

ISO/IEC JTC 1

Secretariat: **ANSI**

Voting begins on:  
**2010-12-01**

Voting terminates on:  
**2011-02-01**

---

---

## Information technology — Relayed multicast protocol: Specification for simplex group applications

### AMENDMENT 2: Messages and code values

*Technologies de l'information — Protocole de multidiffusion relayé:  
Spécification relative aux applications de groupe simplex*  
**AMENDEMENT 2: Messages et valeurs de code**

ISO/IEC 16512-2:2008/FDAmD 2

<https://standards.iteh.ai/catalog/standards/sist/e6571a21-ec54-4af6-83f8-a91db985f30d/iso-iec-16512-2-2008-fdamd-2>

Please see the administrative notes on page iii

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.



Reference number  
ISO/IEC 16512-2:2008/FDAM 2:2010(E)

**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

**iTeh STANDARD PREVIEW  
(standards.iteh.ai)**

[ISO/IEC 16512-2:2008/FDAmD 2](https://standards.iteh.ai/catalog/standards/sist/e6571a21-ec54-4af6-83f8-a91db985f30d/iso-iec-16512-2-2008-fdamd-2)

<https://standards.iteh.ai/catalog/standards/sist/e6571a21-ec54-4af6-83f8-a91db985f30d/iso-iec-16512-2-2008-fdamd-2>

**Copyright notice**

This ISO document is a Draft International Standard and is copyright-protected by ISO. Except as permitted under the applicable laws of the user's country, neither this ISO draft nor any extract from it may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission being secured.

Requests for permission to reproduce should be addressed to either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Reproduction may be subject to royalty payments or a licensing agreement.

Violators may be prosecuted.

In accordance with the provisions of Council Resolution 21/1986, this document is **circulated in the English language only**.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO/IEC 16512-2:2008/FDAmD 2](https://standards.iteh.ai/catalog/standards/sist/e6571a21-ec54-4af6-83f8-a91db985f30d/iso-iec-16512-2-2008-fdamd-2)

<https://standards.iteh.ai/catalog/standards/sist/e6571a21-ec54-4af6-83f8-a91db985f30d/iso-iec-16512-2-2008-fdamd-2>

## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Amendment 2 to ISO/IEC 16512-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*, in collaboration with ITU-T. The identical text is published as ITU-T Rec. X.603.1 (2007)/Amd.2 (03/2010).

(standards.iteh.ai)

[ISO/IEC 16512-2:2008/FDAmd 2](https://standards.iteh.ai/catalog/standards/sist/e6571a21-ec54-4af6-83f8-a91db985f30d/iso-iec-16512-2-2008-fdamd-2)

<https://standards.iteh.ai/catalog/standards/sist/e6571a21-ec54-4af6-83f8-a91db985f30d/iso-iec-16512-2-2008-fdamd-2>

# INFORMATION TECHNOLOGY – Relayed multicast protocol: Specification for simplex group applications

## AMENDMENT 2

### Messages and code values

#### 1 Clause 2. Normative references

Delete the following references:

- ITU-T Recommendation X.601 (2000), *Multi-peer communications framework*.
- ITU-T Recommendation X.605 (1998) | ISO/IEC 13252:1999, *Information technology – Enhanced communications transport service definition*.
- ITU-T Recommendation X.606 (2001) | ISO/IEC 14476-1:2002, *Information technology – Enhanced communications transport protocol: Specification of simplex multicast transport*.
- ITU-T Recommendation X.606.1 (2003) | ISO/IEC 14476-2:2003, *Information technology – Enhanced communications transport protocol: Specification of QoS management for simplex multicast transport*.

(standards.iteh.ai)

#### 2 Clause 3. Definitions

Add the following definitions: [ISO/IEC 16512-2:2008/FDAmD 2](https://standards.iteh.ai/catalog/standards/sist/e6571a21-ec54-4af6-83f8-a91db985f30d/iso-iec-16512-2-2008-fdamd-2)

**3.27 regular HB message:** An HB message that is relayed without interruption along the path of the RMCP-2 tree from the SMA to the receiver of the message. The originator of a regular HB message is the SMA.

