IEEE P802.11
Wireless LANs

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| ARC SC January 2017 Meeting Minutes |
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Abstract

This document contains the minutes of the IEEE 802.11 ARC SC meetings held on 18 January 2017, at 8:00am and 1:30pm EST; and on 19 January 2017 at 1:30pm EST. This document also contains the minutes for the joint IEEE 802.11 ARC SC, IEEE 802.11 TGak, and 802.1 meeting held on 19 January 2017 at 8:00am EST.

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# Wednesday, January 18, 8:00am EST

**Administration:**

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

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

**Meeting call to order by Chair 8:08am EST, 18 January 2017**

**Proposed Agenda slide deck:** [11-16/1591r1](https://mentor.ieee.org/802.11/dcn/16/11-16-1591-01-0arc-arc-sc-agenda-january-2017.pptx)**, proposed agenda copied here for reference:**

**Wednesday, January 18, AM1**

* **Administrative: Minutes**
	+ **IEEE 1588 mapping to IEEE 802.11**
	+ **802 activities**
	+ **IETF/802 coordination**
	+ **TGak update**
	+ **MIB attributes Design Pattern -** [11-15/0355r4](https://mentor.ieee.org/802.11/dcn/15/11-15-0355-04-0arc-mib-truthvalue-usage-patterns.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)
	+ **AP/DS/Portal architecture and 802 and GLK concepts** - [11-17/0136r0](https://mentor.ieee.org/802.11/dcn/17/11-17-0136-00-0arc-bridging-architecture-considerations.docx), [11-16/0720r0](https://mentor.ieee.org/802.11/dcn/16/11-16-0720-00-0arc-stacked-architecture-discussion.pptx), [11-16/0457r1](https://mentor.ieee.org/802.11/dcn/16/11-16-0457-01-0arc-802-11ak-802-1ac-stas-aps-dses-and-convergence-functions.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)

**Wednesday, January 18, PM1**

* + **MIB attributes Design Pattern (cont.)**
	+ **YANG/NETCONF modeling discussions (cont.)**
	+ **Future sessions / SC activities**
	+ **“What is an ESS?”**

**Joint session with TGak, Thursday, January 19, AM1**

**Session with 802.1 YANG experts, Thursday, January 19 PM1**

**Administration:**

The Chair reviewed the Administrative information in slides 5-10 in the 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 not response to the call

The proposed agenda was approved by unanimous consent.

**ARC Minutes:**

**November 2016 Minutes,** [**11-16/1594r0**](https://mentor.ieee.org/802.11/dcn/16/11-16-1594-00-0arc-arc-sc-meeting-minutes-november-2016.docx) approved by unanimous consent.

**IEEE 1588 mapping to IEEE 802.11**

The Chair reported:

* Still tracking, but there has no new activity
* 1588 is going to sponsor ballot.

**IEEE 802 Activity**

The Chair reported:

* 802.1Q revision is under consideration, to roll in:
	+ IEEE Std Qcd-2015,
	+ IEEE Std 802.1Qca-2015,
	+ IEEE Std 802.1Q-2014 Cor 1-2015,
	+ IEEE Std 802.1Qbv-2015,
	+ IEEE Std 802.1 Qbu-2016,
	+ IEEE Std 802.1Qbz-2016
* 802.1Q Sponsor Pool is open
* [**11-17/0136r0**](https://mentor.ieee.org/802.11/dcn/17/11-17-0136-00-0arc-bridging-architecture-considerations.docx) – was noted, but will be discussed during the joint meeting on Thursday with 802.1 and TGak, if time allows the document will be reviewed later in the meeting.

**IETF/802 coordination:**

No report, no one reported any activity of interest.

The 802.11 tutorial for IETF has been presented and is in [11-16/0500r1](https://mentor.ieee.org/802.11/dcn/16/11-16-0500-01-0000-ietf-95-wireless-tutorial-802-11-overview.pptx)

(see additional IETF/802 coordination later in the meeting when Dorothy Stanley joined the meeting)

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**TGak update**

The 802.11 TGak Chair reported:

* only 56 comments for this recirc
* looking to go back for recirc out of this meeting
* Call for questions on general link: there were none

**Design Pattern for MIB attributes**

The Chair:

* Reviewed status of [11-15/0355r4](https://mentor.ieee.org/802.11/dcn/15/11-15-0355-04-0arc-mib-truthvalue-usage-patterns.docx)
* Noted that no new work has been done and that the current target for completion is the March meeting.
* Noted that is hasn’t been decided how to roll the “new” MIB design patterns in to the specification.

