IEEE P802.11  
Wireless LANs

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| ARC SC teleconferences minutes 08 February 2021 | | | | |
| Date: 2021-02-08 | | | | |
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Abstract

This document contains the minutes of the IEEE 802.11 ARC SC teleconference held on 08 February 2021 at 19:00-21:00 h ET.

Note: Highlighted text are action items. A- precedes comments from the document’s author, C- precedes comments, R- precedes responses to comments.

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# Monday 08 February 2021, 19:00-21:00 h ET

## Administration:

**Chair: Mark Hamilton, Ruckus/CommScope**

**Vice Chair: Joseph Levy, InterDigital**

**Secretary: Joseph Levy, InterDigital**

**Meeting called to order by the Chair 19:02 ET**

Agenda slide deck: [11-21/0219r0](https://mentor.ieee.org/802.11/dcn/21/11-21-0219-00-0arc-arc-sc-agenda-feb-8-2021.pptx)

**Call for Patents:**

The Chair reviewed the Patent policy and called for potentially essential patents – there was no response to the call.

**IEEE SA Copyright Policy:**

The chair reviewed the Copyright policy.

**Participation:**

The chair reviewed the participation policy.

**Approval of the Agenda:**

* **Attendance, noises/recording, meeting protocol reminders**
* **Policies, duty to inform, participation rules**
* **Contribution/discussion topics:**
  + **802.11 TGbe’s evolving multi-link architecture contributions:**
    - [**11-20/1639r12**](https://mentor.ieee.org/802.11/dcn/20/11-20-1639-12-00be-11be-ap-mld-architecture-discussion.pptx)
* **Next Steps**

The Chair reviewed the agenda and called for comments or amendments to the agenda - there was no response to the call.

The proposed agenda was accepted without comment.

Chair reviewed agenda deck slide 16 – The ARC other topics slide and discussed ongoing ARC activities.

## Contributions:

[**11-20/1639r12**](https://mentor.ieee.org/802.11/dcn/20/11-20-1639-12-00be-11be-ap-mld-architecture-discussion.pptx)“802.11be AP MLD Architecture Discussion” – Mark Hamilton

Starting @ slide 24 – A very quick review of the status was given, as all the participants have been participating in past meetings.

Discussing on Slide 28 – using address one filtering – discussing the highlighted text: “The value of the RA/TA fields sent over-the-air in the MAC header of a frame is the MAC address of the STA affiliated with the MLD corresponding to that link. [Motion 108, [30] and [186]]”

C – This text is fine on the Peer to Peer link. (on the yellow text). Reference –IETF - rfc 4118 and rfc 5416.

Note A statement was made that there is a planned presentation for TGbe to discuss the possible missing pieces.

C – In TGbe the decision was that if the STA has different address – the address would then need to be frame type dependent. Forcing some frames to use an address and other frames to use a different address. So, it was proposed to use the “link” AP address, so it wouldn’t change.

A – So there is no baseline – the is no MLD address in the base line? But we saw that there is a point where it is decided where to send the frame for processing. So, it was proposed to use the MLD address to route stuff via Address 1. But this is not possible when the “link” AP address is used.

C – The motivation was to be consistent with control frame addressing, which are not MLD frames. TGbe didn’t want to change the MAC address or want to change the MAC address dependent on the type of frame being sent. So, the AP MLD will know even though it is sent to the AP MAC address, if it comes from a non-AP MLD because of the TA that it is an MLD frame.

R – So an incoming frame addressed to the legacy AP’s MAC address from a non-AP MLD will be understood to be an MLD frame if it is a data frame.

R – The AP MLD can figure it out. Control frame and Management frames don’t change. Also, TGbe didn’t want to change the MAC header. The filtering done on R1 and MLO will not use a different address. If you use the MLD address – you need to filter it out at the beginning.

R – So it is based on the TA – you can filter based on the sending address.

R – There are some cases that the MLD address is carried – MDSU the non-AP MLD needs to know what key to use. And before you can see the MLD address the frame needs to be decrypted. So, the information needs to be in the header to be work.

Slide 30 –

Slide 31 –

C – in UL – agree either way forwarding to the DS doesn’t matter. But for DL – there needs to be a single AP in the AP MLD that the DS will send the frames. Either link may be fine, but the DS should know which of the affiliated APs of the AP MLD to send frames. All the upper should only see only one link. The AP MLD will be able to do aggregation, and half on one “link” and half on the other “link”, or maybe 1/3 2/3 split – it is an AP MLD implementation thing. The DS should not be making this decision, the AP MLD should make it.

