

FOUNDATION FOR INTELLIGENT PHYSICAL AGENTS

FIPA Nomadic Application Support Monitor Agent Specification

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19 **Foreword**

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21 industry of intelligent agents by openly developing specifications supporting interoperability among agents and agent-
22 based applications. This occurs through open collaboration among its member organizations, which are companies and
23 universities that are active in the field of agents. FIPA makes the results of its activities available to all interested parties
24 and intends to contribute its results to the appropriate formal standards bodies.

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28 implement or use specific agent-based standards, recommendations and FIPA specifications by virtue of their
29 participation in FIPA.

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

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

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48 **1 Scope**

49 This document is part of the FIPA specifications and deals with agent middleware to support applications in nomadic
50 environment. This specification also forms part of the FIPA Nomadic Application Support Specification [FIPA00066] and
51 contains specifications for:

52
53 Monitor Agent (MA) functionality.

54

2 Monitor Agent Ontology

2.1 Object Descriptions

This section describes a set of frames that represent the classes of objects in the domain of discourse within the framework of the FIPA-Nomadic-Application ontology.

The following terms are used to describe the objects of the domain:

Frame. This is the mandatory name of this entity that must be used to represent each instance of this class.

Ontology. This is the name of the ontology, whose domain of discourse includes the parameters described in the table.

Parameter. This is the mandatory name of a parameter of this frame.

Description. This is a natural language description of the semantics of each parameter.

Presence. This indicates whether each parameter is mandatory or optional.

Type. This is the type of the values of the parameter: Integer, Word, String, URL, Term, Set or Sequence.

Reserved Values. This is a list of FIPA-defined constants that can assume values for this parameter.

2.1.1 Service Description

This type of object represents the description of each service registered with the DF.

Frame	service-description			
Ontology	FIPA-Nomadic-Application			
Parameter	Description	Presence	Type	Reserved Values
name	The name of the service.	Mandatory	String	fipa-mts-monitor
type	The type of the service.	Mandatory	String	fipa-ma
ontology	A list of ontologies supported by the service.	Optional	Set of String	FIPA-Nomadic-Application
protocol	A list of interaction protocols supported by the service.	Optional	Set of String	
properties	A list of properties that discriminate the service.	Optional	Set of property	

2.2 Function Descriptions

The following tables define usage and semantics of the functions that are part of the FIPA-Nomadic-Application ontology.

The following terms are used to describe the functions of the FIPA-Nomadic-Application domain:

Function. This is the symbol that identifies the function in the ontology.

Ontology. This is the name of the ontology, whose domain of discourse includes the function described in the table.

Supported by. This is the type of agent that supports this function.

Description. This is a natural language description of the semantics of the function.

Domain. This indicates the domain over which the function is defined. The arguments passed to the function must belong to the set identified by the domain.

Range. This indicates the range to which the function maps the symbols of the domain. The result of the function is a symbol belonging to the set identified by the range.

Arity. This indicates the number of arguments that a function takes. If a function can take an arbitrary number of arguments, then its arity is undefined.

2.2.1 Request Monitoring Information

Function	qos-information
Ontology	FIPA-Nomadic-Application
Supported by	MA
Description	An agent asks for quality of service information from an MA using the FIPA-Query interaction protocol (see [FIPA00027]). The agent may specify either a communication channel or transport protocol to request quality of service information from.
Domain	comm-channel / transport-protocol, qos (see [FIPA00065])
Range	qos
Arity	2

2.2.2 Subscribe to Changes

Function	qos-notification
Ontology	FIPA-Nomadic-Application
Supported by	MA
Description	An agent subscribes to notifications about changes to the quality of service from an MA using the FIPA-Subscribe interaction protocol (see [FIPA00035]).
Domain	comm-channel, qos, change-constraints / time-constraints
Range	qos
Arity	3

