**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) |
| Title | **Proposed Comment Resolutions for Topology Things** |
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| Re: | Proposed comment resolutions related to the 802.15.10 Consolidated Comment Entry Form, CID #1139, #1160, #1378 and #1360 |
| Abstract | This document provides a proposed comment resolutions for the comments which are related to TC of D2 of 802.15.10 |
| Purpose | To propose |
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1. **CID#1139, #1160**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1139 | Tero Kivinen | INSIDE Secure | 23 | 5.2.1 | 16 | I assume this is just copy of the Service List from the table 1? Why do we need the copy here? Is it going to be different than what is in the table 1? We already have Mesh root Address in this table, so using that we can actually find the mesh root L2R MT entry, and see the service list from there. Or is it possible that same root has multiple L2R meshes, each with different services, i.e. different service lists? I would assume that as Service list is list of services, then there would be exactly one L2R MT entry for each mesh root. | Remove service list from NT table, and point out that it can be found from the MT table by using the Mesh root Address. |
| 1160 | Verotiana Rabarijaona | NICT | 25 | 5.2.2 | 50 | The NLM IE format does not contain any information on the L2R mesh on which it is transmitted, unless it is always sent along with a TC IE. Information is needed on how a device process the information in an NLM IE | Option 1: Explain how an NLM IE is processed when a device receives an NLM IE:- from a device from a different mesh, with the same PQM- from a device from a different mesh, with a different PQM- from a device from a different mesh, using a different addressing mode.- from a device that is not in the NT- other casesIf two devices belong to the same two different meshes with different PQMs, does the device have to wait to read the Neighbor Metric Container before knowing with mesh an NLM IE is for?Option 2: add the Service ID and the mesh root address in the format, and modify 5.2.2 to state that the NLM IE may be received by any device but the information therein should only be stored by neighbors within the same mesh |
| 1378 | Noriyuki Sato | Oki Electric Industry | 58 | 6.2.3 | 4 | NLM IE should have address mode to let a receiver know which address mode is used in this format without knowledge of address mode of mesh root address to let it do validity check of the format. Besides, NLM IE can be used among the tree which mesh root address are in different address modes. | Consider to have address mode in Metric container or NLM IE. |

A service ID list belongs to a certain mesh and thus the MT has a service list in it. Besides, an NT has a neighbor address and service ID list. If an NT belongs to the MT, service ID lists on both tables can be merged to avoid redundancy.

Some of elements in NT are common among the mesh. Besides, an issue that a device needs to know neighbors EUI-64 to decrypt frames from them was realized in the last session. The matching table needs to be added in some table in L2R. NT should be divided into ‘global one’ and ‘per mesh’.

Resulting into:

* Organize MT and NT
* Separate NT into ‘global’ elements and ‘per mesh ‘ elements
* Make ‘per mesh’ elements of NT belong to the MT

A neighbor record for a mesh other than the device joins to may be useful for the purpose to switch the mesh it belongs to. However, current NT table is designed so that it stores the neighbor records only for the same mesh which the device belongs to.

While having neighbor information not only for the mesh may be useful for NHL to let it select mesh and may be useful for L2R layer to select mesh of same service ID, it may cause memory issue. It can be NHL’s choice whether it has rich information of neighbor.

To solve that, L2R layer should have ‘l2rMeshRecordMode’ as a new PIB.

**Resolution: AiP**

* ***Add new PIB ‘l2rMeshRecordMode’ as an L2R attribute into Table 41***
	+ ***Type: Enumeration***
	+ ***Range: 0: Only mesh, 1: Same Service ID, 2: All neighbors***
	+ ***Description: To select the range of neighbor information to be recorded, (as specified in 5.x.x.x.). With ‘Only mesh’, MT and NT are recorded by TC IEs from the neighbors that belong to the same mesh as the device belongs to. With ‘Same Service ID’, tables are made by TC IEs from the neighbors that belong to same service ID. With ‘All neighbors’ TC IEs from all neighbors are recorded into MT and NT.***
* ***Replace Table 1 as follows***

