**Introduction**

This contribution tackles the comment #4 and #5 of current LB.

This contribution enables the use of multicast for MIH signaling purposes. A specific set of messages can be sent to a group of users which are addressed at the MIHF\_ID space through the zero-length MIHF\_ID. The discrimination of these users in groups is performed by the use of L2/L3 multicast mechanisms. Users join a certain multicast group, which is then used to command these users to perform handover.

The new primitives included in this document enable the share of information about the existing groups and the creation of groups. The information exchanged encompass the L2/L3 address used by the group, so any MIH User can join it and receive the signaling specific to this group.

All changes are explicitly marked in bold.

**Here starts the contribution:**

|  |  |  |
| --- | --- | --- |
| Data type name | Derived from | Definition |
| MIHF\_ID | OCTET\_STRING | The MIHF Identifier: MIHF\_ID is a network access identifier (NAI). NAI shall be unique as per IETF RFC 4282. If L3 communication is used and MIHF entity resides in the network node, then MIHF\_ID is  the fully qualified domain name or NAI-encoded IP address (IP4\_ADDR or IP6\_ADDR) of the entity that hosts the MIH Services.  If L2 communication is used then MIHF\_ID is the NAI-encoded linklayer address (LINK\_ADDR) of the entity that hosts the MIH services.  In an NAI-encoded IP address or link-layer address, each octet of binary-encoded IP4\_ADDR, IP6\_ADDR and LINK\_ADDR data is encoded in the username part of the NAI as .“\.” followed by the octet value. A **broadcast** MIHF identifier is defined as an MIHF ID of zero length. **A multicast MIHF identifier is defined as a NAI-encoded multicast linklayer address in the case L2 communication is used or a NAI-encoded IP address (IP4\_ADDR or IP6\_ADDR) in case L3 communication is used.**  When an MIH protocol message with multicast**/broadcast** MIHF ID is transmitted over the L2 data plane, a group MAC address (01-80-C2-00-00-0E) shall be used (see IEEE P802.1aj/D2.2). The maximum length is 253 octets |

8.3.1 MIHF ID

MIHF Identifier (MIHF ID) is an identifier that is required to uniquely identify an MIHF entity for

delivering the MIH services. MIHF ID is used in all MIH protocol messages. This enables the MIH protocol to be transport agnostic.

MIHF ID is assigned to the MIHF during its configuration process. The configuration process is outside the scope of the standard.

**Broadcast** MIHF ID is defined as an MIHF ID of zero length. A **broadcast** MIHF ID can be used when destination MIHF ID is not known to a source MIHF, such as for discovering an MIH peer, or when there are multiple receivers for the message, such as in a broadcast scenario. The following MIH messages can use a broadcast MIHF ID:

**a)MIH Messages for Management Service:**

1) MIH\_Capability\_Discover request

**b)MIH Messages for Command Service:**

1) MIH\_Link\_Get\_Parameters request

2) MIH\_Link\_Configure\_Thresholds request

3) MIH\_Net\_HO\_Bcst\_Commit indication

**c)MIH Messages for Information Service:**

1) MIH\_Push\_Information indication

**If an MIH signaling message must be processed by a set of MNs, the MIHF ID used as destination in such messages corresponds to the zero-length MIHF\_ID. The discrimination of users for MIH signaling purposes, is accomplished by the use of L2 or L3 multicast mechanisms (See subclauses 7.4.28 to 7.4.30).**

The MIHF ID is of type MIHF\_ID. (See F.3.11.)

8.6 MIH protocol messages

The following subclauses specify different MIH protocol messages in TLV form. The shaded areas represent the MIH protocol header, while the unshaded areas represent the MIH protocol payload. The payload consists of a set of identifiers in TLV form.

The TLV Type assignment for each TLV can be found in Annex L, Table L.2.

TLV type values ranging from 101 to 255 are reserved for experimental TLVs. These values are used by different implementations to evaluate the option of using TLVs not defined by the specification.

When a TLV type value is in the range of experimental TLVs and the data type of the TLV value is unknown or the TLV value is not in the range of valid values, the TLV should be ignored and the rest of the message should be processed. Also, experimental TLVs can be ignored, based on the MIHF information that is communicating with another MIHF with different experimental TLVs implementation.

All MIH messages carry a source MIHF ID followed by a destination MIHF ID as the first two TLVs of the MIH protocol payload part of the message. **Broadcast** MIHF ID can be used in MIH\_Capability\_Discover request and response messages as its destination MIHF ID.

All .“Optional.” fields are optionally sent but the receiver shall properly operate on them if present, i.e., these fields are mandatory in the implementation, but optional in their use.

On receipt of an MIH request message the MIHF shall respond with a corresponding response message.