3 Examples

1. An MA registers with a DF (see [FIPA00023]):

```
(request
  :sender
    (agent-identifier
      :name ma@foo.com
      :addresses (sequence http://foo.com/acc))
  :receiver (set
    (agent-identifier
      :name df@foo.com
      :addresses (sequence http://foo.com/acc)))
  :language FIPA-SL0
  :protocol FIPA-Request
  :ontology FIPA-Agent-Management
  :content
    (action
      (agent-identifier
        :name df@foo.com
        :addresses (sequence http://foo.com/acc))
      (register
        (df-agent-description
          :name
            (agent-identifier
              :name ma@foo.com
              :addresses (sequence http://foo.com/acc))
          :services (set
            (service-description
              :name fipa-mts-monitor
              :type fipa-ma
              :ontology (set FIPA-Nomadic-Application))))))))
```

2. An agent wants to know the current round-trip time of communication channel named GPRS:

```
(query-ref
  :sender
    (agent-identifier
      :name agent@foo.com
      :addresses (sequence http://foo.com/acc))
  :receiver (set
    (agent-identifier
      :name ma@bar.com
      :addresses (sequence http://bar.com/acc)))
  :ontology FIPA-Nomadic-Application
  :language FIPA-SL2
  :protocol FIPA-Query
  :content
    (iota ?x
      (qos-information
        (comm-channel
          :name GPRS)
        (qos
          :rtt
            (time-value
              :direction Inbound
              :value ?x))))))
```

3. An agent wants to know the current throughput of WAP MTP (see [FIPA00076]):

```

165 (query-ref
166   :sender
167     (agent-identifier
168       :name agent@foo.com
169       :addresses (sequence http://foo.com/acc))
170   :receiver (set
171     (agent-identifier
172       :name ma@bar.com
173       :addresses (sequence http://bar.com/acc)))
174   :ontology FIPA-Nomadic-Application
175   :language FIPA-SL2
176   :protocol FIPA-Query
177   :content
178     (iota ?x
179       (qos-information
180         (transport-protocol
181           :name fipa.mts.mtp.wap.std)
182         (qos
183           :throughput
184             (rate-value
185               :direction Outbound
186               :value ?x))))))

```

4. An agent wants to get notifications about the quality of service every time the throughput drops below 1 Mbits/s or goes above 2 Mbits/s:

```

192 (subscribe
193   :sender
194     (agent-identifier
195       :name ma@bar.com
196       :addresses (sequence http://bar.com/acc))
197   :receiver (set
198     (agent-identifier
199       :name agent@foo.com
200       :addresses (sequence http://foo.com/acc)))
201   :ontology FIPA-Nomadic-Application
202   :protocol FIPA-Subscribe
203   :language FIPA-SL2
204   :content
205     (iota ?x
206       (qos-notification
207         (comm-channel
208           :name GSM)
209         (qos
210           :throughput
211             (rate-value
212               :direction Outbound
213               :value ?x))
214         (change-constraint
215           :value
216             (or
217               (<
218                 (qos
219                   :throughput
220                     (rate-value
221                       :unit Mbits/s
222                       :value 1
223                       :direction Outbound)))
224                 (>
225                   (qos
226                     :throughput

```



```
228          (rate-value
229            :unit Mbits/s
230            :value 2
231            :direction outbound))))))
232
```

4 References

- [FIPA00023] FIPA Agent Management Specification. Foundation for Intelligent Physical Agents, 2000.
<http://www.fipa.org/specs/fipa00023/>
- [FIPA00027] FIPA Query Interaction Protocol Specification. Foundation for Intelligent Physical Agents, 2000.
<http://www.fipa.org/specs/fipa00027/>
- [FIPA00035] FIPA Subscribe Interaction Protocol Specification. Foundation for Intelligent Physical Agents, 2000.
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- [FIPA00065] FIPA Nomadic Application Support Ontology Specification. Foundation for Intelligent Physical Agents, 2000.
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<http://www.fipa.org/specs/fipa00066/>
- [FIPA00076] FIPA Agent Message Transport Protocol for WAP Specification. Foundation for Intelligent Physical Agents, 2000.
<http://www.fipa.org/specs/fipa00076/>