**Table 1—Entries of the L2R MT**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** | **Condition to record (\*1)** |
| Mesh root addressmode | Enumeration | SHORT, LONG | Indicates the address mode of the meshroot. If SHORT, a short address is used. IfLONG, a 64-bit address is used. | A |
| Mesh root address | As indicated by the Mesh root address mode | 64-bit extended universalidentifier (EUI-64)\*or short address | Address of the root of a mesh offeringrouting towards a service available | A |
| Service List | List of services | 0x00 - 0xff | List of the services reachable through theL2R mesh defined in Table 2. | A |
| Mesh Sequence Number (MSN) | Integer | 0x00 - 0xff | Indicates the latest TC IE, used as describedin 5.2.1. | A |
| Neighbor Table (NT) list | List of NTs | As specified in table 2 | List of tables of neighbors who belong to the mesh indicated by Mesh root address in this table. | M |
| PQM ID | Integer | 0x00 - 0x0f | Identifies the metric in use in the mesh. The metric identifier values are listed in Table 11 in 6.2.2.10. | M |
| My PQM value | — | Depends on the metric ID | Value of the metric of the current device. | J |
| My Depth | Integer | 0x00 - 0xfe | Distance in hops of the current device to the mesh root. | J |
| L2R Max Depth | Integer | 0x00 - 0xff | Indicates the maximum depth allowed in an L2R mesh. | M |
| Link quality threshold | — | Depends on the metric ID | Indicates the threshold of the metric that a link shared with an ancestor should satisfy. | J |
| Key Exchange Mode | Integer | 0x00 - 0x02 | As described in Table 7 in 6.2.1.1. | M |
| DCat | Boolean | TRUE, FALSE | If TRUE, DCat is allowed in the L2R mesh. Otherwise, DCat is prohibited. | J |
| Multi-channel operation | Boolean | TRUE, FALSE | If TRUE, MCO is used. Otherwise, MCOis not used. | M |
| DS route required | Boolean | TRUE, FALSE | If TRUE, all the devices are required to send a Route Announcement (RA) IE to build downstream routes. | M |
| On-demand P2P discovery | Boolean |  |  | M |
| L2R Multicast | Boolean | TRUE, FALSE | If TRUE, RA IEs may contain a Multicast Subscription field and multicast routing is handled by the L2R sublayer. Otherwise, multicast packets are | M |
| NLM Operation | Boolean | TRUE, FALSE | Indicates whether NLM IEs are used. | J |
| PANCoordConnection | Boolean | TRUE, FALSE | Indicates whether the mesh root has a direct connection to the PAn coordinator. | M |

\*1: A: Always recorded, J: Recorded if the device is a part of the mesh of this table, M: Depends on the PIB ‘l2rMeshRecord Mode’

\*2: EUI-64's are defined by IEEE Std 802-2014 and assigned by the IEEE Registration Authority. Interested applicants should contact the IEEE Registration Authority, http://standards.ieee.org/develop/regauth/.

* ***Replace Table 2 with following Table 2, 3 and 4***

**Table 2—Entries of the L2R NT**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** |
| Neighbor address | As indicated inthe MT inTable 1 | EUI-64/shortaddress | As indicated in Table 1 |
| Mesh root address | As indicated by the Mesh root address mode | 64-bit extended universalidentifier (EUI-64)\*or short address | Address of the root of a mesh offeringrouting towards a service available |
| Depth | Integer | 0x00 - 0xfe | Distance in hops of the neighbor to the mesh root |
| PQM Value | — | Depends on the metric ID | Value of the PQM provided by the current neighbor. |
| List of reachable destinations | List of addresses | EUI-64/shortaddress | List of devices that are reachable through the neighbor by DS or P2P routing |
| Set of subscribed multicast addresses | Set of short addresses | 0xff00-0xfffd | Indicate the addresses of the multicast groups to which a neighbor is subscribed |

**Table 3—Entries of the L2R Global NT**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** | **Condition to record (\*3)** |
| Neighbor EUI-64 address | As indicated inthe MT inTable 1 | EUI-64 | EUI-64 address of the neighbor | M |
| Neighbor short address | As indicated by the Mesh root address mode | Short address | Short address of the neighbor | M |
| LQM list | List of LQM | As specified in table 4 | LQM list for the neighbor | M |
| Associated PAN coordinator EUI-64 | IEEE address | EUI-64 | Address of the PAN coordinator to which the neighbor is associated. Present only if MCO is enabled in the L2R mesh | C |
| Allocated channel page | Integer | 0 - 31 | I Indicates the page on which the coordinator of the neighbor is operating. Present only if the MCO is enabled in the L2R mesh | C |
| Allocated channel number | Integer | The number of any channel | Indicates the channel on which the coordinator of the neighbor is operating. Present only if the MCO is enabled in the L2R mesh | C |
| UWB preamble Code | Integer | — | SHR preamble code for UWB PHY | U |

\*3: M: Depends on the PIB ‘l2rMeshRecord Mode’, C: When MCO is enabled, U: If PHY is UWB