A comment was made that the task groups working on amendments should do the work.

Adrian Stephens volunteered to review and clean up [11-15/0355r4](https://mentor.ieee.org/802.11/dcn/15/11-15-0355-04-0arc-mib-truthvalue-usage-patterns.docx).

The current plan is to complete the document and then to get 802.11 WG approval of the document. Once it is approved, we will enforce it use in new/working amendments, and then evaluate what should be done for 802.11md and amendments which have completed MDR.

**Discussion on YANG/NETCONF models**

The scope of the ARC activity was reviewed: the goal is to review the concept of using YANG/NETCONF models for management interfaces and to define the Cost/Benefit trade-off.

Discussion:

Some members have reviewed the tutorials. Seem to be general consensus that there is nothing that says it won’t be an improvement relative to the MIB. YAGN\/NETCONF seem to be more software based and more structured and are see some acceptance from industry (people are using them). 802.1 is currently planning to use YAG/NETGONF and will have 7 projects (once for each of its standards).

Several questions were raised:

* Would we do this as a project or as part of the amendment? (the questioner suggested using a project)
* Would be enough WG support for a project?
* Would we keep the MIB and add YANG models or would we replace the MIB?

Concern was raised about the complexity of YANG models.

It was observed that the purpose of the MIB is to identify local variables and YANG can probably provide this. Also we don’t know of anyone who implements the existing MIB.

Should we create YANG models only for the subset of MIB variables that are used in real implementation?

There were comments made for making the YANG modelling a separate activity from TGmd and there were comments made that if 2000 pages need to changes it becomes unwieldy to do in parallel, so it may have to be part of TGmd.

No conclusions were reached.

A list of discussion points for the YANG discussion with 802.1 experts were reviewed and expanded:

* Look at 11-16/1436
* Pro/Con considerations – Cost/Benefit
* Tools: (including ‘Mapping’ tools? And YANG development tools)
* Does the YANG model replace the MIB?
* Tools for YANG?
* Examples of real world use?
* How do you manage the transition MIB to YANG?
* Github publication, or published document?
* SA CAG – is looking at Github publication and IEEE publishing? Looking to establish a policy
* Separate project, or in REVmd?

**IETF/802 coordination (revisited as Dorothy Stanley joined the meeting):**

It was noted that the dust is settling on multicast – currently there are no requests of questions for 802.11 from IETF.

The Chair asked if we needed to do anything in “self-defense”.

There are some issues, but for specific issues there are mitigation being developed. 802.11 currently has many methods which are not deployed: proxyout, proxy in are just starting to be deployed.

It was observed that DMS needs to see real deployments first.

There was a question as to the status 6LoWPAN work: Area Networks (6LoWPANs) defines a registration mechanism for accomplishing proxy ND: IoT and other applications motivating registration over discovery.

The Tutorial is done and no additional tutorial work is planned.

The next call is January 30th, but for now there seems to be nothing that needs to be done.

**Review of** [**11-17/0136r0**](https://mentor.ieee.org/802.11/dcn/17/11-17-0136-00-0arc-bridging-architecture-considerations.docx)

The Chair then reviewed [**11-17/0136r0**](https://mentor.ieee.org/802.11/dcn/17/11-17-0136-00-0arc-bridging-architecture-considerations.docx) in preparation of the joint meeting scheduled for Thursday, AM1.

There was no time for comments or questions, the discussion will continue in PM1.

**Recessed at 10:08am EST**

# Wednesday, January 18, 1:30pm EST

**Administration:**

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

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

**Meeting call to order by Chair 1:30pm EST, 18 January 2017**

**Agenda slide deck:** [11-16/1591r2](https://mentor.ieee.org/802.11/dcn/16/11-16-1591-02-0arc-arc-sc-agenda-january-2017.pptx)**, proposed agenda copied here for reference:**

* + **MIB attributes Design Pattern (cont)**
	+ **YANG/NETCONF modeling discussions (cont)**
	+ **Future sessions / SC activities**
	+ **“What is an ESS?”**

**Administration:**

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

**Call for Patents:**

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

**The Chair noted that he reviewed the ARC YANG discussion points (see AM1 meeting notes) with the 802.1 experts and they will come to the Thursday PM1 meeting ready to address them.**

**Approval of the Agenda:**

The Chair called for comments or amendments to the agenda – there was not response to the call

The proposed agenda was approved by unanimous consent.

