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A Model of Distributed Rights Allocation in Online Social Interaction

A thesis presented in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
in
Information Technology
at
Massey University,
Albany, Auckland, New Zealand

Adnan Ahmad

2013

This research was sponsored by the National Science Foundation (NSF), U.S. under contract no. 0968445. However, the views and conclusions contained in this dissertation are those of the author and should not be interpreted as representing the official policies, either expressed or implied, of NSF, or of the U.S. government or any other entity.

Abstract

In computing, the management of information resources is done through access control, a process by which authorized users are granted permission over resources. The last decade has witnessed the emergence of socio-technical systems (STS) like Facebook, Twitter, and YouTube, where millions of users interact with each other and share billions of resources on daily basis. Access control for a STS is different from traditional systems in having to satisfy the social requirements of the community as well as the technical requirements of the system.

The problems traditional access control models face today are firstly the complexity of mapping millions of users to billions of resources, and secondly the social requirements of users who want to own the resources they post. Current access control models for STS manage access through rule semantics, roles, trust, history management or contents. However, there is no general logical scheme that allows users to allocate rights, covering not just transfer and delegation but also joint and several ownership.

The trend from centralized to distributed access control demands a general model to manage rights allocation for users having heterogeneous privacy policies. The model's validity derives from socio-technical design, where social requirements like ownership, freedom and privacy give technical access axioms. The aim is to satisfy not only technical but also social requirements, over which the success of today's software depends.

This research first proposes the social access control model for supporting local administration, dynamic asymmetric relationships and object privacy classification. This core model is then used as a basis of various rights allocation models. The research further illustrates a rights allocation framework based on various properties of STS and presents a reduction approach to design the model. This framework reduces all the possible rights allocations into four basic models: Replace, Revoke, Share and Merge, which can manage every tweet, every post, and every single communication on any STS. The proposed rights allocation models are demonstrated on various current and hypothetical use-cases of current STS to show that it can be used in any system that has social interactions, and where users want to control their resources. This research extends the online social interactions in STS to new horizons which are currently restricted due to the limitations posed by current technology.

Acknowledgement

My success(es) are not through my individual effort alone, but rather through the combined efforts of many.

~Maori proverb

First and foremost, I would like to praise and thank Allah Almighty for bestowing upon me the wisdom, courage, patience and blessings to complete such a huge research endeavor. Thanks Allah, You have given me the power to believe in my passion and pursue my dreams. I could never have done this without the faith I have in you.

The most important person I would like to thank is Dr. Brian, my supervisor, for his support and care during this long and tiring journey. As a “mathematician is a machine for converting coffee into theorems”, Dr. Brian is a mind for converting complex, detailed theorems into amazingly simple ‘two-liners’. Whenever I struck in some problem, he always had a cheerful smile with a mind boggling direction, and a friendly suggestion to enjoy the beautiful weather and God's other blessings bestowed upon us. I have learned a lot from him in terms of research and leading a joyful life – to disconnect from the ‘connected’ world. He really taught me to appreciate the beauty of life along with my goals. Dr. Brian, I will surely miss our long thoughtful discussions. I wish I could stay with you a little longer as I still have to learn a lot from you.

I take immense pleasure in thanking Dr. Lech, my co-supervisor, for his friendly attitude that he has maintained towards me throughout these years. I found a thoughtful supervisor, a caring elder and a cherish friend in his form. His concern for his every single student, cycle stealing from his busy schedule to adjust one of us was quite impressive. Dr. Lech, you are more than a supervisor to me and for that I am really thankful to you. I wish, I can carry on our relation in the future, and it may get stronger with time.

I would like to thank Dr. Yasir and Dr. Sohaib for their support throughout these years. Their room was the ‘chamber of secrets’ for our lively discussions, absurd ideas and what not! I especially thank Dr. Sohaib for reading out this dissertation and helping to improve its presentation.

Also, I wish to express my sincere gratitude to Dr. Tony Norris, Dr. David Parsons, Dr. Andre Barczak, Dr. Andrew Colarik, Dr. Daniel Playne and Mrs. Siew Whitworth for their valuable suggestions. I am also obliged to many anonymous conference and journal reviewers who helped to improve the quality of my papers and thus this dissertation quite substantially.

Finally, I am forever indebted to my parents. I can barely find words to express their endless love, unconditional support and encouragement when it was most needed. Mama and Papa, I cannot thank you enough for being there. If it was not for you I cannot accomplish my greatly desired dream!

