References

13. MSC34-C, Do Not Use Deprecated and Obsolete Functions—Secure Coding—CERT Secure Coding (2010), Available at: https://www.securecoding.cert.org/confluence/display/c/VOID+MSC34-C.+Do+not+use+deprecated+and+obsolete+functions
15. The Open Service Availability Framework (OpenSAF) (2010), Available at: http://www.opensaf.org/
16. OCaml for Scientists (2011), Available at: http://caml.inria.fr/pub/docs/manual-ocaml
17. Kermeta—Breathe life into your metamodels (2012), Available at: http://www.kermeta.org/
18. CERT C Secure Coding Standard (2009), Available at: https://www.securecoding.cert.org/confluence/display/c/CERT+C+Coding+Standard, June 2009
19. CERT C++ Secure Coding Standard (2009), Available at: https://www.securecoding.cert.org/confluence/pages/viewpage.action?pageId=637, June 2009

© Springer International Publishing Switzerland 2015
D. Mouheb et al., Aspect-Oriented Security Hardening of UML Design Models,
DOI 10.1007/978-3-319-16106-8
23. Aspicere2, more AOP for C (2009), Available at: http://mcis.polymtl.ca/~bram/aspicere/, Oct 2009
41. Aspect-Oriented Software Development (2010), Available at: www.aosd.net. Last visited: May 2010
45. D. Bell, L. LaPadula, Secure computer systems: mathematical foundations model. M74-244, Mitre Corporation (1975)
59. S. Clarke, E. Baniassad, Aspect-Oriented Analysis and Design: The Theme Approach (Addison-Wesley, Boston, 2005)
78. P. Epstein, R.S. Sandhu, Towards a UML based approach to role engineering, in Proceedings of the 4th ACM Workshop on Role-Based Access Control (ACM, New York, 1999), pp. 135–143
226 References


108. F. Jouault. Eclipse QVT Operational (2008), Available at: http://www.eclipse.org/mmt/?project=qvto


230 References


Index

A
Abstract, 6, 19, 66, 167
  Action, 114
  Element, 88
  Meta-element, 73
  Method, 121
  Model, 40, 213
  Syntax, 6, 11, 19, 21, 22, 217
Abuse cases, 50, 55
  Discretionary access control, 5
  Mandatory access control, 5
  Role-based access control, 4, 5, 54, 113
Action, 9, 20, 21, 49, 75, 80, 97, 114, 120, 124, 127, 136, 138, 194, 210, 216
  Accept, 194
  Action language, 163, 193, 218
  Call operation, 124, 127, 129, 140, 142, 145, 146, 193–195, 197
  Create object, 140, 142, 145
  Destroy object, 140, 142, 145
  Input pin, 140
  Opaque, 140, 145, 194, 195, 197
  Output pin, 140
  Read structural feature, 140, 142, 145
  Read variable, 195, 197
  Write structural feature, 140, 142, 145
  Write variable, 195, 198
Activity diagram, 50, 72, 73, 76, 80, 163, 193, 195–197, 204, 210, 212, 215–217
  Activity diagram adaptation, 73
  Adaptation rule, 73–75, 216
  Add adaptation, 93, 103, 104, 116, 124, 127, 131, 137, 141
  Behavioral adaptation, 73
  Class diagram adaptation, 73
  Remove adaptation, 141
  Sequence diagram adaptation, 73
  State machine diagram adaptation, 73
  Structural adaptation, 73
  Adaptive programming, 26, 27
Advice, 9, 24, 31, 73, 75, 179, 204
  Advice body, 204, 207
  Advice execution, 183, 207
  After-advice, 24, 31, 204
  Around-advice, 24, 31, 204
  Before-advice, 24, 31, 204
  Alf, 21, 193–196, 199, 211, 212, 216
  Alf expression, 193–197, 204, 217
  AOM profile, 71, 85, 86, 216, 218
  Apply function, 171, 174, 181, 183, 186, 205, 207
  Aspect, 9, 28, 32, 70, 71, 74, 179, 217
    Application-independent aspect, 69, 70, 87
    Aspect adaptation, 69–71, 87–89, 92, 93, 115, 124, 127, 131
    Aspect-Oriented Modeling, 3, 8, 9, 32, 47, 57, 58, 66, 137, 215
    Aspect-Oriented Programming, 3, 8, 23, 33
    Aspect-Oriented Software Development, 40
    AspectC++, 70
    AspectJ, 24, 70, 73
  Assignment, 209, 211, 216
  Atlas Transformation Language, 43
    ATL, 43
    ATL Virtual Machine, 43
    Atlas Model Weaver, 43
Attacker, 4, 5, 48, 210

© Springer International Publishing Switzerland 2015
D. Mouheb et al., Aspect-Oriented Security Hardening of UML Design Models,
DOI 10.1007/978-3-319-16106-8
Authentication, 5, 58, 69, 215, 216
Authenticity, 48, 54
Authorization, 5, 69, 111, 164, 212, 216

B
Base model, 70, 71, 87, 91, 216, 218
Behavior diagram, 47, 50, 51, 54–56
Buffer overflow, 128

