

**DERECHO DE BLOCKCHAIN
Y DIGITALIZACIÓN DE LA SOCIEDAD**

Director: JAVIER IBÁÑEZ JIMÉNEZ

**ALASTRIA MISSION AND VISION:
A multidisciplinary research**

Coordinator: JAVIER IBÁÑEZ JIMÉNEZ

First edition

ISMAEL ARRIBAS FONTANILLAS	CARLOS BELLÓN
MOISÉS BARRIO ANDRÉS	ROCÍO SÁENZ-DÍAZ ROJAS
DAVID CONTRERAS BÁRCENA	MIGUEL Á. BERNAL BLAY
JOSÉ LUIS GAHETE DÍAZ	eva MARÍA IBÁÑEZ
ISRAEL ALONSO MARTÍNEZ	ANTONIO PARTAL UREÑA
DAVID ALFYA SÁNCHEZ	TERESA ALARCOS TAMAYO
JAVIER IBÁÑEZ JIMÉNEZ	PABLO GALLEGO RODRÍGUEZ
PIETRO MARCHIONNI	JOSEP LLUIS DE LA ROSA ESTEVA
SALVATORE MOCCIA	JULEN MILAN RONCERO
IGNACIO ALAMILLO DOMINGO	ANTONIO D. MASEGOSA
JULIÁN VALERO TORRIJOS	JESÚS SIEIRA GIL
ELENA DAVARA FERNÁNDEZ DE MARCOS	JIMENA CAMPUZANO GÓMEZ-ACEBO
PEDRO MARTÍN JURADO	MIRARI BARRENA LONGARTE
MAHMoud AYMO	CARLOS DE CORES HELGUERA
MARÍA DE LOS REYES CORRIPIO GIL-DELGADO	



Madrid, 2020

© Each author
© Editorial Reus, S.A.

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law. For permission requests, write to the publisher, addressed “Attention: Permissions Coordinator,” at the addresses below.

C/ Rafael Calvo, 18, 2º C – 28010 Madrid
Phone: +34 91 521 36 19
reus@editorialreus.es
www.editorialreus.es

1.^a edition REUS, S.A. (2020)
ISBN: 978-84-290-2312-1
Legal Deposit: M-14617-2020
Design of the cover: Editorial Reus

Printed in Spain
Print by: *Estilo Estugraf Impresores S.L.*

INDEX

FOREWORD.....	15
PART ONE: GOVERNANCE	23
ALTERNATIVE DISPUTE RESOLUTION MECHANISMS (AS PART OF THE ALASTRIA GOVERNANCE) - ISMAEL ARRIBAS	25
I. Introduction	25
II. Definitions and characterization of ADR solutions in the permissioned blockchain context	26
III. The fundamentals of arbitration as an optimal solution in the permissioned-blockchain governance context.....	27
IV. A proposal for Alastria	29
1. Specimen of inception	29
2. Components.....	30
3. Minimal common legal requirements	31
4. Challenges and recommendations for Alastria	32
5. Case of use: wine plantations	33
V. References	34
ALASTRIA AS A CASE OF INTERNET GOVERNANCE - MOISÉS BARRIO ANDRÉS.....	35
I. Introduction	35
II. From technical governance to social governance	38
2.1. ICANN's creation	39
2.2. The creation of the Internet Governance Forum (IGF)	41
2.3. ICANN's globalisation.....	43
III. Concluding remarks: lessons from cyberlaw for Alastria's governance	44