Table of Contents

CHAPTER 1: INTRODUCTION.....	1
1.1 PROBLEM STATEMENT.....	3
1.1.1 <i>Complexity</i>	4
1.1.2 <i>Privacy</i>	4
1.1.3 <i>Operations</i>	5
1.1.4 <i>Local ownership</i>	5
1.2 RESEARCH OBJECTIVES AND SCOPE.....	6
1.3 GUIDE TO THIS DISSERTATION.....	7
CHAPTER 2: STATE OF THE ART	10
2.1 THE ORIGIN OF ACCESS CONTROL.....	11
2.2 POLICIES, MECHANISMS AND MODELS.....	11
2.2.1 <i>Access control policies</i>	12
2.2.2 <i>Access control mechanism</i>	12
2.2.3 <i>Access control model</i>	12
2.3 THE EVOLUTION OF ACCESS CONTROL.....	13
2.3.1 <i>Bell-LaPadula model</i>	13
2.3.2 <i>Biba's integrity model</i>	13
2.3.3 <i>DoD models</i>	14
2.3.4 <i>Clark Wilson model</i>	14
2.3.5 <i>Chinese wall policy</i>	15
2.3.6 <i>Role based access control</i>	15
2.3.7 <i>Rule based access control</i>	16
2.3.8 <i>Distributed environments</i>	16
2.3.9 <i>Customized access control models</i>	16
2.4 SOCIO-TECHNICAL SYSTEMS.....	17
2.4.1 <i>Socio-technical design</i>	20
2.5 TYPES OF STS.....	21
2.5.1 <i>One-to-one</i>	22

2.5.2	<i>One-to-Many</i>	22
2.5.3	<i>Many-to-Many</i>	22
2.6	CURRENT ACCESS CONTROL MODELS FOR SOCIAL NETWORKS.....	23
2.6.1	<i>Trust based access control</i>	24
2.6.2	<i>Rule based access control</i>	26
2.6.3	<i>Role based access control</i>	28
2.6.4	<i>History based access control</i>	30
2.6.5	<i>Content based access control</i>	31
2.7	CURRENT RIGHTS ALLOCATION PRACTICES.....	32
2.7.1	<i>Knowledge management services</i>	33
2.7.2	<i>Social networks</i>	34
2.7.3	<i>Video sharing services</i>	34
2.8	RIGHTS ALLOCATION FOR TRADITIONAL MODELS.....	35
2.8.1	<i>Delegation</i>	36
2.8.1.1	<i>Machine to machine delegation</i>	37
2.8.1.2	<i>User to machine delegation</i>	38
2.8.1.3	<i>User to user delegation</i>	38
2.8.2	<i>Rights transfer</i>	42
2.8.3	<i>Rights sharing</i>	43
2.8.4	<i>Rights merge</i>	44
2.9	THESIS STATEMENT.....	47
2.10	RESEARCH QUESTION.....	48
2.11	METHODOLOGY.....	49
2.11.1	<i>Constructive research methodology</i>	49
2.11.2	<i>Extreme formal modeling (XFM)</i>	52
2.12	SUMMARY.....	53

CHAPTER 3: CONCEPTUAL FRAMEWORK56

3.1	CHARACTERISTICS OF ONLINE SOCIAL INTERACTIONS.....	56
3.1.1	<i>Creator Ownership</i>	58
3.1.2	<i>Freedom</i>	59

3.1.3 Privacy.....	59
3.1.4 Relationships.....	59
3.1.5 Objects' local visibility.....	60
3.1.6 Object classification.....	62
3.2 ACCESS CONTROL SPECIFICATIONS.....	62
3.2.1 Actors.....	63
3.2.2 Objects.....	64
3.2.2.1 Items.....	64
3.2.2.2 Spaces.....	64
3.2.3 Operations.....	65
3.2.4 Rights.....	65
3.2.4.1 Meta-Rights.....	67
3.2.5 Authorization authority.....	67
3.2.5.1 Central administration.....	68
3.2.5.2 Ownership administration.....	68
3.2.6 Operations on rights.....	69
3.2.6.1 Rights allocation.....	70
3.2.6.1.1 Replace.....	71
3.2.6.1.2 Share.....	71
3.2.6.1.3 Merge.....	71
3.2.6.1.4 Revoke.....	71
3.3 CHARACTERISTICS OF RIGHTS ALLOCATION.....	72
3.3.1 Consent.....	72
3.3.2 Totality.....	72
3.3.3 Cardinality.....	73
3.3.4 Monotonicity.....	73
3.3.5 Depth.....	74
3.3.6 Revocation.....	74
3.4 REDUCTION APPROACH.....	75
3.4.1 Mutual exclusive allocation.....	75
3.4.1.1 Cardinality.....	75
3.4.1.2 Totality.....	76
3.4.1.3 Consent.....	77

