IEEE P802.11  
Wireless LANs

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| --- |
| Support for 802.1Qat in 802.11 |
| Date: 2010-09-13 |

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|  |  |  |  |  |

Abstract

This submission contains the normative text related to changes required in 802.11 in order to support 802.1Qat SRP over 802.11. This document resolves all Interworking category comments. This document is based on 802.11aa Draft 1.01. Editorial instructions are relative to the contents of 802.11aa Draft 1.01.

**7.3 Management frame body components**

***Editor: Insert a definition for the Higher Layer Stream ID element to Table 7-26***

|  |  |  |  |
| --- | --- | --- | --- |
| **Information Element** | **Element ID** | **Length (in octets)** | **Extensible** |
| Higher Layer Stream ID (See 7.3.2.aa96) | <ANA> | Variable | Yes |

***Editor: Insert a definition for the Higher Layer Stream ID element to Clause 7.3.2***

**7.3.2.aa96 Higher Layer Stream ID Element**

The Higher Layer Stream ID element identifies a higher layer stream. This element is used to bind non-atomic operations between the non-AP STA and the AP, required to support the higher layer stream. See 11.4.4 AP Initiated TS Setup.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Element ID | Length | Higher Layer Stream ID |
| Octets | 1 | 1 | Variable |

**Figure 7-aa20—Higher Layer Stream ID element format**

The Element ID field is set to the Higher Layer Stream ID value in Table 7-26

The value of the Length field is variable and is set to the length of the Higher Layer Stream ID.

The Higher Layer Stream ID field is an octet string identifying the stream.

**7.4.2 QoS Action frame details**

***Editor: Insert a row for ADDTS Trigger to Table 7-45 – QoS Action field values***

Several Action frame formats are defined for QoS purposes. The Action field values associated with each frame format within the QoS category are defined in Table 7-45 (QoS Action field values).

**Table 7-45—QoS Action field values**

|  |  |
| --- | --- |
| Action Field Value | Meaning |
| 0 | ADDTS Request |
| 1 | ADDTS Response |
| 2 | DELTS |
| 3 | Schedule |
| 4 | ADDTS Reserve |
| 5 | ADDTS Complete |
| 6-255 | Reserved |

**7.4.2.1 ADDTS Request frame format**

The ADDTS frames are used to carry TSPEC and optionally TCLAS elements to set up and maintain TSs using the procedures defined in 11.4 (TS operation).

The frame body of the ADDTS Request frame contains the information shown in Table 7-46 (ADDTS Request frame body).

**Table 7-46—ADDTS Request frame body**

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 1 | Category |  |
| 2 | Action |  |
| 3 | Dialog Token |  |
| 4 | TSPEC |  |
| 5-n | TCLAS | Optional |
| n+1 | TCLAS Processing | Optional |
| n+2 | Higher Layer Stream ID | Only in AP Initiated TS Setup |

***Editor: Add a new paragraph to the end of the definition ADDTS Request QoS Action Frame***

The Higher Layer Stream ID element identifies the higher layer stream corresponding to which this ADDTS Request frame is exchanged between the non-AP STA and the AP.

**7.4.2.2 ADDTS Response frame format**

***Editor: Insert a new row at the end of Table 7-47***

**Table 7-47—ADDTS Response frame body**

|  |  |  |
| --- | --- | --- |
| Order | Information | Notes |
| 1 | Category |  |
| 2 | Action |  |
| 3 | Dialog Token |  |
| 4 | Status Code |  |
| 5 | TS Delay |  |
| 6 | TSPEC |  |
| 7-n | TCLAS | Optional |
| n+1 | TCLAS Processing | Optional |
| n+2 | Schedule |  |
| n+3 | Higher Layer Stream ID | Only in AP Initiated TS setup |

The Higher Layer Stream ID element is present only in AP initiated TS setup. The Higher Layer Stream ID element identifies the higher layer stream corresponding to which this ADDTS Response frame is exchanged between the non-AP STA and the AP.

***Editor: Add a new subclause to 7.4.2 as follows:***

7.4.2.5aa ADDTS Reserve frame format

The ADDTS Reserve frame is transmitted by an AP to a non-AP STA in response to a higher layer protocol. See 11.4.4 TS Setup.

The frame body of the ADDTS Reserve frame contains the information shown in Table 7-47.

Table 7-47aa1—ADDTS Reserve frame body

|  |  |
| --- | --- |
| Order | Information |
| 1 | Category |
| 2 | Action |
| 3 | Dialog Token |
| 4 | TSPEC |
| 5 | Schedule |
| 6 | Higher Layer Stream ID |
|  |  |

The Category field is set to 1 (representing QoS).

The QoS Action field is set to 4 (representing ADDTS reserve).

The Dialog Token, TCLAS, and TCLAS Processing fields of this frame are contained in an MLMEADDTS.reserve primitive that causes the frame to be sent. Some of the TSPEC parameters are contained in the MLME-ADDTS.request primitive while the other parameters (i.e., Surplus Bandwidth Allowance, Minimum Service Interval, Maximum Service Interval, and Minimum PHY Rate) are generated within the MAC.