Any message received that has an invalid MIH header, or does not contain the source/destination MIHF IDs, or has an unrecognizable or invalid MIH Message ID shall be discarded without sending any indication to the source MIH node. Any undefined or unrecognizable TLVs in a received message shall be ignored by the receiver.

8.6.1 MIH messages for service management

8.6.1.1 MIH\_Capability\_Discover request

The corresponding MIH primitive of this message is defined in 7.4.1.1.

If a requesting MIHF entity knows the destination MIHF entity.’s MIHF ID, the requesting MIHF entity fills its destination MIHF ID and sends this message to the peer MIHF over the data plane, either L2 or L3.

If a requesting MIHF entity does not know the destination MIHF entity.’s MIHF ID, the requesting MIHF entity may fill its destination MIHF ID with a **broadcast** MIHF ID to send this capability discover message.

8.6.1.2 MIH\_Capability\_Discover response

The corresponding MIH primitive of this message is defined in 7.4.1.3. This message is sent in response to an MIH\_Capability\_Discover request message that was destined to a single or **broadcast** MIHF ID.

8.2.3.4 Inter-state-machine procedures

a) BOOLEAN Process(MIH\_MESSAGE).—This procedure processes the incoming message passed

as an input variable. A value of TRUE is returned if an outgoing message is available in response to

the incoming message. Otherwise, a value of FALSE is returned.

b) void Transmit(MIH\_MESSAGE).—This procedure transmits the message passed as the input

variable.

c) BOOLEAN IsMulticastMsg(MIH\_MESSAGE).—This procedure outputs TRUE if the input

message has a multicast/**broadcast** destination MIHF\_ID. Otherwise, it outputs FALSE.

d) MIHF\_ID SrcMIHF\_ID(MIH\_MESSAGE).—This procedure obtains a Source Identifier TLV

from the message passed as the input and returns the value of the TLV.

e) MIHF\_ID DstMIHF\_ID(MIH\_MESSAGE).—This procedure obtains a Destination Identifier

TLV from the message passed as the input and returns the value of the TLV.

f) void SetMIHF\_ID(MIH\_MESSAGE, MIHF\_ID, MIHF\_ID).—This procedure inserts a Source

Identifier TLV and a Destination Identifier TLV into the MIH message. The first MIHF\_ID is used

as the value of the Source Identifier TLV. The second MIHF\_ID is used as the value of the

Destination Identifier TLV.

8.2.3.7.1 Intra-state-machine variables

a) IsMulticast.—This variable.’s type is BOOLEAN. When its value is TRUE, it indicates that a message has a multicast**/broadcast** destination MIHF\_ID. Otherwise, its value is FALSE.

8.2.4.3.4 Solicited MIH capability discovery

An MIHF (the requestor) discovers its peer MIH functions and capabilities by multicasting or unicasting an MIH\_Capability\_Discover request message to either its multicast domain or a known MIHF ID, respectively. Only MIH network entities respond to a multicast MIH\_Capability\_Discover request.

When a peer MIH function (the responder) receives the MIH\_Capability\_Discover request message, it sends MIH\_Capability\_Discover response message back to the requestor. The response is sent by using the same transport type over which the request message was received. When the requestor receives the unicast MIH\_Capability\_Discover response message, it learns the responder.’s MIHF ID by checking the source ID of MIH\_Capability\_Discover response.

For complete operation, the requestor sets a timer at the time of sending an MIH\_Capability\_Discover

request during which time the requestor is in waiting state for a response from the responder. When the

response message is received while the timer is running, the requestor stops the timer and finishes the MIH function and capability discovery procedure. When the timer expires without receiving a response message, the requestor tries the combined MIH function discovery and capability discovery procedure by using a different transport or terminates the MIH function and capability discovery procedure.

If the MIH capability discovery is invoked upon receiving MIH capability advertisement in unauthenticated state through media specific broadcast messages, such as beacon frames and DCD, destination MIHF ID is filled with **broadcast** MIHF ID and this message is transmitted over the control plane using an L2 management frame, such as an IEEE 802.11 management action frame or an IEEE 802.16 MAC management message. This message contains the SupportedMihEventList, SupportedMihCommandList, SupportedISQueryTypeList, SupportedTransportList, and MBBHandoverSupport TLVs to enable the receiving MIHF to discover the sending MIHF.’s capability. Therefore, peer MIHF entities can discover each other.’s MIH capability by one MIH protocol message transaction. When the requestor receives the unicast MIH\_Capability\_Discover response message, which is embedded in the media specific control message, it retrieves the responder.’s MIHF ID by checking the source of the MIH\_Capability\_Discover response

message.