3.4.1.4 Depth.....	77
3.4.2 <i>Mutual inclusive allocation</i>	77
3.4.2.1 Cardinality	78
3.4.2.2 Totality.....	78
3.4.2.3 Consent.....	78
3.4.2.4 Depth.....	78
3.5 CHAPTER SUMMARY	79
CHAPTER 4: SOCIAL ACCESS CONTROL MODEL.....	80
4.1 OWNERSHIP FRAMEWORK.....	80
4.1.1 <i>Role assignment</i>	81
4.1.1.1 Owner.....	81
4.1.1.2 Parent	82
4.1.1.3. Offspring.....	82
4.1.1.4. General public	83
4.1.2 <i>Space initial configuration</i>	84
4.2 YOUTUBE CREATE PROCESS DEMONSTRATION	84
4.3 SOCIAL ACCESS CONTROL MODEL	85
4.3.1 <i>Definitions</i>	86
4.3.2 <i>Components</i>	86
4.3.2.1 Namespace	86
4.3.2.2 Local roles.....	87
4.3.2.3 Object classes.....	88
4.3.2.4 Attestation certificates	88
4.3.3 <i>System architecture</i>	89
4.3.4 <i>Definition</i>	90
4.3.5 <i>The access control process</i>	91
4.3.6 <i>Theoretical assessment</i>	92
4.4 IMPROVEMENTS OVER PREVIOUS MODELS.....	93
4.5 SUMMARY.....	94

CHAPTER 5: USE-RIGHTS MODEL.....96

- 5.1 REPLACE_{USE} MODEL.....97
 - 5.1.1 *Characteristics of Replace_{USE}*.....99
 - 5.1.1.1 Consent.....100
 - 5.1.1.2 Totality100
 - 5.1.1.3 Cardinality101
 - 5.1.1.4 Monotonicity102
 - 5.1.1.5 Depth.....103
 - 5.1.2 *Replace_{USE} process*.....104
 - 5.1.3 *Definition*.....104
 - 5.1.4 *Rights analysis*106
 - 5.1.5 *Design principles*.....108
 - 5.1.6 *Revocation*.....108
 - 5.1.6.1 Self revocation109
 - 5.1.6.2 Time based revocation.....109
 - 5.1.6.3 Rule based revocation.....110
 - 5.1.6.4 The Replace_{USE} revoke process.....110
 - 5.1.7 *Summary of Replace_{USE}*.....110
- 5.2 SHARE_{USE} MODEL.....111
 - 5.2.1 *Characteristics of Share_{USE}*.....113
 - 5.2.1.1 Consent.....114
 - 5.2.1.2 Totality114
 - 5.2.1.3 Cardinality115
 - 5.2.1.4 Monotonicity116
 - 5.2.1.5 Depth.....117
 - 5.2.2 *Share_{USE} process*.....117
 - 5.2.3 *Definition*.....118
 - 5.2.4 *Rights analysis*119
 - 5.2.5 *Design principles*.....121
 - 5.2.6 *Revocation*.....121
 - 5.2.6.1 Self revocation122
 - 5.2.6.2 Time based revocation.....122
 - 5.2.6.3 Rule based revocation.....122

5.2.6.4 The Share _{Use} revoke process	122
5.2.7 <i>Summary of Share_{Use}</i>	123
5.3 MERGE _{USE} MODEL	123
5.3.1 <i>Characteristics of Merge_{Use}</i>	125
5.3.1.1 Consent	126
5.3.1.2 Totality	126
5.3.1.3 Cardinality	127
5.3.1.4 Monotonicity	128
5.3.1.5 Depth	129
5.3.2 <i>Merge_{Use} process</i>	129
5.3.3 <i>Definition</i>	130
5.3.4 <i>Rights analysis</i>	131
5.3.5 <i>Design principles</i>	133
5.3.6 <i>Revocation</i>	134
5.3.6.1 Self revocation	134
5.3.6.2 Time based revocation	135
5.3.6.3 The Merge _{Use} revoke process	135
5.3.7 <i>Summary of Merge_{Use}</i>	135
5.4 CHAPTER SUMMARY	136

