10. Synchronization architecture, state machines and procedures

10.1 Ethernet endpoint synchronization architecture

10.2 802.11 Wireless synchronization architecture

This clause shall apply to every 802.11 Station (STA) that implements the 802.11 Distribution System Service (DSS) and/or 802.11 Integration Service (IS)

This clause will specify:

a) Participation in best master selection, including: Addressing of Announce messages, message intervals, constant contents of Announce messages, mapping of timestamp accuracy to Announce clock-quality fields, state machines

    1) A STA shall support the Time Offset Measurement option of the Presence Request Options field of 802.
        <<Editors note: Need to reconcile this with LLDP used for 802.3 LANs>>

    2) Every master-capable STA shall originate Announce messages with Desitination MAC Address equal to the following multicast address 0x????????????

    3) A STA containing an 802.11 Integration Service or Distribution Service or both an Integration Service and Distribution Service shall implement a Boundary Clock between STAs of a BSS or or STAS of an ESS, or stations attached to the non-WLAN. All such stations are synchronized through said Boundary Clock.

    4) The Announce Interval shall be uniform across all STAs within a BSS.

    5) A port in the MASTER state which expects to be unavailable for one or more SYNC intervals should communicate this through an ANNOUNCE message which advertises itself as a SLAVE-only device.

    6) The following fields of the ANNOUNCE message shall have constant values:
        <<Editor's note: Table is TBD>>

b) The protocol used to generate timestamp measurements, including: port state machines, generation of 802.11v Presence Request/Response messages, and the timestamp point.
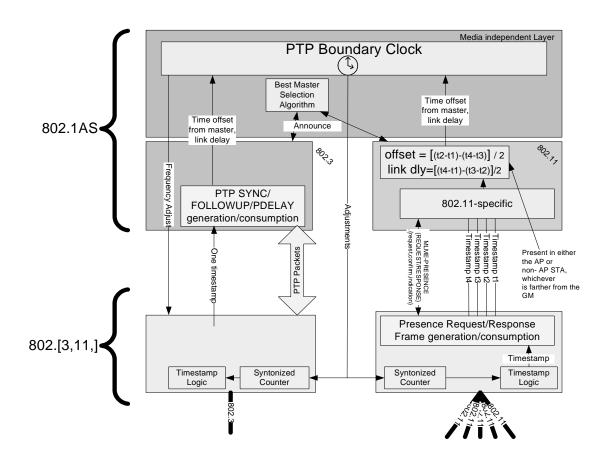
Every STA contains either an OC or a BC, and every port is in a state labeled either MASTER or SLAVE or PASSIVE.

    1) Every port in the SLAVE state shall transmit the appropriate number of Presence Requests to all associated STAs during each Sync Interval.
        <<Editors notes: Multiple STAs can be associated with a single 802.1AS port -- it is not a 1:1 relationship>>

    2) The number of Presence Requests transmitted per Sync Interval shall be equal to the 802.11v "Normal Number of Frames Per Channel" field.

    3) The Normal Number of Frames per Channel parameter shall be uniform across all STAs within a BSS.

    4) The 802.11 Presence Normal Report Interval parameter shall be assigned to the same value as the 802.1AS Sync Interval

    5) A Presence Response message shall follow the Presence Request/ACK transaction and communicate the ingress timestamp and timestamp difference to the non-MASTER port.
        <<Editor's note: The alternative would be to transmit Presence Request and subsequently the Presence Response messages from the MASTER port>>

6) The timestamp point of a transmitted or received frame is ___
   <<Editor's note: Need to decide if the current 802.11k draft specifies PHY-RXEND.indication and PHY-TXSTART.confirm specified precisely enough for our purposes. Also, since these are specified from RXEND to TXSTART, we need to compute the actual RXSTART time also, or measure it directly>>

7) Upon completion of a set of time offset measurements (defined as sending Normal Number of Frames Per Channel"), a single time offset shall be computed as offset=___.

8) Timetsamp accuracy shall be no worse than +/- 100ns

9) A STA with a port in the MASTER state, when requesting reassociation shall first transmit an ANNOUNCE message revoking its preeminence as a clock master until succesfully reassociated.
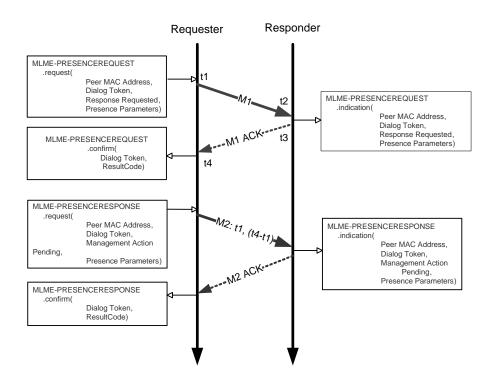
c)

NOTE: Architecturally, an AP contains a single clock (the Boundary Clock) from which timestamps captured on all wired and wireless interfaces are referenced.

The above figure illustrates the functional components of an 802.11 STA that contains both the Integration Service (IS) and the Distribution System Service (DSS).

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10.3 Wireless endpoint synchronizationarchitecture

10.4 State machines

10.5 Procedures

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