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Leader based Multicast Proposal

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Abstract

This document contains substantive text to describe the leader based multicast protocol. Leader based multicast protocol improves the reliability of the multicast frame, the throughput fairness between the multicast connections and the unicast connections. Leader based protocol consists of the leader election protocol and the modified multicast transmission mechanism. With the leader election protocol, one station becomes the leader for the specific multicast group. The leader will generate the ACK frame for each received multicast frames. AP transmits the multicast frame and waits ACK frame. If the AP does not receive the ACK frame, the AP carries out the exponential backoff mechanism.

Change 7.3.2.35 as shown:

Insert the following new clauses after 7.3.2.34:

7.3.2.35 Wireless Network Management Capability information element

The Wireless Network Management Capability Information element contains information about the wireless network management capabilities of a STA as shown in 0.

	Element ID	Length	Wireless Network Management Capabilities
Octets:	1	1	variable

Figure v15—Wireless Network Management Capability information element format

The Element ID field is equal to the Wireless Network Management Capability value in Table 26.

The value of the length field is variable and depends on the length of the Wireless Network Management Capabilities field. The minimum value of the Length field is 2.

The Wireless Network Management Capabilities field is a bit-field indicating the advertised management capabilities of the STA. The Wireless Network Management Capabilities field is shown in 0.

	B0	B1	B2	B3	B4	B5	B6	B7	B8 B15
	Event Log	Diagnostics	Multicast Alert	Presence	FBMS	Proxy ARP Service	Co-located Interference Reporting	Leader based Multicast	Reserved
Bits:	1	1	1	1	1	1	1	1	8

Figure v16—Wireless Network Management Capabilities

— The Event Log bit set to 1 indicates the STA supports Event Log as described in **Erreur ! Source du renvoi introuvable.**. The Event Log bit set to 0 indicates that the STA does not support this service.

— The Diagnostics bit set to 1 indicates the STA supports Diagnostics as described in **Erreur ! Source du renvoi introuvable.**. The Diagnostics bit set to 0 indicates that the STA does not support this service.

— The Multicast Alert bit set to 1 indicates the STA supports Multicast diagnostics as described in **Erreur ! Source du renvoi introuvable.**. The Multicast Alert bit set to 0 indicates that the STA does not support this service.

— The Presence bit set to 1 indicates that the STA supports Presence as described in **Erreur ! Source du renvoi introuvable.**. The Presence bit set to 0 indicates that the STA does not support this service.

— The FBMS bit set to 1 indicates the STA supports FBMS as described in **Erreur ! Source du renvoi introuvable.**. The FBMS bit set to 0 indicates the STA does not support FBMS.

— The Proxy ARP Service bit set to 1 indicates the AP is providing proxy ARP service. If Proxy ARP service is enabled, then the AP responds to broadcast ARP request on behalf of the STA. The Proxy ARP Service bit set to 0 indicates the AP is not providing proxy ARP service for any associated STA.

— The Co-located Interference Reporting bit set to 1 indicates the STA supports Co-located Interference Reporting as described in **Erreur ! Source du renvoi introuvable.**. The Co-located Interference Reporting bit set to 0 indicates that the STA does not support this service.

— The Leader based Multicast bit set to 1 indicates the STA supports the Leader based Multicast as described in 9.2.7.2. The Leader based Multicast bit set to 0 indicates the STA does not support the Leader based Multicast.

— All other bits are reserved, and are set to 0 on transmission and ignored on reception.

The lack of a Wireless Network Management Capability element is interpreted as the STA having no advertised Wireless Network Management Capabilities.

Change 7.4.6 as shown:

7.4.6 Wireless Network Management action details

Several Action frame formats are defined for Wireless Network Management purposes. An Action field, in the octet field immediately after the Category field, differentiates the formats. The Action field values associated with each frame format are defined in 0.

Table v47—Wireless Network Management Action field values

Action field value	Description
0	Event Log Request
1	Event Log Report
2	Diagnostic Request
3	Diagnostic Report
4	Presence Request
5	Presence Response
6	Presence Configuration Request
7	Presence Configuration Response
8	Roaming Management Query
9	Roaming Management Request
10	Roaming Management Response
11	FBMS Request
12	FBMS Response
13	Co-located Interference Request
14	Co-located Interference Response
15	Leader Request
16	Leader Response
17	Leader Release
18-255	Reserved

Insert the following after 7.4.6.15:

7.4.6.16 Leader Request

The Leader Request frame uses the Action frame body format. The format of the Leader Request frame body is shown in Figure v103.

