IEEE P802.11  
Wireless LANs

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| ARC SC Meeting Minutes March 2018 | | | | |
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Abstract

This document contains the minutes of the IEEE 802.11 ARC SC meeting sessions held on 6 March 2018 at 10:30 CST, 6 March 2018 at 16:00 CST and 7 March 2018 at 08:00 CST in Rosemont, Illinois, USA.

Note: Highlighted text are action items.

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# Tuesday, 6 March 2018, at 10:30 CST

**Administration:**

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

**Vice Chair/Secretary Joseph Levy, InterDigital**

**Meeting call to order in ARC meeting room by Chair 10:30 CST,**

Agenda slide deck: [11-18/0310r2](https://mentor.ieee.org/802.11/dcn/18/11-18-0310-02-0arc-arc-sc-agenda-march-2018.pptx) , proposed agenda copied here for reference:

**Tuesday, March 6, AM2**

* **Administrative: Minutes**
* **IEEE 1588 mapping to IEEE 802.11/802.1ASrev use of FTM update -** [11-17/1086r4](https://mentor.ieee.org/802.11/dcn/17/11-17-1086-04-0arc-ieee-802-1as-d5-0-review-comments.pptx)
* **802 (and 802.1) activities: 802c, 802.1CQ**
* **IETF/802 coordination**
* **TGax approach to subclause 10.2 and Figure 10-1:** [11-18/0362r0](https://mentor.ieee.org/802.11/dcn/18/11-18-0362-00-00ax-cr-for-cids-in-10-2-6.docx)
* **YANG/NETCONF modeling discussions –** [11-16/1436r1](https://mentor.ieee.org/802.11/dcn/16/11-16-1436-01-0arc-yang-modelling-and-netconf-protocol-discussion.pptx)

**Tuesday, March 6, PM2**

* + **“What is an ESS?” (Tues PM2)**
  + **MLME-RESET, versus MLME-JOIN and MLME-START**
  + **AP/DS/Portal architecture and 802 and GLK concepts -** [11-17/0136r2](https://mentor.ieee.org/802.11/dcn/17/11-17-0136-02-0arc-bridging-architecture-considerations.docx)**,** [11-16/1512r0](https://mentor.ieee.org/802.11/dcn/16/11-16-1512-00-0arc-glk-802-1q-bridge.pptx)**,** [11-16/0720r0](https://mentor.ieee.org/802.11/dcn/16/11-16-0720-00-0arc-stacked-architecture-discussion.pptx)**,** [11-15/0454r0](https://mentor.ieee.org/802.11/dcn/15/11-15-0454-00-0arc-some-more-ds-architecture-concepts.pptx)**,** [11-14/1213r1](https://mentor.ieee.org/802.11/dcn/14/11-14-1213-01-0arc-ap-arch-concepts-and-distribution-system-access.pptx) **(slides 9-11)**
* **Continue the above**

**Wednesday, March 7, AM1**

* + **Investigation of WUR architecture topics; may lead into “split” PHYs (LC, 28 GHz (Phazr)):** [11-17/1025r0](https://mentor.ieee.org/802.11/dcn/17/11-17-1025-00-0arc-11ba-arch-discussion.pptx) **(Wed AM1)**
  + **Continue the above**
  + **Future sessions / SC activities**

**Administration:**

The Chair reviewed the Administrative information in slides 5-10 in Agenda document,

**Call for Patents:**

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

**Approval of the Agenda:**

The Chair called for comments or amendments to the agenda – there was no response to the call

The proposed agenda was approved by unanimous consent.

**ARC Minutes:**

* **January face-to-face minutes:** [11-18/0224r0](https://mentor.ieee.org/802.11/dcn/18/11-18-0224-00-0arc-arc-sc-meeting-minutes-january-2018.docx)

Minutes approved by unanimous consent.

**IEEE 1588 mapping to IEEE 802.11/802.1ASrev use of FTM update -** [11-17/1086r4](https://mentor.ieee.org/802.11/dcn/17/11-17-1086-04-0arc-ieee-802-1as-d5-0-review-comments.pptx)

Chair asked Ganesh Venkatesan (Intel) for a status report:

Ganesh Venkatesan – nothing new to add - have not met with anyone this week on this. Currently ok with the current mapping of FTM. Will update if anything changes.

**802 (and 802.1) activities: 802c, 802.1CQ**

*Chair:* This looks like it is basically done regarding the 802.1Q revision and we have no known issues.