**3.28 pseudo-HB message:** An HB message that indicates a fault in the delivery path of the RMCP-2 tree. The originator of a pseudo-HB message is the MA that discovers this fault.

#### 3 Clause 4. Abbreviations

Delete the following abbreviation

‘AUTH Authentication’

#### 4 Sub-clause 6.1.2

At the end of the first paragraph, delete the following: ‘and authentication information’

#### 5 Sub-clause 7.3.

Replace 7.3 with the following text:

##### 7.3 Messages

This sub-clause defines each message used in RMCP-2. The message types and corresponding values for the messages are listed in Table 23.

7.3.1 SUBSREQ message

7.3.1.1 General

The SUBSREQ message is used to subscribe to a RMCP-2 session.

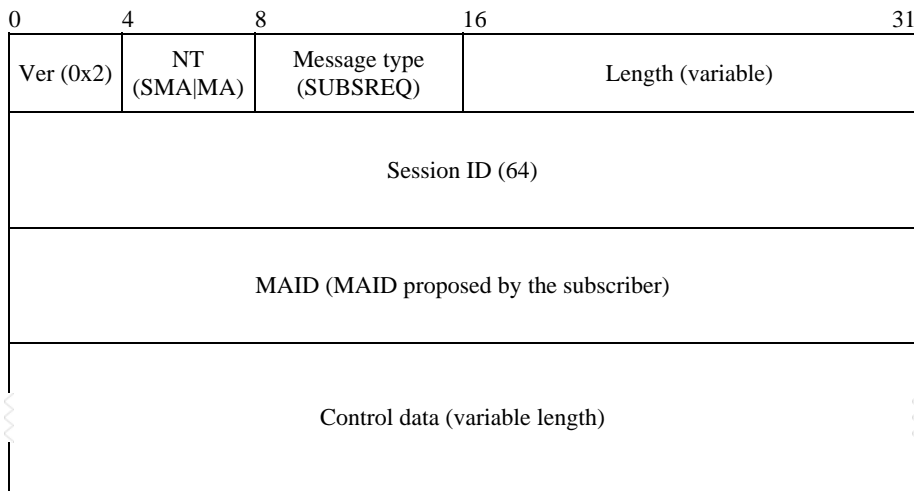


Figure 40 – SUBSREQ message

7.3.1.2 SUBSREQ message format

The format of the SUBSREQ message is shown in Figure 40. The description of each field is as follows:

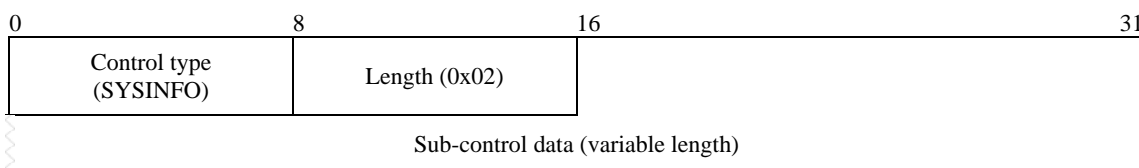
- a) *Ver* – This field denotes the current version of RMCP. Its value shall be set to 0x2.
- b) *NT* – This field denotes the message issuer's node type. Its value shall be set to one of SMA or MA coded as in Table 22.
- c) *Message type* – This field denotes the SUBSREQ message. Its value shall be set to 0x01 (see Table 23).
- d) *Length* – This field shall be set to the total length in bytes of the SUBSREQ message including the control data.
- e) *Session ID* – This field shall be set to the 64-bit value of Session ID as defined in 7.1.1.
- f) *MAID* – This field denotes the MAID proposed by the subscriber. Its value shall be formatted as defined in 7.1.2.
- g) *Control data* – The control types that may be used in SUBSREQ message, and their status, are shown in Table 2.

Table 2 – Control types for the SUBSREQ message

Control type	Meaning	Status	Reference
SYSINFO	A description of the system information of MA.	Optional	See 7.3.1.3
DATAPROFILE	A description of the requirements for forwarding data.	Optional	See 7.3.1.4

7.3.1.3 SYSINFO control

The SYSINFO control in the SUBSREQ message is used to convey system information about the subscribing MA in its SYSINFO sub-controls.