Índice

VALIDATION AND GOVERNANCE IN AN ALASTRIAN TESTNET NODE - DAVID CONTRERAS, JOSÉ LUIS GAHETE, ISRAEL ALONSO, AND DAVID ALFAYA.....	47
I. Introduction to Alastria architecture	47
1. Quorum consensus protocol.....	48
2. Transactions.....	50
II. Alastria members and nodes.....	52
1. Alastria Nodes Requirements.....	52
2. Alastria Nodes Configuration	53
III. Alastria Operation	56
1. Regular introspection	56
2. Network analysis.....	57
3. Results	58
IV. Conclusions and future works	60
ALASTRIA GOVERNANCE POLICIES AND ETHICS - JAVIER IBÁÑEZ JIMÉNEZ	61
I. Introduction	61
1. The relationship between agency problems, conflicts of interest and ethics from a general and legal societal perspective	62
II. Ethics beyond governance organization in DLT permissioned net- works.....	63
III. The case of Alastria: conflicts of interest, implemented controls and alternative solutions in accordance with an ethical acceptable con- sensus.....	67
1. The bylaws of Consorcio Red Alastria, a private-law associa- tion	67
2. Conflicts of interest and related policies	68
3. Ethical code of the association	69
IV. Specific components of governance in the Alastria model: agency problems in Alastria as a DLT associative consortium and node com- munity for the development of a permissioned blockchains	71
1. Authority of nodes and transaction validation in Alastria.....	71
2. Conflicts of interest in the Alastria on-chain governance	74
3. Off-chain governance and agency problems in the Alastria model, and their meta-juridical or extralegal ethical and social projec- tion	76
REWARDING HONEST VALIDATORS IN ALASTRIA - PIETRO MARCHIONNI	81
I. Introduction: consensus among nodes in DLT	81
1. Consensus algorithm in Alastria: fault tolerance and node voting.....	81

2. The need to define a rewarding system for validating activity in a permissioned network	82
3. Objectives.....	82
II. Alastria rewarding model.....	82
1. The optimal characteristics of a validator node as a prerequisite to set the optimal rewarding model	83
2. Alastria Rewarding Measure Algorithm	84
<i>2.1. Key building elements</i>	<i>84</i>
<i>2.2. ARM formula</i>	<i>86</i>
<i>2.3. ARM calculation and simulation</i>	<i>86</i>
<i>2.4. Alastria Rewarding Measure strategy and marketing</i>	<i>87</i>
THE VALUE OF LEADERSHIP IN ALASTRIA GOVERNANCE - SALVATORE MOCCIA	89
I. Leadership as a matter of research	89
II. Analysis: the evolution of leadership standards and conception	90
III. Alastria governance seen from the entrepreneurial leadership viewpoint.....	92
IV. Conclusion	95
V. References	95
PART TWO: DIGITAL IDENTITY	97
THE CONCEPTUAL LEGAL FRAMEWORK OF ALASTRIA IDENTITY - IGNACIO ALAMILLO DOMINGO AND JULIÁN VALERO TORRIJOS	99
I. Contents.....	99
II. The convenience of a conceptual legal framework for the Alastria self-sovereign identity initiative	100
1. The alignment of the Alastria identity with the regulatory framework for the usage of identification systems by the national public sector bodies.....	100
2. The influence of the interoperability framework for cross-border electronic identification in the European Union: the eIDAS Regulation	103
3. The convenience of offering support for compliance with the formal identification obligations contained in anti-money laundering regulations	110
III. Guidance for the Alastria trust framework and identity interoperability agreements	111
IV. References.....	112