Called for comments, none were forth coming.

*Chair:* Regarding 802c and (follow on) 802.1CQ, reviewed status

*Comment –* they (802c) really screwed up the 802.11aq timeline and what can be done to not have this happen again.

*Chair:* in the future .11 can look at 802c and avoid the issue.

*Comment -* a call was made for more than monitoring.

*Chair:* indicated that we could allocate agenda time.

*Question:* Is there a section in 802.11 where we say we comply – do we need to run an 802c check.

*Chair:* we already incorporate 802 (which includes 802c) – but any review may be an MDR type thing.

*Comment:* I don’t know, but this is the issue and I haven’t gone beyond the issue. If I feel motivated, I’ll write a contribution. This may affect other programs (e.g. ax) – I’ve seen this happen more than once 1905 and in aq.

**IETF/802 coordination**

The Chair noted the following topics:

Deterministic networks

Multicast (note: WNG presentation 11-17/1736)

Comment on Deterministic networks: The last version of the IETF Use Case document specifically calls out 802.11 as a technology that cannot support deterministic network – which I think is incorrect.

*Chair:* I think we need contributions on this

*Comment*: They are open to contributions that fix their specification.

Dorothy Stanley (HPE) reported: “RFC 8290 and applicability of Flow Control Controlled Delay (FC-CoDel) to Wi-Fi/802.11 systems for reduction of latency and jitter.” See <https://www.ietf.org/blog/blind-men-and-elephant/>, the Wi-Fi section, and included references. This article is on the first page of the IETF website.

Calling for people to review this material – partially the Wi-Fi and Wireless - calling out reported amazing improvements in Wi-Fi also "[The Good, the Bad and the WiFi: Modern AQMs in a residential setting](https://www.sciencedirect.com/science/article/pii/S1389128615002479?via%3Dihub)".

*Comment*: Someone came to 11ax gave contributions on buffer bloating. It may be worth reviewing: [11-14/1265](https://mentor.ieee.org/802.11/dcn/15/11-15-1265-02-00ax-rtscts-for-ul-dl-ofdma-control.pptx) and [11-14/1264](https://mentor.ieee.org/802.11/dcn/17/11-17-1264-02-00ax-mac-cr-misc-trigger-frame-format.docx).

Dorothy pointed to: rfc 8290 – The Flow Queue CoDel Packet Scheduler and Active Queue Management Algorithm – experimental.

Dorothy also reported – the EPP update and Updates to TLS103 group – has started up again – we may want to follow this.

**TGax approach to subclause 10.2 and Figure 10-1:** [11-18/0362r0](https://mentor.ieee.org/802.11/dcn/18/11-18-0362-00-00ax-cr-for-cids-in-10-2-6.docx)

Report from Osama Aboul-Magid (Huawei, Chair of TGax) on TGax status – 11-18/362r1 – TUA MUUA, all references to coordination functions were removed. So, both of these are triggered, for random access and MUUA, Also the figure was cleaned up.

*Chair*: Are both required or optional?

Please look at 362r1 and review, if there are concerns please provide comments – Osama indicated there is time for changes before the next LB.

**YANG/NETCONF modeling discussions –** [11-16/1436r1](https://mentor.ieee.org/802.11/dcn/16/11-16-1436-01-0arc-yang-modelling-and-netconf-protocol-discussion.pptx)

**Scott Mansfield (Telefon AB LM Ericsson, 802.1 YANGster) Presentation and discussion:**

Order:

1. What is YANG.
2. Who the YANGsters are.
3. What are the tools available

What is YANG: <http://www.ieee802.org/1/files/public/docs2017/yang-parsons-open-source-motivation-1217.pdf> - starting with Network Management protocol soup – Why did the IETF create YANG – Yet Another Next Generation - Defining what the difference between YANG and NETCONF is: NETCONF is a protocol – YANG is a data modeling language. NETCONF has a new way of handling communications, it provides efficient configuration and management, relative to other protocol. YANG – is a hierarchical, human readable, language – there are lots of constraints that can be added – behavior can be in the YANG model as well as the structure. It sounds object oriented but it is not, it is hierarchical.

*Question:* Are there tools to convert MIB to YANG

*Ans:* Yes, there are.

*Chair:* How complete is the conversion?

*Ans:* You get ~80% of the way there – the artifacts are not the same, you need to check leaf references, pointers need to be checked, paths need to be checked. There are guidelines – as to what should be checked and any constraints need to be added.