CHAPTER 6: META-RIGHTS MODEL..... 137

6.1 REPLACE _{META} MODEL	138
6.1.1 <i>Characteristics of Replace_{Meta}</i>	139
6.1.1.1 Consent	140
6.1.1.2 Totality	141
6.1.1.3 Cardinality	142
6.1.1.4 Monotonicity	142
6.1.1.5 Depth	143
6.1.2 <i>Replace_{Meta} process</i>	144
6.1.3 <i>Definition</i>	145
6.1.4 <i>Rights analysis</i>	145
6.1.5 <i>Design principles</i>	148

6.1.6	<i>Revocation</i>	149
6.1.7	<i>Summary of Replace_{Meta}</i>	149
6.2	SHARE _{META} MODEL.....	150
6.2.1	<i>Characteristics of Share_{Meta}</i>	151
6.2.1.1	Consent.....	152
6.2.1.2	Totality.....	153
6.2.1.3	Cardinality.....	154
6.2.1.4	Monotonicity.....	154
6.2.1.5	Depth.....	155
6.2.2	<i>Share_{Meta} process</i>	156
6.2.3	<i>Definition</i>	156
6.2.4	<i>Rights analysis</i>	158
6.2.5	<i>Design principles</i>	160
6.2.6	<i>Revocation</i>	160
6.2.6.1	Self revocation.....	161
6.2.6.2	The Share _{Meta} revoke process.....	161
6.2.7	<i>Summary of Share_{Meta}</i>	161
6.3	MERGE _{META} MODEL.....	162
6.3.1	<i>Characteristics of Merge_{Meta}</i>	163
6.3.1.1	Consent.....	164
6.3.1.2	Totality.....	165
6.3.1.3	Cardinality.....	165
6.3.1.4	Monotonicity.....	166
6.3.1.5	Depth.....	167
6.3.2	<i>Merge_{Meta} process</i>	167
6.3.3	<i>Definition</i>	168
6.3.4	<i>Rights analysis</i>	169
6.3.5	<i>Design principles</i>	171
6.3.6	<i>Revocation</i>	172
6.3.6.1	Self revocation.....	172
6.3.6.2	The Merge _{Meta} revoke process.....	172
6.3.7	<i>Summary of Merge_{Meta}</i>	173
6.4	CHAPTER SUMMARY.....	173

CHAPTER 7: ANALYSIS.....	174
7.1 MODEL PERMUTATIONS AND THEIR PRECEDENCE	174
7.1.1 <i>Use-Rights permutations</i>	175
7.1.1.1 Observations.....	176
7.1.2 <i>Meta-Rights permutations</i>	178
7.1.2.1 Observations.....	178
7.2 SIMILARITIES BETWEEN USE-RIGHTS AND META-RIGHTS MODELS	179
7.2.1 <i>Replace model</i>	180
7.2.1.1 Similarity analysis	180
7.2.1.2 Precedence analysis	184
7.2.1.3 Order analysis	185
7.2.2 <i>Share model</i>	185
7.2.2.1 Similarity analysis	185
7.2.2.2 Precedence analysis	189
7.2.2.3 Order analysis	190
7.2.3 <i>Merge model</i>	190
7.2.3.1 Similarity analysis	190
7.2.3.2 Precedence analysis	194
7.2.3.3 Order analysis	195
7.3 COMPLETENESS	195
7.4 SUMMARY.....	197

CHAPTER 8: DEMONSTRATION..... 198

8.1 BASIC USE-CASES.....	199
8.1.1 <i>Creation use-case</i>	199
8.1.1.1 Facebook.....	199
8.1.1.2 Orkut.....	199
8.1.1.3 YouTube.....	199
8.1.1.4 Wikipedia	200
8.1.1.5 Knowledge management systems	200
8.1.1.6 Discussion.....	200
8.1.2 <i>System administrator rights</i>	200