**ARC Future Activities & sessions:**

The Chair reviewed the future ARC SC activities and sessions as listed on slide 20 of [11-16/1591r2](https://mentor.ieee.org/802.11/dcn/16/11-16-1591-02-0arc-arc-sc-agenda-january-2017.pptx).

There were no questions or comments.

 **Planning for March 2017:**

The Chair reviewed the planning for March 2017 on slide 21 of [11-16/1591r2](https://mentor.ieee.org/802.11/dcn/16/11-16-1591-02-0arc-arc-sc-agenda-january-2017.pptx).

Some discussion was had on adding a teleconference in February to help complete the MIB design document.

The Chair called for inputs or interest in the “What is an ESS” activity for TGmd.

Non was voiced.

**Discussion of** [**11-17/0136r1**](https://mentor.ieee.org/802.11/dcn/17/11-17-0136-01-0arc-bridging-architecture-considerations.docx)

There were questions voiced:

* How many LLC connections does a GLK STA have?
* Can the Bridge port LLC provide full LLC functionality to a GLK STA or does the STA require an additional LLC connection?

Some suggestions were made:

* Mixed Mode GLK AP – one figure example
* Add a figure for GLK AP (non-mixed mode)
* Add a figure for the case of a single integrated mixed mode AP with a portal and internal bridge.

**Recessed 3:35pm EST**

# Thursday, January 19, 8:00am EST – Join 802.11 ARC SC meeting with 802.11 TGak and 802.1

**Administration:**

**802.11 ARC SC Chair: Mark Hamilton, Ruckus/Brocade**

**802.11 TGak Chair: Donald Eastlake**

**802.1 WG Vice Chair: John Messenger**

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

**Meeting call to order by Chair 8:08am EST, 19 January 2017**

**Agenda slide deck:** [**11-16/1586r7**](https://mentor.ieee.org/802.11/dcn/16/11-16-1586-07-00ak-january-2017-802-11ak-agenda.pptx)**, proposed agenda copied here for reference:**

* **Call 802.11 TGak/ARC/802.1 Joint Meeting to Order**
* **Appointment of Secretary**
* **Call for essential patents**
* **Attendance Recording Reminder**
* **Architecture discussion:**
	+ **11-17/136r2, Mark Hamilton (Ruckus, Brocade)**
* **Status**
	+ **802.1Q roll-up, John Messenger (ADVA Optical Networking)**
	+ **802.1Qbz status**
	+ **802.1AC status**
	+ **802.11ak status**

**Administration:**

The Chair reviewed the Administrative information in slides 8-12 in the Agenda document

**Call for Patents:**

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

**Architecture discussion:** [**11-17/136r2**](https://mentor.ieee.org/802.11/dcn/17/11-17-0136-02-0arc-bridging-architecture-considerations.docx)**, Mark Hamilton (Ruckus, Brocade)**

Mark Hamilton reviewed 11-17/136r2:

* The “Baggy Pants” diagram (Figure 8-2 from 802.1Q-2014) was quickly reviewed
* A figure strictly adhering to up is up and down is down, that “replaces” the “Baggy Pants” diagram was presented (page 4 of 11-17/136r2)
* It was general consensus that this new diagram (on page 4 of 11-17/136r2) is correct and clearly provides the up is up and down is down view.
* The overall flow diagram (on page 6 of 11/17136r2) was reviewed and there was general consensus that the diagram is clear and that the gaps in the figure (between the bridge relay and the stack) add to the clarity.
* The 802.11 (legacy) AP and DS figure (on page 7 of 11-17/136r2) was reviewed, it generated some discussion, at the conclusion of the discussion there was consensus that the diagram is correct.
* Reviewed the current 802.11 view of 802.11ak GLK as shown in the figure on page 8 (of 11-17/136r2). There was consensus that this figure is correct.
* Reviewed the current 802.11 view of an 802.11 non-GLK AP network shown on page 9 (of 11-17/136r2) – there was some discussion and confusion due to the placement of the Portal in the figure. The current 802.11 view of an 802.11 non-GLK AP network as shown in Figure 7-1 of 802.11-2016 was then shown:



This figure correctly shows the portal location in the up is up, down is down manner. There was consensus that the Figure 7.1 from 802.11-2016 is correct.