*Chair:* 802.1 has done work, from which we can learn.

*Scott Mansfield continued the presentation:*

Git Hub/YANG catalog: <https://github.com/YangModels/yang> - overview of the structure:

Experimental folder – is for work that has no PAR

Standard folder – is for work that has a PAR – under this there is an IEEE folder, under IEEE is 802.1 and 802.3 – 802.11 can be added. Under these a draft folder, in the draft folder are the YANG models in the catalog. If you open a model – you see the code.

There is a current effort to explain how to use github, properly – will provide reference when available.

GitHub structure – workshop in Geneva – link will be provided. 802.1 is working with ITU to generate the models.

YANGsters – Objectives and Rationale – need a group to support YANG activity in 802: hence the YANGsters were formed. So far the group contains .1 and .3 people. .3 is YANGing clause 30, their management clause. There is a web site and mailing list: <https://1.ieee802.org/yangsters/> - [STD-802-YANG@listserv.ieeee.org](mailto:STD-802-YANG@listserv.ieeee.org) - meeting time join.me/ieee802.1, last Wednesday of the month @ 6am PT, next call 28 March 2018 – call information is available on the web site. An example of an issue that would be discussed is NMDA (network management data administration) – there are multiple options which should be used. Then reviewed the web page. Recommend start tutorial and guidelines for authors and then nmda – (add links). You want to use 1.1, not 1.0.

Tools: YANG Catalog – is a set of tools:

[Pyang](https://github.com/mbj4668/pyang) – python tool for YANG

[Cygwin](https://github.com/mbj4668/pyang/wiki/Pyang-installation-on-MS-Windows) – will clone the YANG Catalog – so you can work locally.

[Papyrus](https://www.eclipse.org/papyrus/) is a tool to create UML – there are tools to convert UML to YANG – there are guidelines regarding what you should do in UML to create good YANG out. Additional tools are available on line.

The YANG work in IEEE – page will be updated, with the results from this week.

The YANG work in other SDOs – also needs work to add information on how to use Papyrus, To use these tools to generate YANG.

The Chair called for discussion:

*Question:* what do you want to YANG?

*Comment:* in my opinion YANG is an opportunity to do something right that we have been doing wrong. We have 300 pages of MIB – it is useless – our current MIB meets the EC requirement, and the definition of local variables.

*Comment:* I like to expand this to the Wi-Fi industry – WFA has been looking at this recently – it is not just solving a single AP in a home, but multiple APs in a home – the current model for it does not work at all. But the work is started in WFA – maybe there is some coordination that should happen – this is a start, maybe there should be some coordination.

*Question:* who is doing this work.

*Comment:* There are several operators who say we need this – APs in homes that need to be managed by operators – specifically multiple APs. To have a simple model.

*Question:* where should we start – should we start with an UML model?

*Scott:* I can provide you with examples of what we did and should be done – as much as Papyrus is a pain – it does have very useful tools and capabilities to make a YANG model via the available tools. I suggest strongly building UML as UMLs will be protocol neutral model – hence if YANG is replaced the UML should be convertible to whatever is the new language. So starting with a UML model is the way to go.

*Chair:* It was suggested to pick some small part of our MIB and start with that.

*Scott:* Find someone to be the UML person – install the environment – if they’ve used a UML tool, it shouldn’t be too hard – so the best way forward is to start small and then play with the tools and generate outputs. IISOMI – is a group, related to NGMN – the had 80 people from 15 standards modeling who understand modeling – part of this group still meets and talks and work to move this work forward. Scott will add a link to this group to the yangsters page <https://1.ieee802.org/yangsters/>.

*Chair:* IEEE 1588 – maps on to us – how does this map to YANG/us.

*Scott:* Suggests Rodney Cummings should be asked regarding 1588.

*Chair*: this may be a good place to start – there is probably an 802.3 piece currently there, which we can use to look what we should do for an .11 piece.

*Scott:* would like to see consistency in how this refencing is done. It would be interesting to make sure that 1588 interfaces are consistent.

*Chair:* Obviously, there is stuff that relates to IETF –

*Comment:* YANG is a primary topic in the coordination call (802/IETF coordination calls).

*Chair*: Is there more information or direction from the call?

*Comment:* We can leverage the coordination.