The TSPEC element contains the QoS parameters that define the TS. The TS is identified by the TSID and Direction fields within the TSPEC element.

Dialog Token is set to 0.

TSPEC is set to the TS that the AP has admitted,

The Schedule element is set to reflect schedule information corresponding to the TSPEC specification the corresponding Higher Layer Protocol ID element is included

The Higher Layer Stream ID element (7.3.2.aa96) provides the stream identifier from a higher layer protocol.

**7.4.2.5 ADDTS Complete frame format**

An ADDTS Complete action frame is used to by a non-AP STA to indicate the completion of an AP Initiated TS Setup procedure (11.4.4 TS Setup). The frame body of the ADDTS Complete frame contains the information shown in Table 7-48.aa (ADDTS Complete frame body).

**Table 7-48—ADDTS Complete frame body**

|  |  |
| --- | --- |
| Order | Information |
| 0 | Category |
| 1 | Action |
| 2 | Higher Layer Stream ID |
| 3 | Status Code |

The Category field is set to 1 (representing QoS).

The Action field is set to 4 (representing ADDTS Complete).

The Higher Layer Stream ID is defined in 7.3.2.aa96 (Higher Layer Stream ID element).

The Status Code field is defined in 7.3.1.7 (Status Code field).

**10.3.24.4 MLME-ADDTS.response**

**10.3.24.4.1 Function**

**10.3.24.4.2 Semantics of the service primitive**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid Range | Description |
| Higher Layer Stream ID | Higher Layer Stream ID element | As defined in 7.3.2.aa96 | Identifies the higher layer stream corresponding to which this primitive is invoked. This parameter is only present if this primitive is invoked by the SME at the AP in response to a higher layer protocol. |
| VendorSpecificInfo | A set of information elements | As defined in 7.3.2.26 (VendorSpecific information element) | Zero or more information elements. |

**10.3.24.4.3 ADDTS Response Indication**

**10.3.24.4.1 Function**

**10.3.24.4.2 Semantics of the service primitive**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid Range | Description |
| Higher Layer Stream ID | Higher Layer Stream ID element | As defined in 7.3.2.aa96 | Identifies the higher layer stream corresponding to which this primitive is invoked. |
| VendorSpecificInfo | A set of information elements | As defined in 7.3.2.26 (VendorSpecific information element) | Zero or more information elements. |

**10.3.24.4.aa ADDTS Reserve Request**

**10.3.24.4.aa.1 Function**

This primitive request is used by the HC to indicate to a non-AP STA that a TS has been setup in response to a higher layer protocol.

**10.3.24.4.aa.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-ADDTSReserve.request (

DialogToken,

TSPEC,

Higher Layer Stream ID,

VendorSpecificInfo)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid Range | Description |
| DialogToken | Integer | 0 or  as defined in the corresponding MLMEADDTS. indication | DialogToken of the matching MLME-ADDTS.indication primitive.  Set to 0, if the response is generated AP is responding to a higher layer protocol |
| TSPEC | TSPEC Element | As defined in 7.3.2.30. | Specifies the QoS parameters of the TS. |
| Schedule | Integer | >= 0 | Specifies the schedule  information, service start time, SI, and the specification interval. |
| Higher Layer Stream ID | Higher Layer Stream ID element | As defined in 7.3.2.aa96 | Identifies the higher layer stream corresponding to which this primitive is invoked. |
| VendorSpecificInfo | **A set of information elements** | **As defined in 7.3.2.26 (VendorSpecific information element)** | **Zero or more information elements.** |

**10.3.24.4.aa.3 When generated**

This primitive is generated by the SME to indicate to a non-AP STA that the HC has setup a TS in response to a higher layer protocol

.

**10.3.24.4.aa.4 Effect of receipt**

The STA operates according to the procedures defined in 11.4.4.

**10.3.24.5.aa ADDTS Reserve Confirm**

**10.3.24.5.aa.1 Function**

This primitive reports the transmission status of a ADDTS Reserve action frame.

**10.3.24.5.aa.2 Semantics of the service primitive**

The primitive parameters are as follows:

MLME-ADDTSReserve.confirm (

ResultCode,

Higher Layer Stream ID

)

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid Range | Description |
| ResultCode | Enumeration | SUCCESS,  INVALID\_PARAMETERS,  FAILURE | Indicates the results of the  corresponding MLMEADDTSReserve.  request primitive. |
| Stream ID | Higher Layer Stream ID element | As defined in 7.3.2.aa96 | Higher Layer Stream ID from the TSPEC element included in the ADDTS Response from the AP (only for AP initiated TS Setup) |

**10.3.24.5.aa.3 When generated**

This primitive is generated by the MLME as a result of an MLME-ADDTSReserve.request primitive after the

ADDTS Reserve action frame has been sent (or attempts to send it have failed).

**10.3.24.5.aa.4 Effect of receipt**

The SME is notified of the results of the ADDTSReserve procedure.

