduction	63
5.3.2. Operating principle	63
5.4. LDAP service	66
5.4.1. Introduction	66
5.4.2. LDAP protocol	67
5.4.3. LDAP directory	68
5.5. E-mail service	70
5.5.1. Introduction	70
5.5.2. Architecture and operating principle.	71
5.5.3. Protocols involved	72
5.6. Web server	73
5.6.1. Introduction	73
5.6.2. Operating principle	73
5.6.3. The principle of virtual hosting.	74

5.7. FTP file transfer service	76
5.7.1. Definition	76
5.7.2. Operating principle	77
5.7.3. Types	77
5.8. Chapter summary	78
Chapter 6. System and Network Security	79
6.1. Introduction.	79
6.2. Definitions, challenges and basic concepts	80
6.3. Threats/attacks	82
6.3.1. Access attacks	82
6.3.2. Modification attacks	83
6.3.3. Saturation attacks	83
6.3.4. Repudiation attacks.	83
6.4. Security mechanisms	83
6.4.1. Encryption tools.	84
6.4.2. Antivirus programs	84
6.4.3. Firewalls/IDS and IPS	84
6.4.4. VPNs	86
6.4.5. Other means of security	89
6.5. Security management systems: norms and security policies	91
6.5.1. Norms.	91
6.5.2. The idea of security policy	92
6.6. Chapter summary	93
Chapter 7. Virtualization and Cloud Computing	95
7.1. Introduction.	95
7.2. Virtualization.	96
7.2.1. Definition	96
7.2.2. Benefits of virtualization	96
7.2.3. Areas of application	97
7.2.4. Categories of virtualization	100
7.2.5. Limits of virtualization.	103
7.3. Cloud computing	103
7.3.1. Definitions	103
7.3.2. Leverage factors and generic principles.	104
7.3.3. Architecture models	104
7.3.4. Types of cloud.	107
7.3.5. Areas of application	109
7.3.6. Advantages and limitations	110
7.4. Chapter summary	111

Chapter 8. Quality of Service and High Availability	113
8.1. Introduction.	113
8.2. Quality of service	114
8.2.1. Motivation	114
8.2.2. Definition(s)	115
8.2.3. Objectives of QoS	116
8.2.4. Metrics of QoS	117
8.2.5. General principles of QoS.	118
8.2.6. QoS mechanisms	120
8.3. High availability	141
8.3.1. Redundancy in the physical layer	143
8.3.2. Redundancy in the data link layer	143
8.3.3. Redundancy in the network layer	149
8.3.4. Redundancy in the application layer.	154
8.4. Chapter summary	156
Chapter 9. Monitoring Systems and Networks	157
9.1. Introduction.	157
9.2. Main concepts of network and service supervision	158
9.2.1. Definition	158
9.2.2. Challenges of monitoring	158
9.2.3. Typology	159
9.3. Monitoring protocols	161
9.3.1. SNMP protocol (Simple Network Management Protocol).	161
9.3.2. WMI (Windows Management Instrumentation)	164
9.3.3. WS-Management (Web Services for Management).	164
9.3.4. IPMI (Intelligent Platform Management Interface)	164
9.3.5. NetFlow/IPFIX	165
9.3.6. Netconf.	165
9.4. Monitoring tools	165
9.4.1. Commercial monitoring solutions (HP OpenView, Tivoli) and software publisher solutions.	166
9.4.2. Free monitoring solutions	167
9.5. Chapter summary	171
References	173
Index	179