*Chair:*  IEEE 1930 – may be another management interface – we may want address this in YANG –

*Comment:* IEEE 1930 may be a group which fails, this has been the traditional result of other standards groups that try to manage 802.11.

*Chair:* Maybe we should avoid this group (IEEE 1930).

*Chair:* Should we form a different group in 802.11 to look at YANG? Or should this work be done in ARC? Also .11k and .11v may have portions which may be a good place to start.

*Comment:* I don’t think ARC, is the place to do this work.

*Comment:* In my view, it would be better to form a TIG to start to do this work. Does someone want to lead this TIG and is there membership support?

*Comment:* You (the Chair) may consider generating a call for interest.

*Comment:* Can we start a discussion with WFA – if they are working in the same area we should coordinate.

Stephen Palm (Broadcom) volunteered to be a liaison (unofficially) to WFA and to lead the discuss how to work together on this issue.

*Comment:* We need to work on this. So, we should start working on this. We need to get people here to do this work. There are currently vendor specific YANG models for 802.11 currently available.

*Chair*: We should see if we can get people to start working this. Should we find a leader first or should that be part of the call?

*Comment:* It is always better to have a leader.

*Comment:* This may be a good Friday plenary discussion.

*Chair:* The reason this work should happen here (in 802.11) is that the WFA is focused on only one aspect. It is anticipated that our view would be broader.

The chair thanked Scott for his time and the information he provided.

Recessed 12:27 CST

# Tuesday, 6 March 2018, at 16:00 CST

**Call to order 16:02 CST.**

**Agenda document:** [11-18/0310r2](https://mentor.ieee.org/802.11/dcn/18/11-18-0310-02-0arc-arc-sc-agenda-march-2018.pptx)

**Administration:**

The Chair reviewed the Administrative information in slides 5-10 in Agenda document,

**Call for Patents:**

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

**Proposed Agenda:**

* + **“What is an ESS?”**
  + **MLME-RESET, versus MLME-JOIN and MLME-START**
  + **AP/DS/Portal architecture and 802 and GLK concepts -** [11-17/0136r2](https://mentor.ieee.org/802.11/dcn/17/11-17-0136-02-0arc-bridging-architecture-considerations.docx)**,** [11-16/1512r0](https://mentor.ieee.org/802.11/dcn/16/11-16-1512-00-0arc-glk-802-1q-bridge.pptx)**,** [11-16/0720r0](https://mentor.ieee.org/802.11/dcn/16/11-16-0720-00-0arc-stacked-architecture-discussion.pptx)**,** [11-15/0454r0](https://mentor.ieee.org/802.11/dcn/15/11-15-0454-00-0arc-some-more-ds-architecture-concepts.pptx)**,** [11-14/1213r1](https://mentor.ieee.org/802.11/dcn/14/11-14-1213-01-0arc-ap-arch-concepts-and-distribution-system-access.pptx) **(slides 9-11)**
* **Continue the above**

**Approval of the Agenda:**

The Chair called for comments or amendments to the agenda – there was no response to the call

The proposed agenda was approved by unanimous consent.

**“What is an ESS?” – slide 19-22 of** [11-18/0310r2](https://mentor.ieee.org/802.11/dcn/18/11-18-0310-02-0arc-arc-sc-agenda-march-2018.pptx)

The Chair provided a background overview. Beginning where slide 22 left off.

*Comment:* I don’t this has anything to do with 802.21 – 802.11u introduced the HESSID – and I think that it is an unfortunate coincidence that 802.21 used some of this wording. I think we should just align with WFA and move on.

Therefore: HESS purpose is to support WFA Passpoint/Hotspot 2.0

*Comment*: There is only an identifier, the HESSID, do we need more than an identifier.

*Comment*: HESS does not appear in our standard. HESSID seems to be in lists in clause 6 and 9. So it’s not really in the spec, or at least it is not well defined.

*Chair*: We should have some discussion in .11 to define this and come to a conclusion.

*Comment*: We started in ARC looking at the WFA specification – I think we defined the best use of the HESSID, to be used as a unique identifier:

From the Passpoint/Hotspot 2.0 Tech Spec:

Non-AP STA can assume that if two APs have the same SSID they are considered to be part of the same wireless network. But, because SSIDs are not globally administered it is possible that two APs with the same SSID are in fact in different wireless networks, HESSID element allows devices to detect this condition.

*Comment*: I think we need to define what a wireless network means.

*Question*: Did WFA invent the HESSID element?