6.4.3.2.1 General

***Insert the following rows to the end of Table 7:***

|  |  |  |  |
| --- | --- | --- | --- |
| *MIH Command* | (L) Local  (R) Remote | Comments | Defined in |
| MIH\_Net\_HO\_Bcst\_Commit | R | |  | | --- | | Command used by the network to notify the spe­cific group of MNs of the decided target network information | | |  | | --- | | 7.4.27 | |
| **MiH\_MN\_HO\_Join\_Mcast** | **R** | **Command used by the MN to request the creation of a multicast group for MIHF signaling** | **7.4.28** |
| **MIH\_Net\_HO\_Join\_Mcast** | **R** | **Command used by the network to indicate to the MN a set of multicast groups to join** | **7.4.29** |

7. Service access points (SAPs) and primitives

7.2 SAPs

7.2.3 Media independent SAP: MIH\_SAP

***Insert the following rows in table 17; making these rows the last ones under the service category of*** *Command:*

|  |  |  |  |
| --- | --- | --- | --- |
| *Primitives* | Service Category | Description | Defined in |
| MIH\_Net\_HO\_Bcst\_Commit | Command | |  |  | | --- | --- | | |  | | --- | | Command a specific group of mobile nodes to handover from DO network to other net­works | | | |  | | --- | | 7.4.27 | |
| **MIH\_MN\_HO\_Join\_Mcast** | **Command** | **Command the PoS to create a multicast group for MIHF signaling** | **7.4.28** |
| **MIH\_Net\_HO\_Join\_Mcast** | **Command** | **Command the MN to join a set of multicast groups** | **7.4.29** |

***Insert the following row in table 17; making this row the last one under the service category of Information:***

|  |  |  |  |
| --- | --- | --- | --- |
| *Primitives* | Service Category | Description | Defined in |
| **MIH\_Multicast\_Information** | **Information** | |  |  | | --- | --- | | |  | | --- | | **Notify the MN of the multicast groups for MIHF signaling available in the network** | | | |  | | --- | | **7.4.30** | |

7.4.27 MIH\_Net\_HO\_Bcst\_Commit

7.4.27.1 MIH\_Net\_HO\_Bcst\_Commit.request

7.4.27.1.1 Function

This primitive is used by MIH users on the network to inform the remote MIH users belonging to a specific group of MNs of possible network initiated handovers. This primitive can be used to recommend a handover from either a DO network or a bidirectional network to another network based on the selected choices for candidate networks and PoAs. This primitive includes multimedia service (MMS) or multimedia program (MMP) information to identify a group of MNs to which the DO network recommends the handover. Net­work initiated handovers from the bidirectional network to the DO network for a single MN would be invoked by using MIH\_Net\_HO\_Commit.

7.4.27.1.2 Semantics of service primitives

MIH\_Net\_HO\_Bcst\_Commit.request (

DestinationIdentifier,

TargetMNGroupInfo,

LinkType,

TargetNetworksInfoList,

LinkActionExecutionDelay,

LinkActionsList

)

Parameters:

|  |  |  |
| --- | --- | --- |
| Name | Data type | Description |
| DestinationIdentifier | MIHF\_ID | The remote MIHF, which is the destination of this request. |
| TargetMNGroupInfo | GROUP\_INFO | Multimedia service (MMS) or multimedia program (MMP) information to identify the group of mobile nodes to which the networks recommend a hando­ver. **This parameter is optional when the primitive is used in bidirectional networks and mandatory when used in downlink only technologies.** |
| LinkType | LINK\_TYPE | Contains target link type |
| TargetNetworksInfoList | LIST(TGT\_NET\_INFO) | This list contains information of recommended tar­get networks of type LinkType for assisting the mobile node to perform handover. |
| LinkActionExecutionDelay | UNSIGNED\_INT(2) | Time (in ms) to elapse before an action needs to be taken. A value of 0 indicates that the action is taken immediately. Time elapsed is calculated from the instance the command arrives until the time when the execution of the action is carried out. |
| LinkActionsList | LIST(LINK\_ACTION\_REQ) | A list of network initiated handover actions for the links. |

7.4.27.1.3 When generated

The MIH user on the network generates this primitive to recommend a handover action when a specific MMP or MMS will no longer be available on the DO network.

7.4.27.1.4 Effect on receipt

Upon receipt of this primitive, the MIHF generates and sends and MIH\_Net\_HO\_Bcst\_Commit indication message to the remote MIHF. The remote MIHF forwards the indication as an indication to the MIH users.

7.4.27.2 MIH\_Net\_HO\_Bcst\_Commit.indication

7.4.27.2.1 Function

This primitive is used by an MIHF for MIH users to perform a network initiated handover. This primitive is the result of the receipt of an MIH\_Net\_HO\_Bcst\_Commit indication message from a remote MIHF.

