

FOUNDATION FOR INTELLIGENT PHYSICAL AGENTS

FIPA Content Language Library Specification

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18 **Foreword**

19 The Foundation for Intelligent Physical Agents (FIPA) is an international organization that is dedicated to promoting the
20 industry of intelligent agents by openly developing specifications supporting interoperability among agents and agent-
21 based applications. This occurs through open collaboration among its member organizations, which are companies and
22 universities that are active in the field of agents. FIPA makes the results of its activities available to all interested parties
23 and intends to contribute its results to the appropriate formal standards bodies.

24 The members of FIPA are individually and collectively committed to open competition in the development of agent-
25 based applications, services and equipment. Membership in FIPA is open to any corporation and individual firm,
26 partnership, governmental body or international organization without restriction. In particular, members are not bound to
27 implement or use specific agent-based standards, recommendations and FIPA specifications by virtue of their
28 participation in FIPA.

29 The FIPA specifications are developed through direct involvement of the FIPA membership. The status of a
30 specification can be either Preliminary, Experimental, Standard, Deprecated or Obsolete. More detail about the process
31 of specification may be found in the FIPA Procedures for Technical Work. A complete overview of the FIPA
32 specifications and their current status may be found in the FIPA List of Specifications. A list of terms and abbreviations
33 used in the FIPA specifications may be found in the FIPA Glossary.

34 FIPA is a non-profit association registered in Geneva, Switzerland. As of January 2000, the 56 members of FIPA
35 represented 17 countries worldwide. Further information about FIPA as an organization, membership information, FIPA
36 specifications and upcoming meetings may be found at <http://www.fipa.org/>.

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47 **1 Scope**

48 This document contains specifications for structuring the FIPA Content Language Library (CLL) including: status of a
49 FIPA compliant content language, maintenance of the library and inclusion criteria. This specification also maintains an
50 updated list of FIPA content languages providing the information required to identify those languages and recover their
51 relative specifications.
52

53 The first part of this document is primarily concerned with defining the structure of the FIPA CLL and the requirements
54 for a content language to be included in the library. The elements of the library are listed in the FIPA CLL Registry table
55 (see *Section 3.4, Registry*). The content languages listed in the FIPA CLL Registry table are compliant to the FIPA CLL
56 requirements. FIPA is responsible for updating this list, but agent developers should be aware of possible changes to
57 the FIPA CLL components. We recommend to all readers to consult the latest version of the FIPA Content Language
58 Registry table for the latest specifications.
59

60 **2 Overview**

61 This specification focuses on the organization, structure, and status of the FIPA CLL and discusses the main
62 requirements that a content language must satisfy in order to be FIPA compliant. The FIPA Content Library Registry
63 document lists the current members of the library.

64
65 The objectives of standardizing and defining a library of FIPA compliant content languages are:

- 66 • To allow more flexibility and efficiency for many applications (for example, web based, real-time, nomadic), and,
- 67 • To increase interoperability between agents developed in different contexts, by facilitating the reuse of content
68 languages. This would enable for instance the use of RDF schemas emerging on the Web, or the capability of
69 expressing choices in an agent content language, etc.

70
71 In the following sections, we present the basic principles of the FIPA CLL. These principles help to guarantee that the
72 CLL is stable, that there are public rules for the inclusion and maintenance of the CLL and that the CLL can be used by
73 agent developers seeking a public content language.
74
75
76

77 3 FIPA Content Language Library

78 3.1 Status

79 The definition of a content language belonging to the FIPA CLL is normative. That is, if a given agent advertises that it
80 accepts one of the languages in the FIPA CLL, then it must implement a parser or interpreter for the language as it is
81 defined in the FIPA CLL. However, FIPA-compliant agents are not required to implement any of the FIPA CLL
82 languages, except those required for agent management.

83
84 By collecting content language definitions in a single, publicly accessible registry, the FIPA Content Language Library
85 facilitates the use of standardized content languages by agents developed in different contexts. It also provides a
86 greater incentive to developers to make their content languages generally applicable.

87
88 The name assigned to the content language must uniquely identify which content language is used within a FIPA ACL
89 message. The name must be prefixed by the string `FIPA-` and ended by a suffix of five digits (for example, FIPA-SL-
90 00008, FIPA-CCL-00009, FIPA-KIF-00010, FIPA-RDF-00011). The suffix consists of the five digits that identify the FIPA
91 document containing the specification of the content language.

92
93 FIPA is responsible for maintaining a consistent list of content language names and to make it publicly available to FIPA
94 members and non-members. This list is located in the FIPA Content Language Library Registry.

95
96 Furthermore, every FIPA-compliant content language must specify at least one canonical encoding scheme that can be
97 used for this language within a FIPA ACL message. Most of the languages included in the FIPA CLL include a “string-
98 based” encoding scheme, but other encoding formats are allowed so that ACL messages can more efficiently represent
99 the content of application specific data formats. The encoding schemes that a FIPA content language can support must
100 be supplied as part of the language specification in the FIPA CLL, along with a name identifying each encoding. If
101 several encoding schemes are supplied, the specific encoding scheme that is used in a particular FIPA ACL message
102 must be specified in the `language-encoding` parameter of the message. In addition, one of the encoding schemes
103 shall be designated as the default encoding, to be used if the `language-encoding` parameter is not specified.

104
105 In addition to the list of encoding schemes, each content language in the FIPA CLL may specify additional information,
106 such as stability information, versioning, contact information, different support levels, etc.