8.1.2.1 Facebook.....	200
8.1.2.2 Orkut.....	201
8.1.2.3 YouTube.....	201
8.1.2.4 Wikipedia.....	201
8.1.2.5 Knowledge management system.....	201
8.1.2.6 Discussion.....	202
<i>8.1.3 General public rights.....</i>	<i>202</i>
8.1.3.1 Facebook.....	202
8.1.3.2 Orkut.....	202
8.1.3.3 YouTube.....	202
8.1.3.4 Wikipedia.....	203
8.1.3.5 Knowledge management system.....	203
8.1.3.6 Discussion.....	203
<i>8.1.4 Contents creation.....</i>	<i>203</i>
8.1.4.1 Facebook.....	203
8.1.4.2 Orkut.....	204
8.1.4.3 YouTube.....	204
8.1.4.4 Wikipedia.....	204
8.1.4.5 Knowledge management system.....	205
8.1.4.6 Discussion.....	205
8.2 ADVANCE USE-CASES.....	205
<i>8.2.1 Facebook.....</i>	<i>205</i>
8.2.1.1 Friends Rights Management.....	206
8.2.1.2 Tagging a photo.....	206
8.2.1.3 Sharing a video.....	206
8.2.1.4 Persona sharing.....	207
8.2.1.5 Persona merge.....	207
8.2.1.6 Persona rights delegation.....	208
8.2.1.7 Persona transfer.....	208
<i>8.2.2 YouTube.....</i>	<i>208</i>
8.2.2.1 Video transfer.....	208
<i>8.2.3 Wikipedia.....</i>	<i>209</i>
<i>8.2.4 Knowledge management system.....</i>	<i>209</i>
8.2.4.1 Track delegation.....	209

8.2.4.2 Paper joint authorship	209
8.2.4.3 Paper authorship sharing	210
8.2.4.4 Reviewer rights.....	210
8.2.4.5 Copyright transfer.....	210
8.3 SUMMARY.....	211
CHAPTER 9: DISCUSSION	212
9.1 REVISITING RESEARCH QUESTIONS.....	213
9.2 RESEARCH CONTRIBUTIONS.....	216
9.3 IMPLICATIONS OF THE PRESENTED RESEARCH	218
<i>9.3.1 Ownership theory.....</i>	<i>218</i>
<i>9.3.2 Access control.....</i>	<i>219</i>
<i>9.3.3 Online social interactions.....</i>	<i>219</i>
9.4 LIMITATIONS	220
9.5 FUTURE RESEARCH OPPORTUNITIES.....	220
<i>9.5.1 Implementation.....</i>	<i>220</i>
<i>9.5.2 Transparency</i>	<i>221</i>
<i>9.5.3 Reputation model.....</i>	<i>222</i>
9.6 FINAL REMARKS.....	222
GLOSSARY.....	224
REFERENCES	228
APPENDIX A.....	246
TABLE 7.1.....	246
TABLE 7.3.....	248

List of Figures

Figure 1.1: Guide to this dissertation	9
Figure 2.1: Socio-technical system levels and requirements (Source: Whitworth, 2009, page 5)	19
Figure 2.2: Summary of the literature and contribution of the current research	47
Figure 2.3: The general methodology used in this research (adopted from Kasanen et al., 1993).....	51
Figure 2.4: Detailed illustration of the innovation phase using incremental Extreme Formal Modeling (XFM)	55
Figure 3.1: A simple social network	57
Figure 3.2: Access control matrix magnitude for different models based on eq. [3.1] and eq. [3.4] for Facebook statistics	62
Figure 3.3: Reduction approach illustrated as a tree structure outlining various rights allocation models for online social interactions	76
Figure 4.1: Distributed access control model system architecture.....	89
Figure 4.2: Access control matrix magnitude for different models based on [eq. 3.4] and [eq. 4.11].....	93
Figure 5.1: Replace U_{use} scenario depicting a running conference.....	99
Figure 5.2: Sharing use-rights scenario depicting a VOD system	113
Figure 5.3: Merge use-rights scenario depicting collaborative software.....	125
Figure 6.1: Transfer scenario depicting copyright of accepted paper.....	140
Figure 6.2: Sharing meta-rights scenario depicting Facebook wall	152
Figure 6.3: Meta-rights merge scenario depicting an Internet forum	164
Figure 7.1: Visual description of formation of use-rights allocation permutation table	177