* Discussed how packets are routed via the DS. There was concern express about that all the SAPs are not shown (the D-SAP). It was noted that though they are not shown they are specified.
* The figures shown on page 10 (of 11-17/135r2) were discussed.
	+ Concern was express that these figures are confusing, there was objection to the DS being located below the DSAF as this is breaking the up is up and down is down view. It was suggested that the “brains” are at the same level as the DSAF and are not below it.
	+ After the discussion these figures were viewed as conceptually useful and there was no sustained objection.
* The figure shown on page 11 (of 11-17/135r2) was discussed.
	+ There was quite a long discussion that resulted in general agreement of the figure and a general consensus that the DS “box” should be replaced with the “spiky thing” as in Figure 7.1 above.
* The figure shown on page 12 (of 11-17/135r2) was discussed.
	+ There was general agreement that the yellow end station CR should be removed.

**802.1Q Revision Plan 2017**

John Messenger provide a summary of the 802.1Q Revision Plan (see:<http://www.ieee802.org/1/files/public/docs2017/q-messenger-revision-plan-0117-v1.pdf>)

It was noted that 802.1Qbz is one of the amendments being rolled up in this revision.

The current status is that 802.1Q PAR is approved, the target date for completion is September 2017, for a planned release as 802.1Q-2017.

It was noted that 802.1AC-2016 is approved by not yet published

**802.11 TGak Status**

The Chair of 802.11 TGak provided a brief status of the 802.11ak amendment:

* 802.11ak completed the ballot on 802.11ak D3.0
* only 56 comments for this recirc
* looking to go back for recirc out of this meeting
* Called for questions on general link: there were none

802.1 recessed at 9:45am EST

802.11 ARC recessed at 9:45am EST

# Thursday, January 19, 1:30pm EST

**Administration:**

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

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

**Meeting call to order by Chair 1:33pm EST, 19 January 2017**

**Agenda slide deck:** [11-16/1591r3](https://mentor.ieee.org/802.11/dcn/16/11-16-1591-03-0arc-arc-sc-agenda-january-2017.pptx), r4 after the meeting**, proposed agenda (slide 27) copied here for reference:**

* **Session with 802.1 experts**
* **Discussion of YANG/NETCONF**
	+ **Look at documents: 11-16/1436, new-mholness-yang-overview-0915-v03**
	+ **Pro/Con considerations – Cost/Benefit?**
	+ **Tools? (including “mapping” tools?)**
	+ **Replace MIB or not?**
	+ **How do you manage the transition?**
	+ **Github publication, or published document?**
	+ **Examples of real-world use?**
	+ **Separate project, or in REVmd?**

**Administration:**

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

**Call for Patents:**

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

Mick Seaman is an 802.1 YANG expert and provided the 802.1 view and experience with YANG/NETCONF.

Slide 27 – YANG/NETCONF – Discussion list:

Looked at documents: 11-16/1436, new-mholness-yang-overview-0915-v03

Note: this discussion site looks very useful

**Questions and responses from the 802.1 YANG expert (note the style in this section of the document is: questions and comments made by the participants start in line with this text, response by the YANG expert are indented and in italics:**

How you model the process and how you start?

*The start of operation is: in 2010 moved all our documentation into UML format – this provided the structure of the implementation. Down to the level of element values, participates, etc.*

*This provide the whole of management on a single sheet – (in 6 pt. type)*

*This document is current in the .1Xck.*

*The details of the YANG is what we are doing.*

*So our process was to generate the UML model, the generate a MIB for it and check that, then generate the YANG models from that.*

*So the advice is to agree the management and control first.*

*Then the YANG models – which is like writing code – hence not a group activity.*

*We haven’t suffered do to the MIB being busted – because no one implements the MIB as it is in the standard. But, because the implementation is not closely coupled to the MIB, this hasn’t caused a problem.*

*There are probably already some YANG models out there for our stuff. Writing YANG models is simple.*

*If we don’t do this ourselves, others will do it for us and it will influence what we are doing. Because other will fill the gap.*

*GitHub – is a serious place, and we can treat GitHub is place to we can references as if copyrighted IEEE material. See Glenn for details. This works across all entity based IEEE activity.*

It was stated that: as long as we follow what Glenn did we will be covered for IEEE Copyright.