7.4.27.2.2 Semantics of service primitives

MIH\_Net\_HO\_Bcst\_Commit.indication (

SourceIdentifier,

TargetMNGroupInfo,

LinkType,

TargetNetworksInfoList,

LinkActionExecutionDelay,

LinkActionsList

)

Parameters:

|  |  |  |
| --- | --- | --- |
| Name | Data type | Description |
| SourceIdentifier | MIHF\_ID | The remote MIHF, which sent the MIH\_Net\_HO\_Bcst\_Commit indication message. |
| TargetMNGroupInfo | GROUP\_INFO | Multimedia service (MMS) or multimedia program (MMP) information to identify the group of mobile nodes to which the networks recommend a hando­ver. **This parameter is optional when the primitive is used in bidirectional networks and mandatory when used in downlink only technologies.** |
| LinkType | LINK\_TYPE | Contains target link type |
| TargetNetworksInfoList | LIST(TGT\_NET\_INFO) | This list contains information of recommended tar­get networks of type LinkType for assisting the mobile node to perform handover. |
| LinkActionExecutionDelay | UNSIGNED\_INT(2) | Time (in ms) to elapse before an action needs to be taken. A value of 0 indicates that the action is taken immediately. Time elapsed is calculated from the instance the command arrives until the time when the execution of the action is carried out. |
| LinkActionsList | LIST(LINK\_ACTION\_REQ) | A list of network initiated handover actions for the links. |

7.4.27.2.3 When generated

This primitive is generated by an MIHF upon receiving an MIH\_Net\_HO\_Bcst\_Commit indication mes­sage.

7.4.27.2.4 Effect on receipt

The MIH user receiving this primitive generates no response primitive. Only the applicable actions in the Link Actions List are executed.

**The following primitives are completely new**

**7.4.28 MIH\_MN\_HO\_Join\_Mcast**

**7.4.28.1 MIH\_MN\_HO\_Join\_Mcast.request**

**7.4.28.1.1 Function**

This primitive is used by an MIH user at the MN in order to ask the PoS to create a set of multicast groups, which it wants to join.

**7.4.28.1.2 Semantics of service primitive**

MIH\_MN\_HO\_Join\_Mcast.request (

DestinationIdentifier,

MulticastGroupsList

)

Parameters:

|  |  |  |
| --- | --- | --- |
| Name | Data type | Description |
| DestinationIdentifier | MIHF\_ID | This identifies a remote MIHF that will be the destination of  this request. |
| MulticastGroupsList | LIST(MULTICAST\_GRP) | List of multicast groups queried. |

**7.4.28.1.3 When generated**

This primitive is invoked by the MIH user when it needs to use a certain multicast group but the L2 or L3 multicast address to join is not known.

**7.4.28.1.4 Effect on receipt**

On receipt, the local MIHF sends an MIH\_MN\_HO\_Join\_Mcast request message to the destination MIHF.

**7.4.28.2 MIH\_MN\_HO\_Join\_Mcast.indication**

**7.4.28.2.1 Function**

This primitive is used by an MIHF in the serving network to indicate that an MIH\_MN\_HO\_Join\_Mcast request message has been received from a MN.

**7.4.28.2.2 Semantics of service primitive**

MIH\_MN\_HO\_Join\_Mcast.indication (

SourceIdentifier,

MulticastGroupsList

)

Parameters:

|  |  |  |
| --- | --- | --- |
| Name | Data type | Description |
| SourceIdentifier | MIHF\_ID | This identifies the invoker of this primitive, which is a remote  MIHF. |
| MulticastGroupsList | LIST(MULTICAST\_GRP) | List of multicast groups queried. |

**7.4.28.2.3 When generated**

This primitive is generated by the remote MIHF when an MIH\_MN\_HO\_Join\_Mcast request message is received.

**7.4.28.2.4 Effect on receipt**

The remote MIH user will perform necessary actions to create if needed the appropriate multicast groups and respond with an MIH\_MN\_HO\_Join\_Mcast.response.

**7.4.28.3 MIH\_MN\_HO\_Join\_Mcast.response**

**7.4.28.3.1 Function**

This primitive is used by an MIH user to send the processing status of a received MIH\_MN\_HO\_Join\_Mcast request and the resulting multicast group L2 or L3 address.

**7.4.28.3.2 Semantics of service primitive**

MIH\_MN\_HO\_Join\_Mcast.response (

DestinationIdentifier,

Status,

ValidTimeInterval

MulticastGroupsList

)

Parameters:

|  |  |  |
| --- | --- | --- |
| Name | Data type | Description |
| DestinationIdentifier | MIHF\_ID | This identifies a remote MIHF, which will be the destination of  this response. |
| Status | STATUS | Status of operation. |
| ValidTimeIntervala | UNSIGNED\_INT(4) | Time interval in seconds during which the multicast group will be valid.  Parameter applicable only when the status parameter indicates a  successful operation. A value of 0 indicates an infinite validity  period. |
| MulticastGroupsLista | LIST(MULTICAST\_GRP) | List of multicast groups. |

aThis parameter is not included if Status does not indicate .“Success..”