R - The DS only knows the non-AP MLD’s mac address, so either of the AP can update the DS map with the non-AP mac address to the DS and the DS will only have one place to send frames for the MAC address (one of the associated AP of the MLD). So, either MAC stack can generate the outgoing frames and then the AP MLD can decide which link to send it over. So, the cross arrows above the lower MAC are intentionally just down stack.

C – TGbe agreed there would be one MAC SAP

R - The AP doesn’t support LLC – so any of this stuff is hidden from the LLC. The DS has a single AP associated with the non-AP MLD.

C – How does the MLD appears in the DS? The DS has a mapping of which AP a STA is associated with. The MLO association process – is the non-AP MLD associated with an MLD or an AP affiliated with the AP MLD.

R – As far the DS mapping table – the non-AP MLD is mapped to one AP affiliated with the AP MLD. The DS will rout all frames addressed to the non-AP MLD to the AP identified as the AP the non-AP MLD is mapped to.

C – Assuming the DS can figure out which AP to send things to. After the process of the MAC stack there is a decision as to which “link” is chosen to send the frame over.

R – The choice of which “link” to send the frame over, is required in any of the architecture model alternative discussed.

C – The mapping table in the DS – it is from the association – if you use the figure on slide 33 – the non-AP MLD need to associate with one link or the other link. In the current spec the non-AP MLD can only associate with one AP. Is it possible for the non-AP MLD to switch APs?

R – Either one of the APs can tell the DS it is the AP associated with the non-AP MLD, as either stack can provide the frames to both “links”. This still work as well as any other architecture.

C – The MAC address is the MLD MAC address and the lower MAC may have its own MAC address.

R - the upper MAC needs to process MLO frames - the stack needs to be smart and will need to be able to process the MLO frames.

A – It doesn’t make any sense to service legacy and MLO at the same time for a given “STA”.

C – In the current spec – the non-AP MLD only associates to one entry point – from a DS perspective you can’t have two mappings. Two mappings will violate basic assumptions. TGbe has been working to keep one mapping. On the AP side – the legacy APs use the AP address and the AP MLD also will uses the same address. So, discovery will work and the date connection is one to one.

Chair – Please share what you are thinking about this architecture as you reach conclusions – so we can update this contribution and make things clear.

## Next Steps:

**How to communicate the ARC position to TGbe?**

Chair - How should we communicate ARC views/comments/recommendations to TGbe?

C – I intend to understand what is missing in the spec and make sure it is in line with the motion vision. If there is something TGbe should revise, TGbe will consider it. If comments are provided, I will try to address them. I will take the ARC group input in and try to work it in to the spec.

Chair – May be some sort of a document would be useful. Let’s try to come up with a plan – some time between now and the plenary. Should we do something formal or is the informal communication adequate?

**Next Teleconference(s):**

* + Next teleconference on TGbe topic:
    - Feb 22: 19:00 ET, 2 hours
  + Also, next teleconference on ESS/HeSS topic (preparing liaison to REVme)
    - Mar 1, 13:00 ET, 2 hours
    - Expect MOTION to liaise our document to REVme

**Contributions requested/expected:**

* TGbe architecture topics, especially trying to consolidate security discussion to be liaised to TGbe

## Adjourned: 20:21 h EDT

**Attendance:**

| **Name** | **Affiliation** |
| --- | --- |
| Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| Fang, Yonggang | Self |
| Hamilton, Mark | Ruckus/CommScope |
| Huang, Po-Kai\* | Intel Corporation |
| Kim, Youhan | Qualcomm Incorporated |
| Levy, Joseph | InterDigital, Inc. |
| Montemurro, Michael | Huawei Technologies Co. Ltd |
| Patwardhan, Gaurav | Hewlett Packard Enterprise |
| Petrick, Albert | Jones-Petrick and Associates, LLC. |
| Rolfe, Benjamin | Blind Creek Associates |
| Rosdahl, Jon | Qualcomm Technologies, Inc. |
| Stanley, Dorothy | Hewlett Packard Enterprise |
| Sun, Bo\* | ZTE Corporation |
| Torab Jahromi, Payam | Facebook |
| Wang, Lei | Futurewei Technologies |
| Yang, Rui\* | InterDigital, Inc |

\* Added based on Webex participants list.