**Figure 41 – SYSINFO control**

The format of the SYSINFO control is shown in Figure 41. The description of each field is as follows:

- a) *Control type* – This field denotes the SYSINFO control. Its value shall be set to 0x08 (see Table 24).
- b) *Length* – This field denotes the length (2 bytes) of the SYSINFO control. Its value shall be set to 0x02.
- c) *Sub-control data* – The SYSINFO sub-control types that may be used in the SUBSREQ message are listed in Table 3. If more than one SYSINFO sub-control is required, each sub-control shall be preceded by a two-byte SYSINFO control.

**Table 3 – SYSINFO sub-control types for the SUBSREQ message**

Sub-control type	Meaning	Status	Reference
SI_ROOM_CMA	The number of CMA places that an MA has allocated and the total number that it is able to support.	Optional	See 7.3.11.4.3
SI_POSS_BW	The possible forwarding bandwidth that the MA can afford.	Optional	See 7.3.11.4.5

NOTE – The additional SYSINFO controls defined for other RMCP-2 messages are not relevant for the session subscription as they relate to the position once the MA has joined the RMCP-2 tree.

7.3.1.4 DATAPROFILE control

The DATAPROFILE control is used to describe the proposed data profile of the subscribing MA.



**Figure 42 – DATAPROFILE control**

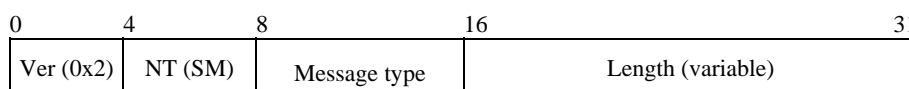
The format of the DATAPROFILE control is shown in Figure 42. The description of each field is as follows:

- a) *Control type* – This field denotes the DATAPROFILE control. Its value shall be set to 0x03 (see Table 24).
- b) *Length* – This field denotes the length in bytes of the DATAPROFILE control. Its value shall be a multiple of four bytes (see item d) in this list) and it shall not exceed 0xFC.
- c) *Data profile* – This field shall contain the data profile for the MA formatted in text mode. It follows an SDL-like encoding scheme. An example is shown in Figure 87.
- d) *Padding* – If the total length of the control type, length and data profile fields is not a multiple of 4 bytes, the padding field shall be filled with zeros to ensure that the length of the DATAPROFILE control is a multiple of 4 bytes.

7.3.2 SUBSANS message

7.3.2.1 General

The SUBSANS message is used by SM to provide the results of subscription request and bootstrapping information for the session.



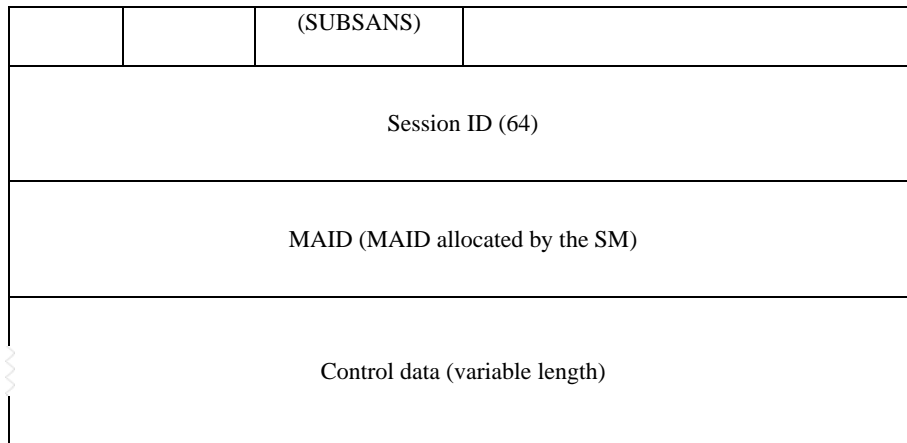


Figure 43 – SUBSANS message

7.3.2.2 SUBSANS message format

The format of the SUBSANS message is shown in Figure 43. The description of each field is as follows:

- a) *Ver* – This field denotes the current version of RMCP. Its value shall be set to 0x2.
- b) *NT* – This field denotes the message issuer's node type. Its value shall be set to the code value for SM in Table 22.
- c) *Message type* – This field denotes the SUBSANS message. Its value shall be set to 0x02 (see Table 23).
- d) *Length* – This field shall be set to the total length in bytes of the SUBSANS message including control data.
- e) *Session ID* – This field shall be set to the 64-bit value of Session ID as defined in 7.1.1.
- f) *MAID* – This field shall be set to the MAID of the subscriber as allocated by the SM. Its value shall be formatted as defined in 7.1.2.

NOTE – This may not be identical to the MAID proposed by the subscriber (see 6.1.2).

- g) *Control data* – The control types that may be used in SUBSANS message, and their status, are shown in Table 4.

Table 4 – Control types for the SUBSANS message

Control type	Meaning	Status	Reference
RESULT	The result of the subscription request.	Mandatory	See 7.3.2.3
NEIGHBORLIST	A list of MAIDs for performing the map discovery.	See Condition 1	See 7.3.2.5
DATAPROFILE	A description of the requirements for forwarding data.	Optional	See 7.3.2.4

Table 4. Condition 1: If the RESULT is successful, the NEIGHBORLIST is mandatory. If not, the NEIGHBORLIST shall not be included.

7.3.2.3 RESULT control

The RESULT control in a SUBSANS message is used to convey whether or not the MA's subscription request is successful. If successful, it returns an OK result code. If not, it returns an appropriate error code.

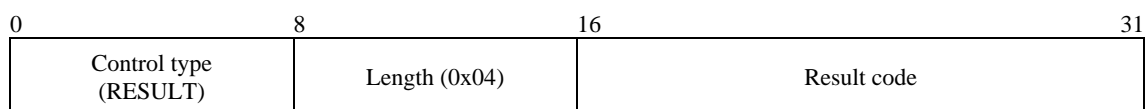


Figure 44 – RESULT control

The format of RESULT control is shown in Figure 44. The description of each field is as follows:



- a) *Control type* – This field denotes the RESULT control. Its value shall be set to 0x06 (see Table 24).
- b) *Length* – This field denotes the length (4 bytes) of the RESULT control. Its value shall be set to 0x04.
- c) *Result code* – This field denotes the result of the request. It shall be set to one of the result codes listed in Table 25.

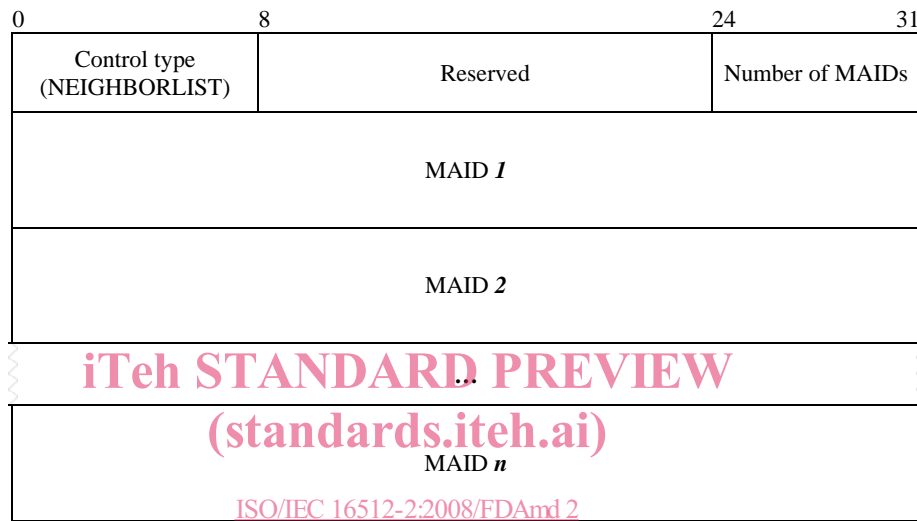
7.3.2.4 DATAPROFILE control

The DATAPROFILE control is used by the SM to confirm data profile proposed by the subscriber, or to provide extra data forwarding information to the subscriber.