**7.4.28.3.3 When generated**

This primitive is invoked by the MIH user to report back the result after completing the processing of a

MIH\_MN\_HO\_Join\_Mcast request message.

**7.4.28.3.4 Effect on receipt**

Upon receipt, the local MIHF sends an MIH\_MN\_HO\_Join\_Mcast response message to the destination MIHF.

**7.4.28.4 MIH\_MN\_HO\_Join\_Mcast.confirm**

**7.4.28.4.1 Function**

This primitive is used by the local MIHF to convey the result of an MIH\_MN\_HO\_Join\_Mcast.request to an MIH user.

7.4.28.4.2 Semantics of service primitive

MIH\_MN\_HO\_Join\_Mcast.confirm (

SourceIdentifier,

Status,

ValidTimeInterval

MulticastGroupsList

)

Parameters:

|  |  |  |
| --- | --- | --- |
| Name | Data type | Description |
| SourceIdentifier | MIHF\_ID | This identifies the invoker of this primitive, which is a remote  MIHF. |
| Status | STATUS | Status of operation. |
| ValidTimeIntervala | UNSIGNED\_INT(4) | Time interval in seconds during which the registration is valid.  Parameter applicable only when the status parameter indicates a  successful operation. A value of 0 indicates an infinite validity  period. |
| MulticastGroupsLista | LIST(MULTICAST\_GRP) | List of multicast groups. |

aThis parameter is not included if Status does not indicate .“Success..”

**7.4.28.4.3 When generated**

This primitive is used by an MIHF to notify an MIH user the result of an MIH\_MN\_HO\_Join\_Mcast request.

**7.4.28.4.4 Effect on receipt**

Upon receipt, the MIH user can determine the L3 or L2 address of the requested multicast group and start an L2 or L3 multicast group joining procedure.

**7.4.29 MIH\_Net\_HO\_Join\_Mcast**

**7.4.29.1 MIH\_Net\_HO\_Join\_Mcast.request**

**7.4.29.1.1 Function**

This primitive is used by an MIH user located at the network side to command the MIHF at the MN to join an L2/L3 multicast group.

**7.4.29.1.2 Semantics of service primitive**

MIH\_Net\_HO\_Join\_Mcast.request (

DestinationIdentifier,

MulticastGroupsList

)

Parameters:

|  |  |  |
| --- | --- | --- |
| Name | Data type | Description |
| DestinationIdentifier | MIHF\_ID | This identifies a remote MIHF that will be the destination of  this request. |
| MulticastGroupsList | LIST(MULTICAST\_GRP) | List of multicast groups to join. |

**7.4.29.1.3 When generated**

This primitive is invoked by the MIH user at the network side to command an MN to join a specific set of multicast groups, defined by their L2/L3 address.

**7.4.29.1.4 Effect on receipt**

On receipt, the local MIHF sends an MIH\_Net\_HO\_Join\_Mcast request message to the destination MIHF.

**7.4.29.2 MIH\_Net\_HO\_Join\_Mcast.indication**

**7.4.29.2.1 Function**

This primitive is used by an MIHF in the MN to indicate that an MIH\_Net\_HO\_Join\_Mcast request message has been received from a remote MIHF.

**7.4.29.2.2 Semantics of service primitive**

MIH\_Net\_HO\_Join\_Mcast.indication (

SourceIdentifier,

MulticastGroupsList

)

Parameters:

|  |  |  |
| --- | --- | --- |
| Name | Data type | Description |
| SourceIdentifier | MIHF\_ID | This identifies the invoker of this primitive, which is a remote  MIHF. |
| MulticastGroupsList | LIST(MULTICAST\_GRP) | List of multicast groups to join. |

**7.4.29.2.3 When generated**

This primitive is generated by the remote MIHF when an MIH\_Net\_HO\_Join\_Mcast request message is received.

**7.4.29.2.4 Effect on receipt**

The remote MIH user will perform necessary actions to join the corresponding multicast groups and respond with an MIH\_Net\_HO\_Join\_Mcast.response.

**7.4.29.3 MIH\_Net\_HO\_Join\_Mcast.response**

**7.4.29.3.1 Function**

This primitive is used by an MIH user in the MN to send the status regarding its registration on the multicast groups requested by the peer MIHF.

