

Contents

1	Introduction	1
1.1	What's So Special About Digital Things?	2
1.2	Terminology	5
1.3	Summary	5
2	The Really Foolproof Solution for Digital Preservation	7
 Part I Theory – The Concepts and Techniques Which Are Essential for Preserving Digitally Encoded Information		
3	Introduction to OAIS Concepts and Terminology	13
3.1	Preserve What, for How Long and for Whom?	13
3.2	What “Metadata”, How Much “Metadata”?	16
3.3	Recursion – A Pervasive Concept	26
3.4	Disincentives Against Digital Preservation	28
3.5	Summary	30
4	Types of Digital Objects	31
4.1	Simple vs. Composite	31
4.2	Rendered vs. Non-rendered	33
4.3	Static vs. Dynamic	38
4.4	Active vs. Passive	38
4.5	Multiple-Classifications	39
4.6	Summary	39
5	Threats to Digital Preservation and Possible Solutions	41
5.1	What Can Be Relied on in the Long-Term?	43
5.2	What Others Think About Major Threats to Digital Preservation	44
5.3	Summary	45
6	OAIS in More Depth	47
6.1	OAIS Conformance	49
6.2	OAIS Mandatory Responsibilities	50
6.3	OAIS Information Model	53
6.4	OAIS Functional Model	63

6.5	Information Flows and Layering	65
6.6	Issues Not Covered in Detail by OAIS	65
6.7	Summary	67
7	Understanding a Digital Object: Basic Representation	
	Information	69
	Co-author Stephen Rankin	
7.1	Levels of Application of Representation	
	Information Concept	69
7.2	Overview of Techniques for Describing Digital Objects	71
7.3	Structure Representation Information	75
7.4	Format Identification	96
7.5	Semantic Representation Information	97
7.6	Other Representation Information	101
7.7	Application to Types of Digital Objects	102
7.8	Virtualisation	112
7.9	Emulation	123
7.10	Summary	137
8	Preservation of Intelligibility of Digital Objects	139
	Co-authors Yannis Tzitzikas, Yannis Marketakis, and Vassilis Christophides	
8.1	On Digital Objects and Dependencies	139
8.2	A Formal Model for the Intelligibility of Digital Objects	142
8.3	Modelling and Implementation Frameworks	163
8.4	Summary	166
9	Understandability and Usability of Data	167
9.1	Re-Use of Digital Objects – Interoperability and Preservation	168
9.2	Use of Existing Software	171
9.3	Creation of New Software	173
9.4	Without Software	173
9.5	Software as the Digital Object Being Preserved	174
9.6	Digital Archaeology, Digital Forensics and Re-Use	174
9.7	Multiple Objects	175
9.8	Summary	175
10	In Addition to Understanding It – What Is It?: Preservation	
	Description Information	177
10.1	Introduction	177
10.2	Fixity Information	177
10.3	Reference Information	178
10.4	Context Information	184
10.5	Provenance Information	184
10.6	Access Rights Management	185
10.7	Summary	190

11	Linking Data and “Metadata”: Packaging	191
11.1	Information Packaging Overview	191
11.2	Archival Information Packaging	192
11.3	XFDU	193
11.4	Summary	196
12	Basic Preservation Strategies	197
12.1	Description – Adding Representation Information	198
12.2	Maintaining Access	198
12.3	Migration/Transformation	200
12.4	Summary	202
13	Authenticity	203
13.1	Background to Authenticity	204
13.2	OAIS Definition of Authenticity	205
13.3	Elements of the Authenticity Conceptual Model	208
13.4	Overall Authenticity Model	212
13.5	Authenticity Evidence	214
13.6	Significant Properties	214
13.7	Prototype Authenticity Evidence Capture Tool	221
13.8	Summary	232
14	Advanced Preservation Analysis	233
	Co-author Esther Conway	
14.1	Preliminary Investigation of Data Holdings	234
14.2	Stakeholder and Archive Analysis	235
14.3	Defining a Preservation Objective	237
14.4	Defining a Designated User Community	238
14.5	Preservation Information Flows	240
14.6	Preservation Strategy Topics	243
14.7	Preservation Plans	245
14.8	Cost/Benefit/Risk Analysis	245
14.9	Preservation Analysis Summary	246
14.10	Preservation Analysis and Representation Information in More Detail	246
14.11	Network Modelling Approach	247
14.12	Summary	264
Part II	Practice – Use and Validation of the Tools and Techniques that Can Be Used for Preserving Digitally Encoded Information	
15	Testing Claims About Digital Preservation	267
15.1	“Accelerated Lifetime” Testing of Digital Preservation Techniques	267
15.2	Summary	269