*Comment*: We will need rules – to how we define an ESS and how to roam and when to reassociate, etc.

*Comment*: The MACID is assumed to be unique – why would we need to be any more unique than that for the HESSID.

*Comment*: If someone spoofs my home AP – maybe security will solve this issue. So if I see a HESSID this means I can do something. So it is what is says it is.

*Comment*: One could use HESSID to be a globally unique ID –

*Chair*: Mobility domains is another thing. It was said we could do this, but we can’t.

*Comment*: the concept of CAG is critical to HESSID –

Slide 24/25 in the r3 –

In recess – 18:00 CST.

# Wednesday, 7 March 2018, at 8:00 CST

**Call to order 8:12 CST**

**Agenda document:** [11-18/0310r3](https://mentor.ieee.org/802.11/dcn/18/11-18-0310-03-0arc-arc-sc-agenda-march-2018.pptx)

**Administration:**

The Chair reviewed the Administrative information in slides 5-10 in Agenda document,

**Call for Patents:**

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

Proposed agenda from: 18/0310r4

* + Investigation of WUR architecture topics; may lead into “split” PHYs (LC, 28 GHz (Phazr)): [11-17/1025r0](https://mentor.ieee.org/802.11/dcn/17/11-17-1025-00-0arc-11ba-arch-discussion.pptx), [11-18/0533r0](https://mentor.ieee.org/802.11/dcn/18/11-18-0533-00-0arc-802-11ba-topics-related-to-arc.pptx)
  + MLME-RESET, versus MLME-JOIN and MLME-START
  + Continue the above
  + Future sessions / SC activities

**Approval of the Agenda:**

The Chair called for comments or amendments to the agenda – there was no response to the call

The proposed agenda was approved by unanimous consent.

**Investigation of WUR architecture topics; may lead into “split” PHYs (LC, 28 GHz (Phazr)):** [**11-17/1025r0**](https://mentor.ieee.org/802.11/dcn/17/11-17-1025-00-0arc-11ba-arch-discussion.pptx)**,** [**11-18/0533r0**](https://mentor.ieee.org/802.11/dcn/18/11-18-0533-00-0arc-802-11ba-topics-related-to-arc.pptx)

Ganesh Venkatesan (Intel) presented: [**11-18/0533r0**](https://mentor.ieee.org/802.11/dcn/18/11-18-0533-00-0arc-802-11ba-topics-related-to-arc.pptx)

Questions and discussion:

The STA with a WUR is simply in a different power save mode, it is still associated with the AP.

Does WUR require the STA to be in PS mode? Hence on wakeup does a STA need to send a PS Poll? What is the wake up sequence?

Can you move between different PS modes, including WUR mode? Is WUR mode a PS mode?

There is a duty cycle mode for the WUR which can be set for a few ms to several seconds (TBS).

At the AP the WUR transmission can be looked at as “MCS minus-1” The WUR configuration is done doing usual 802.11 management frame exchanges.

There are discovery WUR transmissions and security concerns which are still under development

For the STA: there are two PHYs – WUR has nothing to do with multiband.

Can the WUR receiver receive a wake-up frame on a channel or band other than the one the primary connectivity radio (PCR) is associated on?

Is there one MAC for the WUR (non-AP STA receiver) and the PCR?

Does the WUR have its own MAC.

Discovery and Vendor Specific frames (which are currently in development) may require architecture review – as MAC and SAP definitions for these frames need to fit into the architecture.

[17/1333r2](https://mentor.ieee.org/802.11/dcn/17/11-17-1333-02-00ba-wur-operating-channel.pptx) – different channel operation - good reference.

A WUR STA is a 802.11 non-AP STA that supports WURx (Wake up radio receiver) services. A WUR non-AP STA may receiver a Wake Up ID and a Group ID frame. The WUR non-AP STA can be a member of multiple groups.

**Future sessions / SC activities**

Planning – May 2018

Joint session with TGba – Mark will discuss with TGba and try to set it up.

Teleconferences? 10 days’ notice.

**Adjourned: 10:03 CST**

Note: final agenda slide deck is: [11-18/0310r4](https://mentor.ieee.org/802.11/dcn/18/11-18-0310-04-0arc-arc-sc-agenda-march-2018.pptx) and closing report is: [11-18/0581r0](https://mentor.ieee.org/802.11/dcn/18/11-18-0581-00-0arc-arc-closing-report-march-2018.pptx)