	Category	Action	Length	Multicast Group Address #1	Multicast Group Address #n
Octets:	1	1	1	6	6

Figure v103—Leader Request frame body format

The Category field is set to the value indicating the Wireless Network Management category, as specified in Table 24 in 7.3.1.11.

The Action field is set to the value indicating Leader Request frame, as specified in Table v47 in 7.4.6.

The Length field is set to 1+n, where n indicates the total length of all multicast group address.

The Multicast Group Address field is set to the MAC address of the multicast group. The non-AP STA is requested to becoms the leader for each Multicast Group Address.

7.4.6.17 Leader Response

The Leader Response frame uses the Action frame body format. The format of the Leader Response frame body is shown in Figure v104.

	Category	Action	Length	Status Code #1	Status Code #n
Octets:	1	1	1	1	1

Figure v104—Leader Response frame body format

The Category field is set to the value indicating the Wireless Network Management category, as specified in Table 24 in 7.3.1.11.

The Action field is set to the value indicating Leader Response frame, as specified in Table v47 in 7.4.6.

The Length field is set to 1+n, where n indicates the total length of all status code.

The Status Code field is set to the status code in response to the Leader Request as defined in Table v54. If the non-AP station receving the Leader Request accepts to become the leader, then the status code is set to 0. Otherwise, the status code is set to 1, for indicating the rejection of the leader rquest.

Mise en forme : Puces et numéros

Table v54—Satus Code Definitions for a Leader Response

Status Code	Status Code Description
0	Accept
1	Reject
2-255	Reserved

7.4.6.18 Leader Release

The Leader Release frame uses the Action frame body format. The format of the Leader Release frame body is shown in Figure v105.

	Category	Action	Length	Multicast Group Address #1	Multicast Group Address #n
Octets:	1	1	1	6	6

Figure v105—Leader Release frame body format

The Category field is set to the value indicating the Wireless Network Management category, as specified in Table 24 in 7.3.1.11.

The Action field is set to the value indicating Leader Release frame, as specified in Table v47 in 7.4.6.

The Length field is set to 1+n, where n indicates the total length of all multicast group address.

The Multicast Group Address field is set to the MAC address of the multicast group. After receving the Leader Release frame, the non-AP STA does not work as the leader for each Multicast Group Address.

Insert the following after 9.2.7.1:

9.2.7.2 Leader based Multicast

An AP supporting Leader based multicast shall indicate its support by using Wireless Network Management Capability information element. A non-AP STA wishing to use Leader based Multicast shall indicate it by using Wireless Network Management Capability information element.

9.2.7.2.1 Leader based Multicast operation

In order to use the Leader based Multicast, the AP selects a leader for a multicast group. The leader may be selected to the multicast receiver with the highest packet error rate. The packet error rate of multicast receivers may be obtained through the Multicast Diagnostic Reports. But a specific leader selection algorithm and a leader change algorithm are out of scope in the IEEE 802.11 standard.

The AP sends a Leader Request to the selected leader. If the selected leader accepts to become a new leader for the multicast group, the selected leader sends the Leader Response with the status code of 0 to the AP. Othewise, the selected leader sends the Leader Response with the status code of 1, for indicating the rejection of the leader request.

If the selected leader accepts the leader request, then the AP should send a Leader Release to a old leader, for indicating a leader change. After receving the Leader Release, the old leader does not work as the leader for the multicast group.

Before sending the Leader Release to the old leader, the AP shoud does not send the buffered multicast frame, in order to prevent ACK frame transmissions from the multiple leaders.

When the AP sends buffered multicast frames, the duration field should be set to an ACK transmission time plus a SIFS time, for NAV setting of other stations. And, the AP should wait the ACK frame from the leader of the multicast group.

If the AP does not receives the ACK frame from the leader during the ACK timeout, the AP should increases the contention window by using the bianry exponential backoff mechanism, for the retansmission of the multicast frame.

After correctly receving the multicast frame, the leader should sends the ACK frame to the AP. Only leader can sends the ACK frame for the multicast frame.