List of Tables

Table 2.1: Evolution of access control models based on application requirements	17
Table 2.2: Type of STS and their respective online social interactions types	23
Table 2.3: Various operations on rights and their definitions	36
Table 3.1: Rights Allocation for use-rights and meta-rights	71
Table 4.1: Right for different roles associated with the created object	83
Table 4.2: Abbreviations and their definitions	86
Table 5.1: Delegator and delegatee rights over different objects before and after delegation	106
Table 5.2: Rights for different roles associated with the object before and after delegation	107
Table 5.3: Difference between proposed and traditional delegation models	111
Table 5.4: Owner and beneficiary rights over different objects before and after the Share _{Use} model	119
Table 5.5: Rights for different roles associated with object before and after the Share _{Use} model	120
Table 5.6: Owner and beneficiary rights over different objects before and after the Merge _{Use} model	132
Table 5.7: Rights for different roles associated with object before and after the Merge _{Use} model	132
Table 6.1 (a): Rights for different old roles associated with object before and after the Replace _{Meta} model	146
Table 6.1 (b): Rights for different new roles associated with object before and after the Replace _{Meta} model	147
Table 6.2: Old and new owner rights over different objects before and after the Replace _{Meta} model	147
Table 6.3: Difference between proposed and traditional delegation models	149
Table 6.4: Rights for different roles associated with the object before and after the Share _{Meta} model	158
Table 6.5: Primary and Secondary Owner rights over different objects before and after the Share _{Meta} model	159
Table 6.6: Rights for different roles associated with object before and after the Merge _{Meta} model	170
Table 6.7: Primary and Joint Owner rights over different objects before and after the Merge _{Meta} model	170
Table 7.2: Precedence of various use-rights model applications over each other	178
Table 7.4: Precedence of various meta-rights model applications over each other	179
Table 7.5: Output summary of Replace _{Use} and Replace _{Meta} models	180
Table 7.6: Comparison of various characteristics of Replace model	181
Table 7.7: Rights of different roles associated with the objects before and after Replace model	182
Table 7.8: Owner and beneficiary rights over different objects before and after Replace model	182
Table 7.9: Output Summary of the Replace model	184
Table 7.10: Precedence of Replace model over other rights allocation models	184
Table 7.11: Output summary of Share _{Use} and Share _{Meta} models	186
Table 7.12: Comparison of various characteristics of Share model	186
Table 7.13: Rights of different roles associated with the objects before and after Share model	187
Table 7.14: Owner and beneficiary rights over different objects before and after Share model	188
Table 7.15: Output Summary of the Share model	189
Table 7.16: Precedence of Share model applications over other rights allocation models	189
Table 7.17: Output summary of Merge _{Use} and Merge _{Meta} models	191

Table 7.18: Comparison of various characteristics of Merge model	191
Table 7.19: Rights of different roles associated with the objects before and after Merge model	192
Table 7.20: Owner and beneficiary rights over different objects before and after Merge model	193
Table 7.21: Output Summary of the Merge model.....	194
Table 7.22: Precedence of Merge model applications over other rights allocation models	195
Table 7.23: All the Possible Options for Various Characteristics of Rights Allocation Framework	197
Table 7.1: Possible permutations for use-rights models	248
Table 7.3: Table depicting all possible cases for meta-rights models	250

List of Publications

- Whitworth, B., & Ahmad, A. (2013). *The Social Design of Technical Systems: Building technologies for communities*. Aarhus, Denmark: The Interaction Design Foundation.
- Ahmad, A., Whitworth, B., & Janczewski, L. (2012). A Framework of Rights Allocation in Online Social Networks. *International Conference on Advances in Information Technology*. Bangkok, Thailand.
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- Ahmad, A., & Whitworth, B. (2012). A Reduction Tree for Social Networks. *8th Annual IIMS Conference*. Auckland, New Zealand.
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Terms used in formulae

<i>Admin</i>	–	Administrator of a system
<i>AC</i>	–	Attestation Certificate
<i>AU</i>	–	Active Users
<i>Ben</i>	–	Beneficiary
<i>D/C</i>	–	Don't Care condition
<i>Dge</i>	–	Delegatee
<i>Dgr</i>	–	Delegator
<i>E</i>	–	Entity
<i>GP</i>	–	General Public
<i>JBen</i>	–	Joint Beneficiary
<i>JO</i>	–	Joint Owner
<i>LR</i>	–	Local Role
<i>MR</i>	–	Meta-Right
<i>Mrg</i>	–	Merge
<i>NS</i>	–	Namespace
<i>O</i>	–	Object
<i>OC</i>	–	Object Class
<i>Opr</i>	–	Operation
<i>PO</i>	–	Primary Owner
<i>R</i>	–	Right
<i>Rep</i>	–	Replace
<i>Rev</i>	–	Revoke
<i>S</i>	–	Subject
<i>SH</i>	–	Stakeholder
<i>Shr</i>	–	Share
<i>SO</i>	–	Secondary Owner
<i>VU</i>	–	Virtual User
<i>UR</i>	–	Use-Right