16	Tools for Countering the Threats to Digital Preservation	271
16.1	Key Preservation Components and Infrastructure	272
16.2	Discipline Independent Aspects	276
16.3	Discipline Dependence: Toolboxes/Libraries	284
16.4	Key Infrastructure Components	284
16.5	Information Package Management	285
16.6	Information Access	287
16.7	Designated Community, Knowledge and Provenance Management	287
16.8	Communication Management	288
16.9	Security Management	289
17	The CASPAR Key Components Implementation	291
17.1	Design Considerations	291
17.2	Registry/Repository of Representation Information Details . . .	291
17.3	Virtualizer	297
17.4	Knowledge Gap Manager	301
17.5	Preservation Orchestration Manager	303
17.6	Preservation DataStores	305
17.7	Data Access and Security	315
17.8	Digital Rights Management Details	318
17.9	Find – Finding Manager	321
17.10	Information Packaging Details	322
17.11	Authenticity Manager Toolkit	332
17.12	Representation Information Toolkit	333
17.13	Key Components – Summary	335
17.14	Integrated tools	337
18	Overview of the Testbeds	341
18.1	Typical Preservation Scenarios	341
18.2	Generic Criteria and Method to Organise and to Evaluate the Testbeds	342
18.3	Cross References Between Scenarios and Changes	343
19	STFC Science Testbed	345
19.1	Dataset Selection	345
19.2	Challenges Addressed	345
19.3	Preservation Aims	347
19.4	Preservation Analysis	347
19.5	MST RADAR Scenarios	347
19.6	Ionosonde Data and the WDC Scenarios	361
19.7	Summary of Testbed Checks	366
20	European Space Agency Testbed	367
20.1	Dataset Selection	369
20.2	Challenge Addressed	370
20.3	Preservation Aim	372

20.4	Preservation Analysis	372
20.5	Scenario ESA1 – Operating System Change	372
20.6	Additional Workflow Scenarios	384
20.7	Conclusions	386
21	Cultural Heritage Testbed	387
21.1	Dataset Selection	388
21.2	Challenges Addressed	396
21.3	Preservation Aim	396
21.4	Preservation Analysis	396
21.5	Scenario UNESCO1: Villa LIVIA	397
21.6	Related Documentation	406
21.7	Other Misc Data with a Brief Description	406
21.8	Glossary	406
22	Contemporary Performing Arts Testbed	407
22.1	Historical Introduction to the Issue	407
22.2	An Insight into Objects	409
22.3	Challenges of Preservation	411
22.4	Preserving the Real-Time Processes	412
22.5	Interactive Multimedia Performance	419
22.6	CIANT Testbed	426
22.7	Summary	428
Part III	Is Money Well Spent? Cutting the Cost and Making Sure Money Is Not Wasted	
23	Sharing the Effort	431
23.1	Chain of Preservation	431
23.2	Mechanisms for Sharing the Burden of Preservation	431
24	Infrastructure Roadmap	435
24.1	Requirements for a Science Data Infrastructure	435
24.2	Possible Financial Infrastructure Concepts and Components	436
24.3	Possible Organisational and Social Infrastructure Concepts and Components	437
24.4	Possible Policy Infrastructure Concepts and Components	446
24.5	Virtualisation of Policies, Resources and Processes	448
24.6	Technical Science Data Concepts and Components	449
24.7	Aspects Excluded from This Roadmap	456
24.8	Relationship to Other Infrastructures	457
24.9	Summary	459
25	Who Is Doing a Good Job? Audit and Certification	461
25.1	Background	461
25.2	TRAC and Related Documents	463

25.3	Development of an ISO Accreditation and Certification Process	464
25.4	Understanding the ISO Trusted Digital Repository Metrics . . .	465
25.5	Summary	480
26	Final Thoughts	481
	References	483
	Contributors	495
	Index	505



<http://www.springer.com/978-3-642-16808-6>

Advanced Digital Preservation

Giaretta, D.

2011, XXII, 510 p., Hardcover

ISBN: 978-3-642-16808-6