The content and format of the DATAPROFILE control are specified in 7.3.1.4, Figure 42 and Figure 87.

7.3.2.5 NEIGHBORLIST control

The NEIGHBORLIST control in a SUBSANS message to a successful subscriber is used to convey a list of active MAs that may be used for bootstrapping purpose.



<https://standards.iteh.ai/catalog/standards/sist/e6571a21-ec54-4af6-83f8-a91db91e2e2c/iso-iec-16512-2-2008-fdamd-2>  
**Figure 45 – NEIGHBORLIST control**

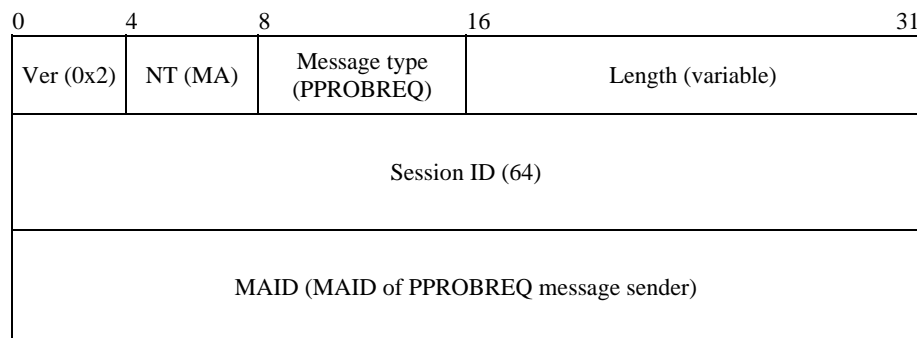
The format of NEIGHBORLIST control is shown in Figure 45. The description of each field is as follows:

- a) *Control type* – This field denotes the NEIGHBORLIST control. Its value shall be set to 0x04 (see Table 24).
- b) *Reserved* – This field is reserved for the future use. Its value shall be set to zero. It is ignored by the receiver.
- c) *Number of MAIDs* – This field shall be set to the number of MAIDs listed in NEIGHBORLIST control.
- d) *MAID(s)* – These fields MAID 1 to MAID n shall contain a list of MAIDs up to 255 active neighbors.

7.3.3 PPROBREQ message

7.3.3.1 General

The PPROBREQ message is used in the Map discovery procedure to explore network conditions and to identify potential near neighbor. It is also used to check whether the neighboring MA is still active.



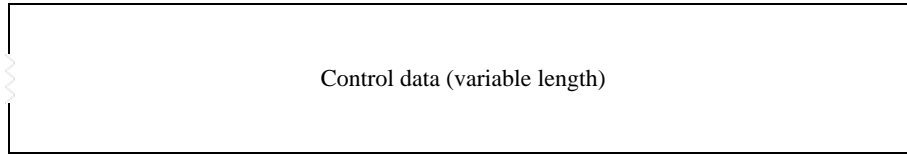


Figure 46 – PPROBREQ message

7.3.3.2 PPROBREQ message format

The format of the PPROBREQ message is shown in Figure 46. The description of each field is as follows:

- a) *Ver* – This field denotes the current version of RMCP. Its value shall be set to 0x2.
- b) *NT* – This field denotes the message issuer's node type. Its value shall be set to the code value for MA in Table 22.
- c) *Message type* – This field denotes the PPROBREQ message. Its value shall be set to 0x03 (see Table 23).
- d) *Length* – This field shall be set to the total length in bytes of the PPROBREQ message including control data.
- e) *Session ID* – This field shall be set to the 64-bit value of Session ID as defined in 7.1.1.
- f) *MAID* – This field shall be set to the MAID of the PPROBREQ message sender. Its value shall be formatted as defined in 7.1.2.
- g) *Control data* – The control types that may be used in PPROBREQ message, and their status, are shown in Table 5.