**7.4.29.3.2 Semantics of service primitive**

MIH\_Net\_HO\_Join\_Mcast.response (

DestinationIdentifier,

Status,

ValidTimeInterval,

MulticastGroupsList

)

Parameters:

|  |  |  |
| --- | --- | --- |
| Name | Data type | Description |
| DestinationIdentifier | MIHF\_ID | This identifies a remote MIHF, which will be the destination of  this response. |
| Status | STATUS | Status of operation. |
| ValidTimeIntervala | UNSIGNED\_INT(4) | Time interval in seconds during which the registration is valid.  Parameter applicable only when the status parameter indicates a  successful operation. A value of 0 indicates an infinite validity  period. |
| MulticastGroupsLista | LIST(MULTICAST\_GRP) | List of multicast groups which have been joined succesfully. |

aThis parameter is not included if Status does not indicate .“Success..”

**7.4.29.3.3 When generated**

This primitive is invoked by the MIH user to report back the result after completing the processing of a

MIH\_Net\_HO\_Join\_Mcast request message.

**7.4.29.3.4 Effect on receipt**

Upon receipt, the local MIHF sends an MIH\_Net\_HO\_Join\_Mcast response message to the destination MIHF.

**7.4.29.4 MIH\_Net\_HO\_Join\_Mcast.confirm**

**7.4.29.4.1 Function**

This primitive is used by the local MIHF to convey the result of an MIH\_Net\_HO\_Join\_Mcast request to an MIH user located in the network.

**7.4.29.4.2 Semantics of service primitive**

MIH\_Net\_HO\_Join\_Mcast.confirm (

SourceIdentifier,

Status,

MulticastGroupsList

)

Parameters:

|  |  |  |
| --- | --- | --- |
| Name | Data type | Description |
| SourceIdentifier | MIHF\_ID | This identifies the invoker of this primitive, which is a remote  MIHF. |
| Status | STATUS | Status of operation. |
| MulticastGroupsLista | LIST(MULTICAST\_GRP) | List of multicast groups successfully joined by the MN. |

aThis parameter is not included if Status does not indicate .“Success..”

**7.4.29.4.3 When generated**

This primitive is used by an MIHF to notify an MIH user the result of an MIH\_Net\_HO\_Join\_Mcast request.

**7.4.29.4.4 Effect on receipt**

Upon receipt, the MIH user can determine the result of the request.

**8.6.3 MIH messages for command service**

***Insert following new subclauses in clause 8.6.3:***

**8.6.3.24 MIH\_MN\_HO\_Join\_Mcast request**

The corresponding MIH primitive of this message is defined in 7.4.28.1

This message is used by the MIHF on the MN to query the MIHF at the PoS to create a multicast group for MIHF signaling.

|  |
| --- |
| **MIH Header Fixed Fields (SID=TBD, Opcode=TBD, AID=TBD)** |
| **Source Identifier =** sending MIHF ID  (Source MIHF ID TLV) |
| **Destination Identifier** = receiving MIHF ID  (Destination MIHF ID TLV) |
| MulticastGroupsList  (Multicast Groups list TLV) |

**8.6.3.25 MIH\_MN\_HO\_Join\_Mcast response**

The corresponding MIH primitive of this message is defined in 7.4.28.3

This message is used by the MIHF on the PoS to reply the MN with the list of multicast groups that the MN should join.

|  |
| --- |
| **MIH Header Fixed Fields (SID=TBD, Opcode=TBD, AID=TBD)** |
| **Source Identifier =** sending MIHF ID  (Source MIHF ID TLV) |
| **Destination Identifier** = receiving MIHF ID  (Destination MIHF ID TLV) |
| |  | | --- | | Status  (Status TLV) | |
| ValidTimeInterval (not included if Status does not indicate ì“Successî”)  (Valid time interval TLV) |
| MulticastGroupsList  (Multicast Groups list TLV) |

**8.6.3.26 MIH\_Net\_HO\_Join\_Mcast request**

The corresponding MIH primitive of this message is defined in 7.4.29.1

This message is used by the MIHF on the serving network to indicate the MN to join a set of multicast groups for MIH signaling.

|  |
| --- |
| **MIH Header Fixed Fields (SID=TBD, Opcode=TBD, AID=TBD)** |
| **Source Identifier =** sending MIHF ID  (Source MIHF ID TLV) |
| **Destination Identifier** = receiving MIHF ID  (Destination MIHF ID TLV) |
| MulticastGroupsList  (Multicast Groups list TLV) |

**8.6.3.27 MIH\_Net\_HO\_Join\_Mcast response**

The corresponding MIH primitive of this message is defined in 7.4.29.3

This message is used by the MIHF on the MN to indicate the status of the process of joining the multicast groups indicated by the PoS.

|  |
| --- |
| **MIH Header Fixed Fields (SID=TBD, Opcode=TBD, AID=TBD)** |
| **Source Identifier =** sending MIHF ID  (Source MIHF ID TLV) |
| **Destination Identifier** = receiving MIHF ID  (Destination MIHF ID TLV) |
| |  | | --- | | Status  (Status TLV) | |
| ValidTimeInterval (not included if Status does not indicate ì“Successî”)  (Valid time interval TLV) |
| MulticastGroupsList  (Multicast Groups list TLV) |

**Annex D**

(normative)

**Mapping MIH messages to reference points**

Table D.1 maps the MIH messages to the MIH communication model reference points.