C
Caching, 194
Class, 75, 77
    Association, 75, 77
    Attribute, 75, 77
    Class adaptation, 75
    Class diagram, 72, 73, 76, 215, 216, 219
    Operation, 75, 77, 194
Closure, 174, 186, 205
Code generation, 41, 106
Communication diagram, 50, 73
Completeness, 148, 216
Component diagram, 73
Computation, 168, 203
Concrete syntax, 6, 217
Concurrency, 195
Condition, 198
Confidentiality, 5, 69, 163, 215
Constant, 196
Continuation, 168, 200, 204
    Continuation-Passing Style, 164, 168, 193
Control token, 197
Correctness, 148, 216
Cost, 213
CPS, 199, 212, 216, 217, 219
    CPS transformation, 174
Cross-site Scripting, 113, 189, 207
Crosscutting concern, 8, 58, 215
CUP Parser Generator for Java, 110

D
Data value, 197, 198
Dataflow pointcut, 163, 193, 207, 210, 212
Decryption, 164, 212
Deductive proof systems, 217
Defunctionalization, 170, 174, 193, 212, 216, 217
Denotational semantics, 167, 174, 196, 197, 199
Dependency, 208, 212
Deployment diagram, 73

E
Eclipse M2M QVT Operational, 111
Edge, 80, 97, 138, 195, 197, 198
    Incoming, 97, 138
    Outgoing, 97, 138
Encryption, 164, 212
Environment, 167, 197, 204
Exception handling, 195
Executable
    Behavior, 193
    Model, 6, 218
Execution semantics, 92
Expression, 196, 199
Extensible Messaging and Presence protocol, 119

F
Faire exchange, 48, 50, 54
Filtering, 91
Flaw, 213
Formal semantics, 48, 161, 163, 212, 216
Foundational UML, 19
    Invocation actions, 20
    Link actions, 20
    Object actions, 20
    Structural feature actions, 20
Frame, 174, 194, 204, 205, 216
    Frame-based semantics, 174, 199, 212, 219
    Marker frame, 208
Function, 195–197
    Argument, 200
    Body, 199
    Call, 193, 208
    Definition, 199
    Evaluation, 211
    Execution, 208, 209
    Identifier, 200
    Parameter, 199

G
Graph transformation, 217
Guard condition, 138

H
HyperJ, 26, 27
Index

I
IBM Model Transformation Framework, 43
IBM-Rational Software Architect, 106, 216
Implementation, 213
Information flow, 54, 164, 184, 207, 212, 216
Input validation, 111, 136, 163
Integrity, 5, 54, 69, 163, 215
Interaction, 78
  Diagram, 50
  Fragment, 75
  Overview diagram, 50, 73
Internet Relay Chat (IRC), 119
Introduction, 9, 32, 73, 75

J
Java meta-data interface, 42
Join point, 9, 24, 28, 33, 71, 75, 88, 179, 204, 205, 212, 215
  Advice execution, 29
  Constructor call, 29
  Constructor execution, 29
  Exception-handler, 29
  Field reference, 29
  Field set, 29
  Method call, 29
  Method execution, 29
  Object initialization, 29
  Object pre-initialization, 29
  Static initializer execution, 29
Judgment, 142

K
Kermeta, 43

L
Label, 195, 198
Lambda calculus, 164, 165
  Bound variable, 165
  Conversion, 166
  Expression, 165
  Free variable, 165
  Function abstraction, 165
  Function application, 165
  Reduction, 166
  Substitution, 166
  Variable, 165
Lifeline, 78
Location, 196
Logging, 194
Logical operator, 77

M
Malicious scripts, 210
Mapping rule, 91, 92
  Add mapping rule, 103
  Remove mapping rule, 104
Matching, 9, 25, 89, 93, 179, 193, 204, 205, 212
  Advice, 205
  Semantic rule, 144
  Semantics, 142, 179, 194, 204
Message, 75, 78
Meta-model, 6, 218
Meta-Object Facility, 6, 11, 51
Model, 6, 12, 215
  Model checker, 48
  Model Driven Software Development, 40
  Model manipulation, 106
  Model transformation, 7, 35, 40, 217
Model-Driven Architecture, 35
Model-Driven Engineering, 2, 6, 215
Model-to-model transformation, 35, 71, 85, 216
Model-to-text transformation, 35
Modeling language, 6, 217
Modeling view, 73
Source model, 92
Target model, 92
Multi-Dimensional Separation of Concerns, 26, 27

N
Node, 94, 97, 138, 195, 197
  Action, 20, 137, 140, 195
  Activity parameter, 20
  Control node, 20, 97, 137, 138, 195, 215, 216
  Decision, 97, 138, 195, 198
  Executable, 138, 195, 215
  Final, 138, 195, 198
  Fork, 97, 138
  Initial, 138, 195, 197
  Join, 97, 138
  Merge, 97, 138, 195, 198
  Object node, 20
  Source, 198
  Structured activity, 102, 138, 140

O
Object Constraint Language, 18, 42, 49, 216, 218
  Constraint, 49
  Guards, 49
### Index