Índice

CHARACTERIZATION AND IMPORTANCE OF CYBER-IDENTITY IN PERMISSIONED NETWORKS - ELENA DAVARA FERNÁNDEZ DE MARCOS.....	115
I. Introduction to the concepts of cyber-identity and permissioned inter- net networks	115
1. Cyber-identity as a digital personal identity.....	115
2. Permissioned networks	116
II. Data security and vulnerabilities: the need of effectiveness in regu- latory implementations, and the role of blockchain within this con- text	117
1. The role of the DLT	118
2. Introductory GDPR issues	119
2.1. <i>Profiles</i>	119
2.2. <i>Biometric data</i>	120
3. Self-sovereign identity in the DLT context	122
4. A word on the Alastria self-sovereign identity	123
THE VALUE OF ALASTRIA IDENTITY FOR PUBLIC ADMINISTRA- TIONS - PEDRO MARTÍN JURADO	125
I. Blockchain and improvement of efficiency in Public Administrations	125
II. The digital identification of citizens and the functions of public administrations	126
1. Self-sovereign identity in the relations between public adminis- trations and citizens	127
2. The European Self-Sovereign Identity Framework	128
3. Some issues on the accreditation of European citizens, and the initiatives of the European Commission.....	130
4. Reference to the Alastria network within the current public per- missioned Blockchain identity context.....	131
PART THREE: SUPERSTRUCTURES.....	133
SMART CONTRACTS AND DECENTRALIZED APPLICATIONS IN ALASTRIA: THE CASE OF SPANISH WINE - M. AYMO, C. BELLÓN, AND R. SÁENZ-DÍAZ.....	135
I. Idea in brief	136
II. Introduction	136
III. The wine industry in Spain	138
IV. Use case: exporting Rioja wine. Situation today	140
1. The Alastria Wine Solution.....	142
2. Supply Chain Management Issues.....	143

3. Alpha version of the Alastria Wine Solution. Application to Rioja wine exports	144
V. Conclusions for all stakeholders.....	149
THE USE OF SMART CONTRACTS FOR PUBLIC TENDERS IN THE REGION OF ARAGÓN (SPAIN) - M. A. BERNAL BLAY	151
I. Blockchain for the public sector.....	151
II. A distributed ledger for offers in public procurement	152
1. Context and initial objective	153
2. Smart contracts for the evaluation of the offers	154
III. Some tips about the project: the public procurement of innovation	154
IV. Other use cases	156
ACCOUNTING AND NON-FINANCIAL FIRM DATA TOKENS IN ALASTRIA - E. M. IBÁÑEZ.....	157
I. Is Blockchain useful in accountancy? Presentation of its benefits and main obstacles.....	157
II. Blockchain as a reliable but limited accounting information system	159
III. Exploring the role of Blockchain as a tool for the digital audit of accounting information in public permissioned networks.....	162
1. Stakeholder integration and benefits in public permissioned blockchains by audit smart contracts: a preliminary consideration	164
2. A sample of registered auditable transaction in the Alastria permissioned blockchain.....	165
IV. Conclusion in brief	166
V. References	166
PRIMARY AND SECONDARY MARKET TOKENS IN ALASTRIA: THE CASE OF OLIVE OIL TOKENS - ANTONIO PARTAL UREÑA.....	169
I. Blockchain and Alastria market utilities.....	169
II. A word on market tokenization	170
III. A project for olive oil tokens on the Alastria T Network.....	171
1. Traceability functions.....	172
2.The olive oil token market	175
IV. Conclusion	180
PART FOUR: PROOFS OF CONCEPT	181
ALASTRIA SMART CONTRACTS FOR THE WOMEN STARTUP COMMUNITY (WSC) - TERESA ALARCOS TAMAYO	183
I. The Women Startup Community (WSC) and the feminine talent in the digital era, and the transformation of entrepreneurship	183
II. The goal of increasing the transformational and social power of	