***Insert the following row in Table D.1; making these rows the last ones:***

**Table D.1—Mapping MIH messages to reference points**

|  |  |
| --- | --- |
| **MIH message name** | **Reference point** |
| MIH\_Net\_HO\_Bcst\_Commit | RP1, RP3 |
| MIH\_MN\_HO\_Join\_Mcast | RP1, RP3 |
| MIH\_Net\_HO\_Join\_Mcast | RP1, RP3 |

ANNEX F

Table F.13.—Data types for information elements **(continued)**

|  |  |  |
| --- | --- | --- |
| Data type name | Derived from | Definition |
| NET\_CAPS | BITMAP(32) | These bits provide high level capabilities supported  on a network.  Bitmap Values:  Bit 0: Security .– Indicates that some level of security  is supported when set.  Bit 1: QoS Class 0 .– Indicates that QoS for class 0 is  supported when set.a  Bit 2: QoS Class 1 .– Indicates that QoS for class 1 is  supported when set. a  Bit 3: QoS Class 2 .– Indicates that QoS for class 2 is  supported when set; Otherwise, no QoS for class 2  support is available.  Bit 4: QoS Class 3 .– Indicates that QoS for class 3 is  supported when set; Otherwise, no QoS for class 3  support is available.  Bit 5: QoS Class 4 .– Indicates that QoS for class 4 is  supported when set; Otherwise, no QoS for class 4  support is available.  Bit 6: QoS Class 5 .– Indicates that QoS for class 5 is  supported when set; Otherwise, no QoS for class 5  support is available.  Bit 7: Internet Access .– Indicates that Internet access  is supported when set; Otherwise, no Internet access  support is available.  Bit 8: Emergency Services .– Indicates that some level  of emergency services is supported when set; Otherwise,  no emergency service support is available.  Bit 9: MIH Capability .– Indicates that MIH is supported  when set; Otherwise, no MIH support is available.  Bit 11: MIH multicast signaling support  Bit 11–31: (Reserved) |

**F.3.12 Data type for MIH capabilities**

***Change Table F.20 as follows:***

**Table F.20—Data type for MIH capabilities**

|  |  |  |
| --- | --- | --- |
| **Data type name** | **Derived from** | **Definition** |
| MIH\_CMD\_LIST | BITMAP(32) | A list of MIH commands.  Bitmap Values:  Bit 0: MIH\_Link\_Get\_Parameters  Bit 1: MIH\_Link\_Configure\_Thresholds  Bit 2: MIH\_Link\_Actions  Bit 3: MIH\_Net\_HO\_Candidate\_Query  MIH\_Net\_HO\_Commit  MIH\_Net\_HO\_Bcst\_Commit  MIH\_N2N\_HO\_Query\_Resources  MIH\_N2N\_HO\_Commit  MIH\_N2N\_HO\_Complete  **MIH\_Net\_HO\_Join\_Mcast**  Bit 4: MIH\_MN\_HO\_Candidate\_Query  MIH\_MN\_HO\_Commit  MIH\_MN\_HO\_Complete  **MIH\_MN\_HO\_Join\_Mcast**  Bit 5-31: (Reserved) |

ADD TO APPENDIX F

|  |  |  |
| --- | --- | --- |
| Data type name | Derived from | Definition |
| MULTICAST\_GRP | SEQUENCE(  CHOICE(IP\_ADDR, MAC\_ADDR,NULL),  CHOICE(MIHF\_ID, NULL),  CHOICE(MULTICAST\_CODE, GROUP\_INFO)  ) | List of multicast L3 or L2 addresses being used for multicast MIHF signaling.  The second parameter corresponds to the multicast MIHF\_ID used by the group, if NULL is selected then the user is requesting the creation of a new group.  When NULL is the choice for the first parameter, the data type is used to indicate the wish to join an unknown group for the program specified by GROUP\_INFO or the code in MULTICAST\_CODE. |

