IEEE P802.11
Wireless LANs

Remaining Technical "NO" Comments on LMSC Ballot on IEEE P802.11D5.0

Summary

A summary of the remaining three issues involved within those five comments and the working group's position follows:

1) The request for a strict 1:1 correspondence between PICs entries and the use of the word "shall";

   The working group has done significant restructuring of the document as the result of processing your review comments. However, the group has declined to strictly enforce a 1:1 correspondence as it believes that the revised PICs structure as presented in draft 5.3 is more useful than what you requested.

2) The request for the elimination of the concepts of mobility, DS and ESS from the draft;

   The working group has declined to eliminate these concepts as they are an integral portion of the work that P802.11 was chartered to do as specified in the P802.11 PAR document.

3) The request to make English prose "informative" rather than "normative".

   The working group has declined to make the prose informative. The group prefers to have both the prose and formal descriptions normative, as each portion has different strengths. The working groups knows of no conflicts between the prose and formal descriptions of the MAC. If any should be discovered, rather than decide ahead of time that one clause takes precedence over another, the group prefers that discrepancies be brought to their attention for case by case resolution.

Actual comment and working group positions

Comment #1
Clauses: 1.2, 5.1.1.4, 5.2, 5.4.2.1, etc.
Voter Rich Siefert
Type of comment: Technical
Part of the No-vote: Y
Comment/ rational
The fact that high-layer applications may desire the ability to move within or among wireless LANs does NOT imply the requirement, as stated in 5.1.1.4, that this mobility must be provided within the MAC sublayer. In fact, 802.11 does not currently provide this mobility service (see discussion of DS and ESS below). Mobility is best relegated to higher-layer protocols (such as Network). 802.11 should provide the appropriate service interfaces (e.g., allowing a MAC client or management entity to determine the current associations of an AP) that allow higher-layer protocols to implement mobility, but not to attempt to implement it within the MAC. There is no need to "reinvent" the entire ISO protocol stack within the MAC, just because it's wireless.

Recommended change
Eliminate mobility as a requirement of, and function provided by 802.11. Include a paragraph in the Scope section identifying mobility as a higher-layer function that can be provided among 802.11 LANs.

Working Group resolution
Request was respectfully declined.

Mobility is inherently a part of the functionality provided by 802.11. A primary purpose of 802.11 is to provide the support necessary for system implementations which may include additional mobility functionality at higher layers. The functions of association, reassociation etc. accomplish this, as well as enable mobility within the 802.11 coverage space.
The degree of mobility functionality included in 802.11 is consistent with the 802.11 PAR. To remove all mobility functionality from the 802.11 draft would mean that the working group would not accomplish the task it was chartered for.
Therefore, the working group must respectfully decline this request.

Comment #2
Clauses: 5.4.2.2, 5.3, etc.
Voter Rich Siefert
Type of comment: Technical
Part of the No-vote: Y
Comment/ rational
There is no specification provided for the DS; neither a specific implementation nor a set of service interfaces and invariants that ensure proper MAC operation across the ESS. Since 802.11 depends on the DS to provide mobility and ESS coverage, it is clear that this standard currently does not provide sufficient information to build an interoperable, conformant ESS. Without conformance requirements, DS's and ESS's become proprietary entities.
In addition, the inclusion of an "unspecified" DS makes the delay as seen at the LLC service interface unbounded and uncontrolled. LAN MAC clients expect a low delay; the inclusion of an arbitrary internetwork (including possible WAN links) invalidates any assumptions about delay that are typically made by LAN clients. IEEE 802.1G allows WAN links for Remote Bridges, but it puts an upper bound on their number and delay, and makes this information available to a management entity.

Recommended change
Eliminate the concept of DS and ESS from the standard at this time, and note that this is "under study" or "work-in-progress". When specifications are available that allow interoperable, conformant implementations to be built, revise the standard to include these new specifications. Eliminate all discussion of mobility as an 802.11-provided service.

Working Group resolution
Request was respectfully declined.

The 802.11 draft specifies what is required for a MAC layer, (i.e. media access to the Wireless Media).

Additionally, since Mobile stations using a WM involve unique problems which 802.11 was required to solve, 802.11 also describes the context within which the 802.11 MAC and PHYs are intended to operate.

The information which explains the architectural context is believed by the working group to be crucial to understanding 802.11 functionality. This approach dates from the earliest days of the working group and is reflected by the fact that the use of the DS and ESS concepts are specifically provided for within the 802.11 PAR.

The conceptual interaction between 802.11 and a DS is important from the 802.11 viewpoint. That interaction is what 802.11 specifies.

As a DS instantiation may (probably will) involve additional non-layer 2 functionality, specific DS internal details are outside the scope of 802.11.

The working group asks the reviewer to consider that the draft is a MAC/PHY std and not necessarily a complete reference for everything required to create an arbitrary network which supports mobility.

The request to eliminate the concept of DS and ESS from the standard was respectfully declined by the working group.