women's businesses and the inspiration of woman leaders in the digital era	185
III. The Alastria-WSC connection and the fundamentals of the TT Trust Token	188
SECURITY, ORDER AND FREEDOM IN THE BLOCKCHAIN ERA: THE CASE OF SPAIN - PABLO GALLEGOS RODRÍGUEZ.....	191
I. Foreword	191
II. Public order and security.....	193
III. Alastria multisectorial consortium and its contribution to guarantee effective protection of public constitutional order and public security	196
RECYCLING PLASTIC PROOF OF CONCEPT WITH TOKENIZATION AND SMART CONTRACTS IN ALASTRIA - JOSEP LLUIS DE LA ROSA.....	201
I. Introduction	201
II. Reciclos: Issue at hand	202
1. Hypothesis and precedents.....	203
<i>1.1. Discounts and Presents Aren't Working Enough.....</i>	<i>204</i>
<i>1.2. Lotteries Redistribute the Individual Rewards</i>	<i>204</i>
<i>1.3 Lotteries and Rewards Programmes Need of Transparency ..</i>	<i>205</i>
III. Tokenization as a Type of Circular Economy.....	205
IV. Minimum Valuable Product (MVP) Design.....	208
1. The Proof of Work	208
2. Tokenising the Tax Discount.....	209
3. Tokenising the Special Lotteries.....	210
4. Smart contracts for Lotteries	211
5. Illustrative Use Case	212
V. The Platform Approach and implementation.....	212
VI. Results	214
VII. Conclusions.....	215
VIII. References	215
BOOSTING COOPETITION THROUGH ALASTRIA, DATA SHARING AND ARTIFICIAL INTELLIGENCE - JULEN MILAN AND ANTONIO D. MASEGOSA	217
I. Introduction	217
II. Artificial intelligence and the data collection problem.....	218
III. The key role of Alastria in data sharing as a distributed ledger.....	219
IV. Related work.....	220
V. Alastria for boosting coopetition through data-sharing and Artificial Intelligence.....	222
1. Coopetition and AI development challenges in blockchain recent	

environments	222
2. The Alastria model and its advantages for the implementation of AI methods.....	224
3. Existing AI models replicable in the Alastria network	225
VI. Conclusions and future work	226
VII. References.....	227
BLOCKCHAIN, REAL ESTATE ASSET TOKENIZATION AND ITS PROTECTION BY THE LAND REGISTRY - JESÚS SIEIRA AND JIMENA CAMPUZANO.....	229
I. Tokenization of real estate assets under Spanish law.....	229
II. Taking real estate transactions to the blockchain.....	231
III. Land Registry: Legality control and <i>erga omnes</i> protection	233
IV. The Land Registry as the link between the “on-chain” and “off-chain” world: Land Registry protection and publicity of tokenization.	233
V. Legal configuration of tokens representing rights in rem on real estate.....	236
VI. Effects of the entry of Tokenized Rights in rem to the Land Registry	239
VII. Conclusion	240
VIII. References	240
PART FIVE: CIVIL LIABILITY AND RELATED LEGAL ISSUES	243
THE PRINCIPLES OF ALASTRIA UNDER SPANISH CIVIL LAW - MIRARI BARRENA	245
I. Legal entity: Association. The kind of legal institution chosen for Alastria constitution	245
II. The Alastria legal principles	246
1. Open access of members	246
2. Open-source software development.....	247
3. Public and permissioned characterization of the network.....	247
4. National body of associated members.....	247
5. Technological neutrality.....	248
6. Multi-sectorial membership	248
7. Interoperability	249
8. Collaboration and incentive systems	249
9. Decentralization and distributed power	250
9.1. <i>General Assembly</i>	251
9.2. <i>Board of Directors</i>	251
9.3. <i>Commissions</i>	252
10. Public-service orientation	252

Índice

ALASTRIA MULTILATERAL CONTRACT: A CIVIL LAW APPROACH	
- CARLOS DE CORES	255
I. Introduction	255
II. Collaborative nature of the Alastria consortium and its incidence on its liability model	257
1. New paradigms of liability in the information society	257
2. Multilateral contracts and Alastria.....	258
3. Different models of liability according to different relationship .	261
<i>3.1 Relationships among Alastria's members</i>	261
<i>3.2. Relationships with third parties.....</i>	262
III. Liability related to the services rendered by the consortium and or its members	263
1. Concept of information society services	263
2. Taxonomy of information society service providers	264
3. Alastria as an information society service provider	265
4. Liability of society information service providers	266
5. Liability “by design”	267
IV. Conclusion	268
ROBOTS, SMART CONTRACTS AND CIVIL LIABILITY IN ALASTRIA	
- M. REYES CORRIPIO GIL-DELGADO	269
I. Robots and civil liability within a DLT or blockchain operative context: a preliminary approach	269
1. A civil personality for robots	270
2. A strict liability system.....	274
II. Alastria Blockchain and Smart Contract	276