- Invariants, 49
- OCL expression, 76
- Post-condition, 49
- Pre-condition, 49
- Object-Oriented Programming, 23
- OMG, 11, 19, 71, 193
- Open Architecture Ware, 43
- Xtend, 43
- XWeave, 43
- OpenSAF, 111, 216
- Operational semantics, 217

### P
- Package, 75, 77
- Pointcut, 9, 24, 28, 33, 70, 71, 75, 179, 204, 215, 216
- Call, 164, 193
- Cflow, 164
- Context matching pointcuts, 29
- Designator, 76
- Dflow, 164
- Exec, 164, 193
- Get, 164, 193
- Kinded pointcuts, 29
- Scope matching pointcuts, 29
- Set, 164, 193
- Pointcut-advice model, 8, 24, 27
- Portability, 216
- PROC language, 178
- Proceed, 24, 140, 179, 204, 207, 216
- Product Line Software Engineering, 40

### Q
- QVT, 42, 71, 85, 89, 216, 218
  - Black-box, 89
  - Engine, 91
  - Mapping rules, 218
  - QVT core, 42
  - QVT operational, 42
  - QVT relations, 42

### R
- Race conditions, 218
- RBAC, 5, 58, 71, 73
  - Constrained RBAC, 115
  - Flat RBAC, 115
  - Hierarchical RBAC, 115
  - Role-permission assignment, 116
  - Symmetric RBAC, 115
  - User-role assignment, 116
- Reference, 196, 199
- Relation Definition Language, 43
- Reuse, 215
- Reverse engineering, 106

### S
- Sanitizing, 189, 211
- Secrecy, 48, 54
- Secure communication, 54
- Security, 215
  - Security aspect, 87, 215, 216, 218
  - Security aspects library, 70
  - Security concern, 215
  - Security design patterns, 57
  - Security expert, 48, 70, 71, 87
  - Security flaw, 4
  - Security hardening, 1, 4, 70, 218
  - Security mechanism, 4, 111, 212, 216
  - Security policy, 4
  - Security profile, 48, 49
  - Security property, 48, 216
  - Security property editor, 108
  - Security requirement, 4, 48, 49, 58, 215, 216
  - Security solution, 70, 87, 215
  - Security specialist, 215
  - Security specification, 49
- Semantics, 7, 196, 204
  - Semantic rule, 148, 216
- Sequence diagram, 50, 72, 73, 75, 76, 78, 215–219
- Sequence pointcut, 217
- Session Initiation Protocol, 119
- SIP communicator, 111, 216
- Software, 215
  - Design, 73
  - Developer, 215
  - Development, 215
  - Development life cycle, 215
  - Development process, 215
  - Engineering, 2
  - Refactoring, 41
  - Security, 4
  - Security hardening, 212, 215
  - System, 215
- Spam, 124
- Specification, 212, 215
- SQL injection, 113, 207
- State machine diagram, 50, 73, 76, 78, 215, 216, 218, 219
- Region, 78
- State, 78
- State machine, 78
Sub-machine state, 102
Transition, 78, 215, 218
Static crosscutting, 28
Stereotype, 18, 48, 49, 74, 218
Store, 197, 198, 204
Structural diagram, 73
Substitution rule, 146
Syntax, 138, 195, 216
Systems engineering, 218
Systems Modeling Language, 218

Tag, 207, 211
  Mapping rules, 104
  Propagation rules, 211
  Tagging environment, 186, 208, 211
Tagged values, 18, 48, 49, 74–76, 218
Theorem prover, 48
Timing diagram, 50
Token, 197, 198
Tracematches, 218
Transactions, 218
Transformation definition, 39, 89
  Activity transformation definition, 91, 97
  Class transformation definition, 91, 92
  Sequence transformation definition, 91, 99
  State machine transformation definition, 91, 93
Transformation language, 89
Transformation rule, 39, 71
Trustworthy, 213
Type, 196

U
UML, 2, 7, 11
  Behavioral diagram, 15
  Constraints, 18
  Design, 48, 215
  Design model, 85
  Development view, 14
  Diagram, 12, 15, 48
  Element, 75, 193
  Extensions, 18
  Logical view, 14
  Meta-element, 48, 76
  Meta-language, 48, 51
  Meta-model, 57, 91
  Model, 216, 217
  Modeling framework, 58
  Physical view, 14
  Process view, 14
  Profile, 57, 70, 75, 215, 218
  Structural diagram, 15
  Use case view, 14
  Views, 13
  Use case diagram, 50
  User permission, 113, 120

V
Value, 197, 204
Variable, 196, 198, 204, 216
Verification and validation, 216
Vulnerability, 1, 4, 113, 207, 210, 212

W
Weaving, 9, 25, 193, 205, 212, 216, 217
  Adaptation, 97, 216
  Configuration, 146
  Process, 216
  Rule, 147, 216
  Semantics, 146, 181, 205
  Weaving interface, 71, 87, 218
Web page, 210
Woven model, 91, 216, 217

X
XSS attack, 210
XUML, 19, 163, 193, 207, 210
  xUML model, 193, 212, 216