Table 5 – Control types for the PPROBREQ message

Control type	Meaning	Status	Reference
TIMESTAMP	A measure of transmission time between sending and receiving MAs.	Mandatory	See 7.3.3.3
NEIGHBORLIST	A list of MAIDs for performing the map discovery.	Optional	See 7.3.3.4
ROOTPATH	A description of the path from the SMA.	Optional	See 7.3.3.5
SYSINFO	A description of the system information of MA.	Optional	See 7.3.3.6
DATAPROFILE	A description of the requirements for forwarding data.	Optional	See 7.3.3.7

7.3.3.3 TIMESTAMP control

The TIMESTAMP control is used to measure transmission time between the sending MA and the receiving MA.

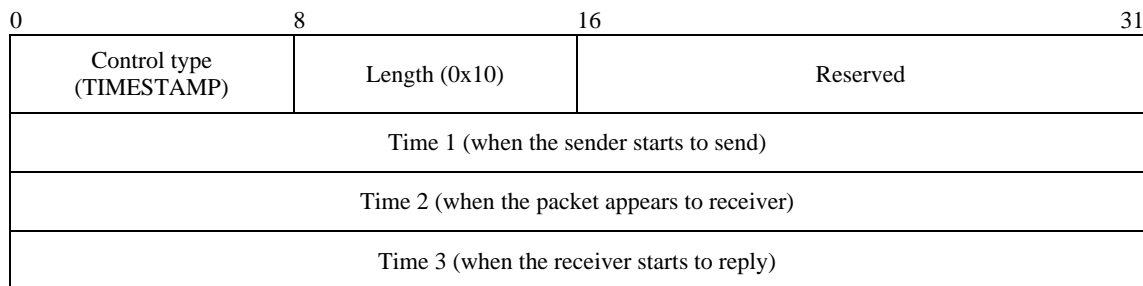


Figure 47 – TIMESTAMP control

The format of the TIMESTAMP control is shown in Figure 47. The description of each field is as follows:

- a) *Control type* – This field denotes the TIMESTAMP control. Its value shall be set to 0x09 (see Table 24).
- b) *Length* – This field denotes the length (16 bytes) of the TIMESTAMP control. Its value shall be set to 0x10.

- c) *Reserved* – This field is reserved for the future use. Its value shall be set to zero. It is ignored by the receiver.
- d) *Time 1* – This field shall be set to the time when the request message is started to be sent to its recipient.
- e) *Time 2* – This field shall be set to the time when the request message appears to the recipient. When this field is included in a request message, its value shall be set to zero.
- f) *Time 3* – This field shall be set to the time when the answer message is started to be sent to the requestor. When this field is included in a request message, its value shall be set to zero.

7.3.3.4 NEIGHBORLIST control

The NEIGHBORLIST control in a PPROBREQ message is used to convey neighbor list information held by the probing MA.

The content and format of the NEIGHBORLIST control are specified in 7.3.2.5 and Figure 45.

7.3.3.5 ROOTPATH control

The ROOTPATH control is used to convey the rootpath from the SMA to message sender. It may be used for network diagnosis and loop detection.

NOTE – This control cannot be used before an MA has joined the RMCP-2 tree as it will not yet have a rootpath.

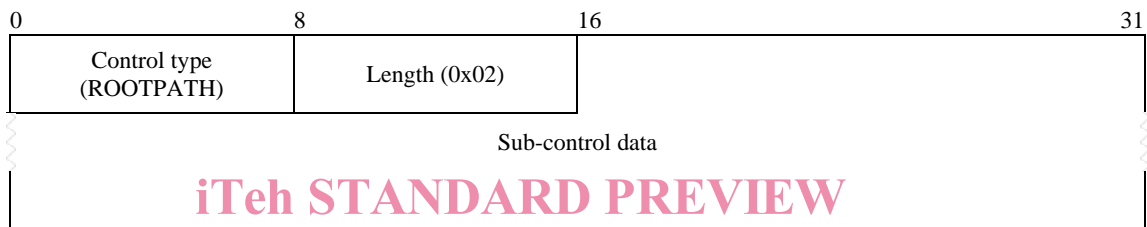


Figure 48 – ROOTPATH control

The format of the ROOTPATH control is shown in Figure 48. The description of each field is as follows:

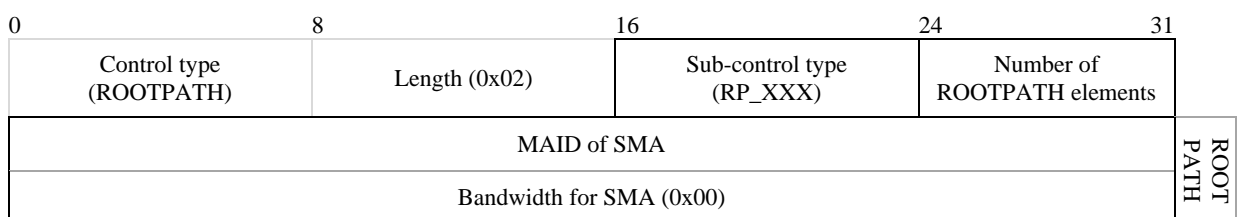
- a) *Control type* – This field denotes the ROOTPATH control. Its value shall be set to 0x07 (see Table 24).
- b) *Length* – This field denotes the length (2 bytes) of the ROOTPATH control. Its value shall be set to 0x02.
- c) *Sub-control data* – The RP\_XXX sub-control that shall be used in the ROOTPATH control is shown in Table 6.

Table 6 – RP\_XXX sub-control type for the ROOTPATH control

Sub-control type	Meaning	Status	Reference
RP_XXX	Specification of rootpath elements to be used.	Mandatory	See 7.3.3.5.1

7.3.3.5.1 RP\_XXX sub-control

Figure 49 shows the general format of the RP\_XXX sub-control preceded by a ROOTPATH control. RP\_XXX stands for one of the ROOTPATH types listed in Table 26 (see note). These RP\_XXX sub-control represents different combinations of fields for MAIDs, bandwidth and delay. If the RP\_XXX sub-control indicates that any of the MAIDs, bandwidth or delay fields are not needed, these fields shall not be present in the RP\_XXX sub-control. The length of the rootpath element, in bytes, for each of the RP\_XXX sub-control is indicated in Table 26.



Delay for SMA (0x00)	ROOTPATH element
MAID of MA 1	
Bandwidth for MA 1 (Mbps)	
Delay for MA 1 (seconds)	
...	
MAID of MA <i>n</i>	ROOTPATH element
Bandwidth for MA <i>n</i> (Mbps)	
Delay for MA <i>n</i> (seconds)	

Figure 49 – General format for RP\_XXX sub-control

The format of an RP\_XXX sub-control preceded by a ROOTPATH control is shown in Figure 49. The description of each field of the RP\_XXX sub-control is as follows:

- a) *Sub-control type* – This field denotes the RP\_XXX sub-control. Its value shall be set to one of the code values in Table 26.
- b) *Number of ROOTPATH elements* – This field shall be set to the number of ROOTPATH elements in the RP\_XXX sub-control.
- c) *MAID* – This field shall be set to that of the MAID corresponding to that element, if present. This field is for each element in the rootpath, listed in order from the SMA.
- d) *Bandwidth* – This field shall be set to the bandwidth, in Mbps, between the MA and its parent, as perceived by the MA for each element in the rootpath, listed in order from the SMA, if present. In the case of the SMA element, the value for the bandwidth shall be set to zero.
- e) *Delay* – This field shall be set to the delay in seconds from the SMA as perceived by the MA for each element in the rootpath, listed in order from the SMA, if present. In the case of the SMA element, the value for the bandwidth shall be set to zero.

NOTE – The values for the perceived bandwidth and delay for the SMA elements are set to zero as the ROOTPATH is assumed to start at the SMA.

7.3.3.6 SYSINFO control

The SYSINFO control in the PPROBREQ message is used to convey system information about the MA in its sub-controls.

The content and format of the SYSINFO control are specified in 7.3.1.3 and Figure 41. The SYSINFO sub-controls that may be used in PPROBREQ message, together with their status and reference to their content and specification, are listed in Table 7.