**10.3.24.8 ADDTS Complete Request**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid Range | Description |
| Stream ID | Higher Layer Stream ID element | As defined in 7.3.2.aa96. | Higher Layer Stream ID corresponding to which the AP initiated this TS setup. |
| Status Code | Enumeration | 0 or 1 (as defined in Table 7-23 – Status codes) | Indicates the status of the AP initiated TS Setup procedure |
| VendorSpecificInfo | A set of elements | As defined in  7.3.2.26 (Vendor  Specific element) | Zero or more elements |

**10.3.24.9 ADDTS Complete Confirm**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid Range | Description |
| ResultCode | Enumeration | SUCCESS,  INVALID\_PARAMETERS,  FAILURE | Indicates the results of the  corresponding MLMEADDTSComplete.  request primitive. |
| Stream ID | Higher Layer Stream ID element | As defined in 7.3.2.aa96 | Higher Layer Stream ID from the TSPEC element included in the ADDTS Response from the AP (only for AP initiated TS Setup) |

**10.3.24.10 ADDTS Complete Indication**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Type | Valid Range | Description |
| STA Address | MAC Address |  | Specifies the MAC address of the non-AP STA from which the ADDTS Complete action frame was received |
| Stream ID | Higher Layer Stream ID element | As defined in 7.3.2.aa96 | Higher Layer Stream ID from the TSPEC element included in the ADDTS Response from the AP (only in AP initiated TS Setup) |
| Status Code | Enumeration | 0 or 1 (as defined in Table 7-23 – Status codes) | Indicates the status of the AP initiated TS Setup procedure |
| VendorSpecificInfo | A set of elements | As defined in  7.3.2.26 (Vendor  Specific element) | Zero or more elements |

**11.4 TS operation**

**11.4.1 Introduction**

A TSPEC describes the traffic characteristics and the QoS requirements of a TS. The main purpose of the TSPEC is to reserve resources within the HC and modify the HC’s scheduling behavior. It also allows other parameters to be specified that are associated with the TS, such as a traffic classifier and acknowledgment policy.

A TS may have one or more TCLAS (within the discretion of the STA that sets up the stream) associated with it. The AP uses the parameters in the TCLAS elements to filter the MSDUs belonging to this TS so that they can be delivered with the QoS parameters that have been set up for the TS.

TSPEC and the optional TCLAS elements are transported on the air by the ADDTS, in the corresponding QoS Action frame and across the MLME SAP by the MLME-ADDTS primitives.

Following a successful negotiation, a TS is created, identified within the non-AP STA by its TSID and direction, and identified within the HC by a combination of TSID, direction, and non-AP STA address.

***Delete the last paragraph in 11.4.1.***

**11.4.4 TS setup**

A TS is setup can be initiated by an AP or a non-AP STA.

***Editor: Wrap the first paragraph in 11.4.4 and Figure 11-8 TS Setup under an unnumbered header* non-AP initiated TS Setup**

**Editor: Created a new unnumbered clause titled “AP initiated TS Setup” and include the following under it.**

Figure 11-8aa shows the sequence of messages occurring at a TS setup when initiated by the AP. Figure 11-8 shows the sequence of messages occurring at a TS setup when initiated by a non-AP STA. This message sequence in this figure and in the subsequent figures does not show the acknowledgment.

***Editor: Replace Figure 11-8aa with the following:***



Figure 11-8aa TS Setup when initiated by the AP

TS Setup can be initiated by an AP in response to a request originating from higher layer protocols. An AP in which dot11RobustAVStreamingImplemented is true shall not send AP initiated TS Setup ADDTS Reserve frames to a non-AP STA in the BSS in which RobustAVStreaming bit in the Extended Capabilities element is 0.

The higher layer Stream ID is defined by the higher layer. The Higher Layer Stream ID shall be included in the ADDTS Reserve action frame sent by the AP to the non-AP STA. This Higher Layer Stream ID is used in the TS Setup procedure between the AP and the non-AP STA.

The AP initiates the TS Setup by sending an ADDTS Reserve that includes the Higher Layer Stream ID element to the non-AP STA. On receipt of the ADDTS Response from the AP, the non-AP STA shall perform one of the following:

1. Ignore the ADDTS Reserve from the AP. The AP initiated TS Setup as a result will be aborted by the AP after a timeout at the AP.
2. Send an ADDTS Complete action frame with the status code set to 1 (Unspecified Failure) to abort the AP initiated TS setup. The Higher Layer Stream ID field in this ADDTS Complete action frame shall be set to the Higher Layer Stream ID corresponding to the AP initiated TS Setup procedure.
3. Send an ADDTS Request to the AP to negotiate the TSPEC parameters. This negotiation may involve multiple ADDTS Request/ADDTS Response exchanges between the non-AP STA and the AP. In all these frames exchanged between the non-AP STA and the AP, the Higher Layer Stream ID corresponding to the AP initiated TS Setup procedure shall be included.

At the end of the negotiation, the non-AP STA shall complete the AP initiated TS Setup procedure by sending an ADDTS Complete action frame that includes the Higher Layer Stream ID corresponding to the AP initiated TS Setup procedure.

***Editor: The second paragraph under 11.4.4. TS Setup from the base specification follows from here***