|  |  |  |
| --- | --- | --- |
| Data type name | Derived from | Definition |
| MULTICAST\_CODE | UNSIGNED\_INT(1) | |  | | --- | | Represents the multicast group code.  Number assignments:  0: Reserved  1: All nodes with interfaces Wireless - GSM  2: All nodes with interfaces Wireless - GPRS  3: All nodes with interfaces Wireless - EDGE  4: All nodes with interfaces Ethernet  5: All nodes with interfaces Wireless - Other  6: All nodes with interfaces Wireless - IEEE 802.11  7: All nodes with interfaces Wireless - CDMA2000  8: All nodes with interfaces Wireless - UMTS  9: All nodes with interfaces Wireless - cdma2000-HRPD  10: All nodes with interfaces Wireless - IEEE 802.16  11: All nodes with interfaces Wireless - IEEE 802.20  12: All nodes with interfaces Wireless - IEEE 802.22  13: All nodes with interfaces DVB  14: All nodes with interfaces  T-DMB  15: All nodes with interfaces ATSC-M/H  16: All nodes with Voice traffic  17: All nodes with Video traffic  18: All nodes with background traffic  19: All nodes with best-effort traffic  20: All mobile routers | |

**Annex L**

(normative)

**MIH Protocol message code assignments**

***Change Table L.1 as follows:***

**Table L.1—AID assignment**

|  |  |
| --- | --- |
| **MIH messages** | **AID** |
| MIH messages for Command Service | |
| MIH\_Link\_Get\_Parameters | 1 |
| MIH\_Link\_Configure\_Thresholds | 2 |
| MIH\_Link\_Actions | 3 |
| MIH\_Net\_HO\_Candidate\_Query | 4 |
| MIH\_MN\_HO\_Candidate\_Query | 5 |
| MIH\_N2N\_HO\_Query\_Resources | 6 |
| MIH\_MN\_HO\_Commit | 7 |
| MIH\_Net\_HO\_Commit | 8 |
| MIH\_N2N\_HO\_Commit | 9 |
| MIH\_MN\_HO\_Complete | 10 |
| MIH\_N2N\_HO\_Complete | 11 |
| MIH\_Net\_HO\_Bcst\_Commit | 12 |
| **MIH\_MN\_HO\_Join\_Mcast** | **13** |
| **MIH\_Net\_HO\_Join\_Mcast** | **14** |
| *MIH messages for Information Service* |  |
| MIH\_Get\_Information | 1 |
| MIH\_Push\_Information | 2 |

***Change Table L.2 as follows:***

**Table L.2—Type values for TLV encoding**

|  |  |  |
| --- | --- | --- |
| **TLV type name** | **TLV**  **type value** | **Data type** |
| Requested resource set | 63 | REQ\_RES\_SET |
| Broadcast multimedia program ID | 76 | BCST\_MMP\_ID |
| Broadcast multimedia service ID | 77 | BCST\_MMS\_ID |
| Target MN group information | 78 | GROUP\_INFO |
| Supported link actions list | 79 | SUPPORTED\_LINK\_ACTIONS\_LIST |
| **Multicast Groups list TLV** | **80** | **LIST(MULTICAST\_GRP)** |
| (Reserved) | ~~64~~ 81- 99 | (Reserved) |
| Vendor specific TLV | 100 | (Vendor specific) |
| (Reserved for experimental TLVs) | 101 - 255 | (Used for experimental purposes) |

**Annex M**

(normative)

**Protocol implementation conformance statement (PICS) proforma14**

**M.8 PICS proforma tables**

**M.8.4 PDUs**

***Change PICS proforma table by adding new rows to the end of the table as indicated:***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Item**  **number** | **Item description** | **References** | **Status** | **Support** | **Mnemonic** |
| M.8.4.41 | MIH\_Event\_Unsubscribe re-quest? | 8.6.1.9 | M | Yes [ ] No [ ] | PDU41 |
| M.8.4.42 | MIH\_Event\_Unsubscribe re-sponse? | 8.6.1.10 | M | Yes [ ] No [ ] | PDU42 |
| M.8.4.43 | MIH\_Net\_HO\_Bcst\_Commit indication? | 5.3.3.1, 8.6.3.23 | MC2:M | Yes [ ] No [ ] N/A [ ] | PDU43 |
| M.8.4.44 | **MIH\_MN\_HO\_Join\_Mcast request?** | **8.6.3.24** | MC2:M | Yes [ ] No [ ] N/A [ ] | **PDU44** |
| M.8.4.45 | **MIH\_MN\_HO\_Join\_Mcast response?** | **8.6.3.25** | MC2:M | Yes [ ] No [ ] N/A [ ] | **PDU45** |
| M.8.4.46 | **MIH\_Net\_HO\_Join\_Mcast request?** | **8.6.3.26** | MC2:M | Yes [ ] No [ ] N/A [ ] | **PDU46** |
| M.8.4.47 | **MIH\_Net\_HO\_Join\_Mcast response?** | **8.6.3.27** | MC2:M | Yes [ ] No [ ] N/A [ ] | **PDU47** |