**Table 4—Entries of the LQM**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Type** | **Valid range** | **Description** | **Condition to record (\*4)** |
| Metric ID | Integer | 0x00 - 0x0f | Identifies the metric in use in the mesh. The metric identifier values are listed in Table 11 in 6.2.2.10. | A |
| Incoming metric | — | Depends on the metric ID  | Value of the single hop metric from the neighbor to the current device | A |
| Outgoing metric | — | Depends on the metric ID | Value of the single hop metric from the current device to the neighbor retrieved in NLM IEs when applicable | N |
| Mutual link | List of LQM | As specified in table 4 | LQM list for the neighbor | N |

\*3:A: Always, N: When NLM Operation

* ***Replace following text in clause 5.2.1 on p.21, l.9-12***

An L2R mesh is managed based on the information retrieved from the PIB attributes found in Table 42 in 7.3.1, the L2R Discovery (L2R-D IE) and the TC IE. The relevant information is stored in a mesh table (MT) illustrated in Table 1. A device manages as many MTs as the number of L2R meshes it has joined.

* ***With:***

An L2R mesh is managed based on the information retrieved from the PIB attributes found in Table 42 in 7.3.1, the L2R Discovery (L2R-D IE) and the TC IE. The relevant information is stored in a mesh table (MT) illustrated in Table 1. A device manages as many MTs as the number of L2R meshes it has joined. A device manages MTs other than is has joined may be managed as following manner.

* The entry which condition to record is specified as ‘A’ in table 1 is recorded.
* The entry which condition to record is specified as ‘J’ in table 1 is recorded when the device is part of the mesh.
* Whether the entry which condition to record is ‘M’ is recorded or not is depends on the PIB l2rMeshRecordMode. If the l2rMeshRecordMode is ‘ONLY\_MESH’, the entry is recorded only when the device is a part of the mesh. If the l2rMeshRecordMode is ‘SAME\_SERVICE\_ID’, the entry is recorded when the mesh which the device has joined and the mesh in the table has same service ID. If the l2rMeshRecordMode is ‘ALL\_NEIGHBORS’, the entry is recorded from L2R-D IE and TC IE from all of neighbors.
* ***Replace following text in clause 5.2.1 on p.23, l.5-6***

The format of a TC IE is described in 6.2.2. The procedure to start the L2R mesh is described in 5.1.1. Each device holds a NT with the information found in Table 3 for each L2R mesh the device has joined.

* ***With:***

The format of a TC IE is described in 6.2.2. The procedure to start the L2R mesh is described in 5.1.1. Each device holds a NT with the information found in Table 3 for each MT as far as l2rMeshRecordMode indicates to store for the mesh. Common neighbor information among the mesh found in Table 4 is held as Global NT.

* ***Replace following word in clause 5.2..4.3 on p.29, l.29***

NT

* ***With:***

Global NT

* ***Replace following word in clause 5.2..4.3 on p.29, l.30***

NT

* ***With:***

Global NT

* ***Replace following word in clause 5.2..4.3 on p.33, l.30***

Upon reception of the TC IE or a NLM IE, a device browses its NT.

* ***With:***

Upon reception of the TC IE or a NLM IE, a device browses its NT in the MT of the mesh in which a device joined..

1. **CID #1285**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1306 | Tero Kivinen | INSIDE Secure | 48 | 5.5.2 | 47 | What are those “individual settins” which are used withn that very long PIB value is TRUE. I would have assumed it would use the extremely long other PIB values listed few lines earlier in that case, and not use individual settings. |  |

**Resolution: AiP**

* ***Rename “l2rSecurityBroadcastCommonSettingIsUsed” as “l2rBCSecCommonSettingIsUsed”***
* ***Rename all of other “l2rSecurityBroadcastCommonSetting..XXX” as “l2rBCSec…XXX”***
* ***Replace following description on p.48, l.44-48***

For a broadcast transmission, the L2R sublayer refers to l*2rSecurityBroadcastCommonSettingLevel*, *l2rSecurityBroadcastCommonSettingKeyIDMode*, *l2rSecurityBroadcastCommonSettingKeySource*, and *l2rSecurityBroadcastCommonSettingKeyIndex* to set the security parameters in the MCPS-Data.request primitive. For the transmission of TC IEs and NLM IEs, individual setting are used to invoke MLMEBeacon.request when *l2rSecurityBroadcastCommonSettingIsUsed* is TRUE.

* ***With:***

For a broadcast transmission, the L2R sublayer refers to l*2rBCSecSecurityLevel*, *l2rBCSecKeyIDMode*, *l2rBCSecKeySource*, and *l2rBCSecKeyIndex* to set the security parameters in the MCPS-Data.request primitive. For the transmission of TC IEs and NLM IEs, individual settings are used to invoke MLMEBeacon.request when *l2rBCSecCommonSettingIsUsed* is FALSE.