*The view is the YANG model is based on the Standard. The Standard is not based on the YANG model.*

How do you fix bugs in GitHub?

*We would need to do a core amendment or in a maintenance document.*

*So things don’t go to GitHub until the standard is approved.*

It seems like the we should have the Standard have a note to the external reference.

Software is subject to change.

*The progression on GitHub is: experimental to drafts to published.*

*Bottom line is very few people need to be able to write YANG only need a few experts as this will yield consistency in the models.*

Comments related to the question should 802.11 create YANG models?

*Every man and his dog can write a YANG model – so if we don’t do it someone will do it for us. Therefore, if we want control of the models we need to do them ourselves.*

Does YAGN support timing and precedent?

*YANG does under operations. – in RUML you have an object which has parameters, but you also have procedures – so things can happen or not happen.*

*It’s not timeless as the MIB is.*

What is the size of the 802.1 URL, MIB, YANG?

*Things we didn’t expect there is a large difference the way people think about MIBs and YANG*

*The MIB and ideas lie in line with the way we thing about things such as shims.*

*Yang is much more driven by simplicity. e.g. if you talk about a bridge port:*

*In our MIB you would see all the interfaces going up.*

*In YANG – it is one interface.*

*This can cause a problem as when the inputs shift (as happens in 802.1) – So YANG has to be less simplified. So you just add to the interface – as things get more complex – so the YANG is made and managed various clumps.*

*When you do augmentation, you need to know who is on top of who. If you think you can take a MIB and run it thought a tool to spit out a YANG model, you will be creating a mess. We need to clear out all the MIB-ish-ness.*

*For 802.1x: UML is 1 page of 6-point font (few man days), specification is 180 pages without MIB, MIB is 70 pages (man days 15-20 days), number of elements, YANG size 33 pages (man days 15-20 days).*

802.11 has put as much information in the MIB as possible. 802.11k – which is for management - is large portion of the MIB. Is YANG for network control?

*I don’t see any reason that you couldn’t use YANG for control.*

For optional implementation, will we have to do complex augmentations is this a problem?

*We haven’t been burnt on any structural yet – but we are not complete.*

CFM is an open issue any comments:

*CFM is in my view the real test to see if YANG works. I’ve been doing UMLs for all specifications that I am the editor of, as I feel it give me a good understanding of the specification. If you have the UML auto drawn it will go all over the place. I build the UML in Visio as this gives me a lot of control. We have not used the UML to auto generate the YANG. I don’t think the UML is a linear problem.*

If you create the YANG first and try to generate the UML from the YANG – it will not work.

*The YANG can remove a lot of clutter. I think everything will move to YANG over the next 4-5 years. We don’t plan on taking anything out of the MIB, we are going to have both MIB and YANG.*

*The MIB rules are to deprecate, and obsolete, but not removed MIBs.*

*The way to get rid of a MIB is to get rid of the whole MIB.*

*We have created new MIBs and jettisoned the old MIB.*

Is the YANG any different?

*I don’t know, but I don’t think it will be any better. An expert might disagree with me. But, I think it is too similar to the MIB – I think MIBs are very poor from a computer language perspective. But, I don’t thing YANG is much better. I would be much happier if YANG was designed from a language perspective.*

An argument I’ve heard is that YANG has real world use is this true?

*We have a positive experience of people actually using GitHub YANG to run in the real world.*

A discussion on what the IEEE areas on GitHub mean followed:
Some thought that the experimental area is open source and the published/draft – is controlled and single author. Some thought that the whole IEEE are is single author and controlled.

We may need to confirm what the rules/agreements are between IEEE, SA, GitHub?

**802.11 way forward:**

First we would need a new table of attributes so that the MIB variables are listed.

Then an UML model can be built.

**Adjourned – 3:34**

**References:**