

**Table of contents**

---

- European foreword.....7**
- Introduction.....8**
- 1 Scope.....9**
- 2 Normative references ..... 10**
- 3 Terms, definitions and abbreviated terms..... 11**
  - 3.1 Terms from other standards..... 11
  - 3.2 Terms specific to the present standard ..... 11
  - 3.3 Abbreviated terms..... 16
  - 3.4 Nomenclature ..... 16
- 4 Principles ..... 17**
  - 4.1 Objectives..... 17
  - 4.2 Common Concepts and common types ..... 17
  - 4.3 Architecture ..... 18
  - 4.4 Time handling principle..... 19
  - 4.5 Simulation lifecycle ..... 20
  - 4.6 Simulation method..... 21
    - 4.6.1 Discrete-event simulation (DES) ..... 21
    - 4.6.2 Parallelization and distribution..... 22
    - 4.6.3 Inter component communication ..... 22
  - 4.7 Models, Services and Components ..... 23
    - 4.7.1 Objects..... 23
    - 4.7.2 Components..... 25
    - 4.7.3 Factories ..... 27
    - 4.7.4 Models and Services..... 27
  - 4.8 Publication and Persistence..... 28
  - 4.9 Dynamic invocation..... 29
  - 4.10 Components meta data ..... 31
    - 4.10.1 Catalogue ..... 31
    - 4.10.2 Package..... 31

4.10.3	Configuration.....	32
4.11	Model exchanges considerations.....	32
4.11.1	Overview.....	32
4.11.2	SMP Bundle.....	32
<b>5</b>	<b>Interface requirements.....</b>	<b>33</b>
5.1	Common.....	33
5.1.1	Primitive Types specification.....	33
5.1.2	Time Kinds.....	35
5.1.3	Path string.....	36
5.1.4	Universally Unique Identifiers (UUID).....	37
5.1.5	Exception specification.....	37
5.2	Components and Objects interfaces.....	37
5.2.1	Object Specification (IObject).....	37
5.2.2	Collection Specification (ICollection).....	38
5.2.3	Component Specification.....	39
5.2.4	Aggregation.....	42
5.2.5	Composition.....	45
5.2.6	Events.....	47
5.2.7	Entry points.....	50
5.2.8	Dynamic Invocation.....	50
5.2.9	Persistence (IPersist).....	54
5.2.10	Failures.....	55
5.2.11	Field interfaces.....	56
5.2.12	Requirements on utilization of Simulation Environments interfaces by components.....	62
5.3	Simulation Environment interfaces.....	63
5.3.1	Logger (ILogger interface).....	63
5.3.2	Time Keeper (ITimeKeeper).....	65
5.3.3	Scheduler (IScheduler).....	67
5.3.4	Event Manager (IEventManager).....	75
5.3.5	Resolver (IResolver).....	79
5.3.6	Link Registry (ILinkRegistry).....	80
5.3.7	Simulator (ISimulator).....	82
5.3.8	Persistence.....	94
5.3.9	Publication.....	95
5.3.10	Type Registry.....	102
5.3.11	Component Factory (IFactory).....	107

5.4	Meta data .....	108
5.4.1	Catalogue .....	108
5.4.2	Package.....	112
5.4.3	Configuration data.....	112
<b>6</b>	<b>Implementation mapping .....</b>	<b>113</b>
6.1	Catalogue to C++ .....	113
6.1.1	Mapping templates.....	113
6.1.2	Namespaces and files.....	116
6.1.3	Element and Type Visibility Kind .....	116
6.1.4	Mapping of elements.....	117
6.1.5	Basic Value Types .....	126
6.1.6	Compound Value Types.....	128
6.1.7	Reference Types.....	130
6.2	Package to library .....	133
6.2.1	Mapping templates.....	133
6.2.2	Common to Unix and Windows .....	133
6.2.3	Unix (Shared object) .....	134
6.2.4	Addendum for Windows Dynamic Link Library (DLL) .....	135
6.2.5	SMP Bundle .....	136
<b>Annex A</b>	<b>(normative) Catalogue file - DRD .....</b>	<b>137</b>
A.1	Catalogue DRD .....	137
A.1.1	Requirement identification and source document.....	137
A.1.2	Purpose and objective.....	137
A.2	Expected response.....	137
A.2.1	Scope and content .....	137
A.2.2	Special remarks .....	137
<b>Annex B</b>	<b>(normative) Package file - DRD .....</b>	<b>138</b>
B.1	Package DRD.....	138
B.1.1	Requirement identification and source document.....	138
B.1.2	Purpose and objective.....	138
B.2	Expected response.....	138
B.2.1	Scope and content .....	138
B.2.2	Special remarks .....	138
<b>Annex C</b>	<b>(normative) Configuration file - DRD .....</b>	<b>139</b>
C.1	Configuration DRD.....	139
C.1.1	Requirement identification and source document.....	139

C.1.2	Purpose and objective.....	139
C.2	Expected response .....	139
C.2.1	Scope and content .....	139
C.2.2	Special remarks .....	139
<b>Annex D (normative) Manifest file - DRD.....</b>		<b>140</b>
D.1	Configuration DRD.....	140
D.1.1	Requirement identification and source document.....	140
D.1.2	Purpose and objective.....	140
D.2	Expected response .....	140
D.2.1	Scope and content .....	140
D.2.2	Special remarks .....	142
<b>Bibliography.....</b>		<b>143</b>

## Figures

Figure 4-1: Common Concepts and Type System .....	18
Figure 4-2: SMP Architecture .....	18
Figure 4-3: SMP State machine.....	20
Figure 4-4: Object mechanisms.....	24
Figure 4-5: Overview of components hierarchy .....	25
Figure 4-6: Component Mechanisms.....	26
Figure 4-7: Component State machine .....	26
Figure 4-8: Sequence of calls for dynamic invocation .....	30

## Tables

Table 4-1: Overview of simulation states .....	21
Table 4-2: ViewKind values .....	28
Table 5-1: Primitive Types.....	33
Table 5-2: Component states .....	39
Table 5-3: Semantically equivalent types for connections.....	61
Table 5-4: Default Log Message Kinds.....	64
Table 5-5: Condition for emitting predefined global events .....	78
Table 6-1: C++ declaration templates.....	114
Table 6-2: C++ definition templates.....	116
Table 6-3: C++ mapping for the Visibility kind attribute.....	116
Table 6-4: C++ mapping of Association depending on ByPointer attribute.....	119
Table 6-5: C++ mapping for the Direction kind attribute.....	120

Table 6-6: C++ mapping for Property depending on ByPointer attribute .....	121
Table 6-7: C++ mapping for the Operator attribute kinds .....	124
Table 6-8: C++ declaration templates for packages.....	133
Table D-1 : SMP Manifest Key .....	141