Table 7 – SYSINFO sub-control types for the PPROBREQ and PPROBANS messages

Sub-control type	Meaning	Status	Reference
SI_UPTIME	The elapsed time in seconds since the node joined the RMCP-2 session.	Optional	See 7.3.11.4.1
SI_DELAY	The delay in seconds from the SMA, as perceived by the MA.	Optional	See 7.3.11.4.2
SI_ROOM_CMA	The number of CMA places that an MA has allocated and the total number that it is able to support.	Optional	See 7.3.11.4.3

SI_PROV_BW	The maximum incoming and outgoing bandwidths in Mbps of the network interface card.	Optional	See 7.3.11.4.4
SI_POSS_BW	The possible forwarding bandwidth that the MA can afford.	Optional	See 7.3.11.4.5
SI_SND_BW	The total bandwidth in Mbps consumed by the MA to serve its CMAs.	Optional	See 7.3.11.4.6
SI_SND_PACKET	The total number of packets sent by the MA from startup.	Optional	See 7.3.11.4.7
SI_SND_BYTES	The total number of bytes sent by the MA from startup.	Optional	See 7.3.11.4.8
SI_RCV_BW	The bandwidth in Mbps perceived by the MA.	Optional	See 7.3.11.4.9
SI_RCV_PACKET	The number of packets received by the MA from startup.	Optional	See 7.3.11.4.10
SI_RCV_BYTES	The number of bytes received by the MA from startup.	Optional	See 7.3.11.4.11
SI_TREE_CONN	A list of PMA and CMAs directly attached to the sending MA.	Optional	See 7.3.11.4.12
SI_TREE_MEM	A set of MAs defined by the use of a TREEEXPLOR control.	Optional	See 7.3.11.4.13

7.3.3.7 DATAPROFILE control

The DATAPROFILE control in the PPROBREQ message contains data profile proposed by probing MA. The content and format of the DATAPROFILE control are specified in 7.3.1.4, Figure 42 and Figure 87.

7.3.4 PPROBANS message

7.3.4.1 General

The PPROBANS message provides a response to the PPROBREQ message in the map discovery procedure and confirms that the probed MA is still active. It contains information about the network condition, and a list of its neighbor information.

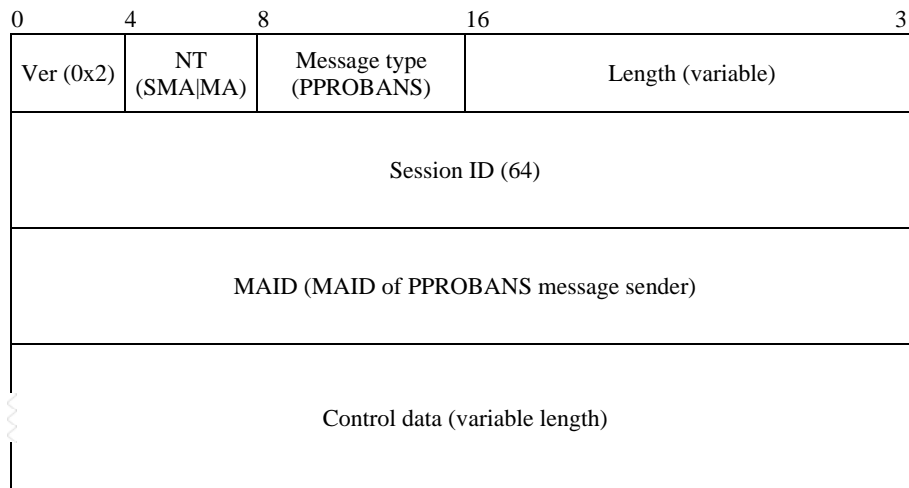


Figure 50 – PPROBANS message

7.3.4.2 PPROBANS message format

The format of the PPROBANS message is shown in Figure 50. The description of each field is as follows:

- a) *Ver* – This field denotes the current version of RMCP. Its value shall be set to 0x2.
- b) *NT* – This field denotes the message issuer's node type. Its value shall be set to one of SMA or MA coded as in Table 22.
- c) *Message type* – This field denotes the PPROBANS message. Its value shall be set to 0x04 (see Table 23).