Comment #3
Clauses: 5.5, etc.
Voter Rich Siefert
Type of comment: Technical
Part of the No-vote: Y
Comment/ rational
There are many places in this clause (and others) where what are essentially MAC and MAC management specifications are buried in the service descriptions. These have associated "shall" statements, which require PICS entries. (For example, on p. 24, bottom: "If STA A receives a class 2 frame . . .") All conformance requirements should be in the same section (MAC and/or MAC management) and not strewn through service descriptions and other clauses. All "shall" statements shall be grouped and easy to find and recognize (sic!).

Recommended change
Put all conformance requirement statements in the clause appropriate to that requirement. There should be no "conformance" requirements in a clause on service specifications, since these are not required to be exposed interfaces.

Working Group resolution
Comment accepted.

The draft has been updated to remove the objections re conformance statements and service specifications.

The working group asks that the reviewer please review the latest draft to see if he agrees that this specific comment has been satisfied.

Comment #4
Clauses: various
Voter Rich Siefert
Type of comment: Technical
Part of the No-vote: Y
Comment/ rational
Use of "shall" and PICS: The use of the word "shall" is critically important in IEEE standards. A "shall" mandates a conformance requirement. Therefore, the word should be used SPARINGLY, in precisely those clauses that absolutely require conformance for interoperability or correctness. In addition, EACH AND EVERY "shall" must have an associated entry in the PICS proforma. This has not been done in this standard. The PICS refers generally to sections that contain many shall statements. This in incorrect. There should be a 1:1 correspondence between the number of "shalls" in the document and the number of conformance requirements in the PICS..
Rather than have a lot of "shalls", it is common practice to have a complete detailed description of some desired behavior, either in prose or a formal language/state-machine, then have *ONE* statement, such as: "The MAC shall implement the requirements of the Transmit State Machine as specified in clause x.x.". This allows one PICS entry for a complex entity.

Recommended change
Eliminate and restructure the use of the term "shall" as indicated, or correct the PICS such that there is a 1:1 correspondence between "shalls" and PICS requirements entries.

Working Group resolution
Comment mostly accepted.

As noted in comment 3, the use of "shall" has been removed from the clauses defining the service interfaces and frame formats. The corresponding entries in the PICS have also been removed.

Regarding the request for a strict 1:1 correspondence between "shalls" and PICs entries;

After consulting with other reviewers, 802 members, and other working group members, the 802.11 working group reached the conclusion that a strict 1:1 correspondence is not required. Additionally, the working group thinks that the PICS is more useful in its current form, as it provides significant useful information to a potential user about the implementation. The working group thinks that the PICS contains enough detail when referencing a sub-clause (even though that sub-clause may, in some cases, contain more than one "shall") for implementers to be given sufficient guidance to build confirming implementations.
After giving the matter serious consideration, the working group decided to decline the request to have a strict 1:1 correspondence between PICs entries and "shalls".

Comment #5
Clauses: 9
Voter Rich Siefert
Type of comment: Technical
Part of the No-vote: Y
Comment/ rational

802.11 specifies an extremely complex MAC in English prose. This is a deviation from all other 802 standards, and unacceptable for a number of reasons:

(1) This standard must be implemented by people unfamiliar with many of the slang terms used by the writers and left undefined, e.g., "transmit again immediately" (How soon is immediately?), or "shall be implemented on top of the DCF" (What does this mean for conformance?), or "shall wake-up" (undefined slang).

(2) This standard must be implementable by non-native English speakers. Having the normative requirements in English prose makes this virtually impossible.

(3) English prose (or any human language, for that matter) is ambiguous. There is not a 1:1 correspondence between *words* and *meaning*; the same words can mean different things depending on the listener's background. (This is a major reason why we have wars and courts of law; if language were unambiguous, we would have no arguments over the meaning of what was said!)

(4) In particular, the 802.11 MAC is extremely complex, perhaps the most complex MAC yet devised within 802. No other 802 MAC standard allows the use of prose for normative specification.

Recommended change

(1) Make the English prose description of the MAC (and MAC Management) *informative*, rather than normative. Remove all "shall" statements from the descriptions.

(2) Provide a normative, formalized presentation of the MAC (and MAC Management). This formalization can use state-machine notation, Pascal, C, Verilog or other code, or any method that is truly unambiguous.

Working Group resolution
Comment mostly accepted.

As a result of this comment as well as several others from the Sponsor ballot review, the 802.11 working group updated and significantly expanded the formal description of the MAC. The formal description of the MAC was rewritten using SDL, an ITU-T standardized language (Rec. Z100 series) and is now included in Annex C which is a normative portion of the document. The working group believes that this satisfies recommended change (1).

Regarding the request to demote the English prose from normative to informative:

The 802.11 working group has done is best to insure that Annex C and the prose are not in conflict in any way.

However, the act of making the prose informative would have the effect of arbitrarily deciding any conflicts within the draft in the favor of the Annex. After due consideration, the working group decided not to adopt an unknown set of default decisions.

Rather, the working group recognizes that since the work behind both the prose and the formal description was done by humans, it is conceivable that either could possibly contain an error which is currently undetected. In case this possibility should come to be fact, the working group strongly prefers that all such issues, if/when they are found, be brought to the working group's attention. This will enable the working group to track issues and resolve them in a revision of the standard, should that become necessary.

Therefore, the working group respectfully decided to decline the request to make the prose informative.