107

108 3.2 Maintenance

109 The most effective way of maintaining the FIPA CLL is through the use of the languages themselves by different agent
110 developers. This is the most direct way of discovering possible bugs, errors, inconsistencies, weaknesses, possible
111 improvements, as well as capabilities, strengths, efficiency etc.

112
113 In order to collect feedback on the content languages in the library and to promote further research, FIPA encourages
114 coordination between language designers, agent developers, and FIPA members. FIPA will make an annual report on
115 the use of the content languages in the library.

116
117 FIPA will designate a Technical Committee (TC) to maintain the FIPA CLL. The FIPA CLL will be managed by this TC,
118 which will be responsible for the following items:

- 119
- 120 • Collecting feedback and the comments about languages in the FIPA CLL. Depending on interest, the technical
121 committee may organize more specific Working Groups. These groups would be responsible for maintaining public
122 lists referring projects and people that are currently using such languages.
- 123
- 124 • Inviting contributions in various forms: e-mail comments, written reports, papers, technical documents and so forth.
125 The current email address of the TC maintaining the FIPA CLL is: comm@fipa.org.
- 126

- 127 • All TC members will be notified about contributions, comments or proposed changes and should be able to access
128 them.
- 129
- 130 • The proposed updates to the FIPA CLL must be discussed and approved during an official FIPA meeting, in order
131 that the FIPA community may be involved with and informed of all of the FIPA approved content languages in the
132 library.
- 133
- 134 • In the future, FIPA intends to supply templates (publicly accessible from the FIPA web site) in order to facilitate
135 submission of languages to the CLL and to ensure that language developers meet the requirements for the
136 submission of a language to the FIPA CLL.
- 137

138 **3.3 Inclusion Criteria**

139 In order to populate the FIPA CLL, it is necessary to set some fundamental guidelines for the selection of specific
140 content languages.

141 The minimal criteria that must be satisfied for a content language to be FIPA-compliant are:

- 142
- 143
- 144 • A good level of syntactical development is required. A "good" level means that, for example, the syntax of the
145 language should allow the implementation of an effective parser. Content languages can express one or more
146 actions, objects and propositions. If not all expressions are supported then all communicative acts may not be
147 allowable. These not allowed communicative acts should be declared explicitly.
- 148
- 149 • A clear and intuitive (although not necessarily formal) semantics that fits with the use of FIPA-ACL must be
150 specified. In particular, the composite semantics of ACL messages containing a communicative act which
151 supervenes on a content expression must be specified.
- 152
- 153 • Examples of the usage of such a language (a parallel with SL for instance for a better understanding of what
154 objects, actions and propositions are, etc.) are recommended.
- 155
- 156 • Substantial and clear documentation must be provided. This means that the proposal must be already well
157 structured. FIPA members are in no way responsible for translating submitted content languages into an acceptable
158 form.
- 159
- 160 • The utility of such a new language should be made clear. Either the language should include functionality which is
161 useful across a wide range of agent activities (introducing extensions or improvements on existing languages) or it
162 should directly support a single but very common agent activity (for example, travel assistance).
- 163

164 FIPA does not enforce the use of any particular content language, except for the case of FIPA-Agent-Management,
165 for which FIPA-SL0 is mandatory (see [FIPA00008] and [FIPA00023]).

167 **3.4 Registry**

168 *Table 1* contains the name of the FIPA content languages that are currently part of FIPA CLL and the name of the FIPA
169 specifications containing the current specification of those content languages.

Content Language	FIPA Specification	Date	Status
FIPA-SL-00008	[FIPA00008]	2000/07/21	Experimental
FIPA-CCL-00009	[FIPA00009]	2000/07/21	Experimental
FIPA-KIF-00010	[FIPA00010]	2000/07/21	Experimental
FIPA-RDF-00011	[FIPA00011]	2000/07/21	Experimental

171 **Table 1:** FIPA Content Language Library Registry

172

173

174 **4 Conclusion**

175 In this document a specific model for a FIPA CLL has been defined. This will allow more efficient usage and
176 maintenance of the library itself.

177
178 Summarizing, the main features of such a model are:

- 179 • Every content language belonging to the FIPA CLL has a normative definition, but is optional in use.
- 181 • FIPA and its designated TC are responsible for the coordination and the maintenance of such a library.
- 182 • A content language proposed to belong to the FIPA CLL must satisfy the fundamental inclusion criteria listed in this
183 document, see *Section 3.3, Inclusion Criteria*. At least a defined syntax and a clear intuitive semantics, which fits
184 with the use of FIPA ACL, are required.

185
186
187
188 The second part of the document contains the FIPA CLL Registry. This table lists the content languages currently
189 included in the FIPA CLL and maintains the references to the FIPA specification containing the relative language
190 descriptions.
191

192 **5 References**

193 [FIPA00008] FIPA SL Content Language Specification. Foundation for Intelligent Physical Agents, 2000.
194 <http://www.fipa.org/specs/fipa00008/>

195 [FIPA00009] FIPA CCL Content Language Specification. Foundation for Intelligent Physical Agents, 2000.
196 <http://www.fipa.org/specs/fipa00009/>

197 [FIPA00010] FIPA KIF Content Language Specification. Foundation for Intelligent Physical Agents, 2000.
198 <http://www.fipa.org/specs/fipa00010/>

199 [FIPA00011] FIPA RDF Content Language Specification. Foundation for Intelligent Physical Agents, 2000.
200 <http://www.fipa.org/specs/fipa00011/>

201 [FIPA00023] FIPA Agent Management Specification. Foundation for Intelligent Physical Agents, 2000.
202 <http://www.fipa.org/specs/fipa00023/>
203