IEEE P802.11
Wireless LANs

Comments on Requirements Document

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This input is based on the version of the IEEE 802.11 Requirements Specification issued at the November meeting (IEEE 802.11/91-108) and was issued privately to the document editor (Ken Biba) at the beginning of December.

I have divided my input into comments and suggestions on the document as it stands and more specific input on the meetings section.

Comments

i) A document version number would be useful — particularly as we have more than one person providing input. This should be linked to a document history at the front of the document.

ii) The PHY definitions (page 38) is great, but not all definitions are PHY specific. I think this should be moved to a seperated definitions section at the front of the document.

iii) A references/conformance section would be useful at the front of the document. I think the primary references are:

1) IEEE 802 Functional Requirements, version, date, reference

2) IEEE 802.11 Project Authorisation Request, version, date, reference

3) Market Requirements, Ken Biba, IEEE 802.11-91/24

The conformance statement should explicitly state the areas of each formal specification (Functional Requirements & PAR) that this document does not conform to. If it conforms completely, then this statement should be made here.

iii) Whilst I realise that specifying the functionality of MAC and PHY is likely to be contentious at this early stage, I wonder whether the requirements specification should introduce some introduction to this division. For example, we might say that the architecture is based on OSI principles and that we divide the system into two parts — a MAC sublayer of the Data Link Layer, and a PHY layer. I believe that including such text progresses the document towards becoming part of the 'draft standard' as we were discussing at the end of the last meeting. A descriptive model is included in the IEEE 802 Functional Requirements — which we might reference.

iv) Concerning the table on page 4

a) Nominal Transfer Delay — should we not be a little more formal and define this time between MAC primitives. Transfer delay would then be defined between a MAC_data_request primitive at the MAC layer service boundary to a corresponding MAC_data_indication primitive at the same service boundary in a peer protocol entity. I realise that this might involve some additional definition elsewhere.

b) MSDU Loss Rate - how does this relate to the MAC undetected error rate as specified in the IEEE 802 Functional Requirements — ammended for 802.11 in our PAR. If we are specifying application requirements rather than a target for the standard then what we have is fine, but we must be careful not to create any inconsistency or misunderstanding.

c) Service Initiation Time — for packet mode communication this is not relevant — the definition should therefore include some text to indicate that this is a circuit mode service.

d) Destination Distribution — I assume that this means within the BSA and also ESA, even if this ESA is achieved using a wired distribution system — if not then the definition is unclear.

e) In the configuration table the dimension parameter is not clear — is this the diameter of a conceptual spherical service area, or the maximum distance between two communicating stations.

v) The global considerations need some explanatory text (although perhaps you consider these too obvious):

a) Internetworking with which networks — other IEEE 802 LANs, wide area networks, ...

b) Graceful degradation in what circumstances — high traffic load, co-located networks, RF propagation issues, ...

c) Privacy is particularly important in a radio environment to prevent eavesdropping.

d) Integrity and denial of service — I'm not sure what this refers to - coverage and authentication ?

e) Power management — I assume this is battery power management, or do you mean RF power management (near-far interference, power saving), or possibly both ?

vi) With respect to the debate during the last meeting on the usefulness of the General Requirements section, then I feel that it provides some useful introductory information that does not appear elsewhere. However, it needs to be stressed that the major sources of such requirements are the IEEE 802 Functional Requirements and IEEE 802.11 PAR. Some specific points:

a) 'Optimised for local area data' — the need for a standard optimised for packet mode communication (connectionless datagram traffic) should come out of the summarised application requirements.

b) 'Power drain' — was this not included in the previous section.

vii) I decline to comment on many of the more specialist application areas through lack of applications knowledge, though I have a couple of comments that relate to specific sections:

a) Some supporting text for the medical applications would be useful in the introduction of this section (6). The core of this might be taken from the application list in the configurations table, with some suitable words added.

b) In the section dealing with office applications you summarise a set of application services as a set of 'archetypal' applications — file access, file transfer, transaction processing, terminal emulation, real time services (voice/video). I feel that this summary can be applied in most of the application areas detailed in this document. That is, the application services detailed in each section are all specific cases of these generalised applications. In the majority of cases if the MAC characteristics suit these gereralised applications, then the specific services will be adequately supported. This is possibly a simplistic view, but might be the justification for a summary table of MAC characteristics.

c) Again in the office applications section, several *de facto* network standards are mentioned. I believe it is important to consider the possible protocols above the MAC. Full 802.2 LLC may be rarely used (IBM NetBEUI ?) but there are several important others:

IPX/SPX (Novell)
NDIS (LAN Manager and lately others)
AppleTalk
ODLI (Novell)
TCP/IP
DECNET

Each of these protocols requires certain MAC services which we need to take into account.

Meetings

I believe that this section needs an introduction indicating that this is a new application area that will be enabled by the combination of low cost portable computing and wireless local area networks. One characteristic of these networks is that they will most often be *ad-hoc* networks that exist for the duration of a meeting and have highly dynamic configurations. In addition, they will not always be confined to company premises — in fact for spontaneous meetings communication might be required in many different situations both on private premises (eg offices, hotels, conference facilities) and even in public places (eg airports, trains). In some cases services might be provided via a fixed infrastructure. These might be as simple as communication between meeting rooms, or to a company wide LAN. In hotels and conference suites, such services might be provided at a cost. In these situations access to wide area networks might also be provided to allow delagates to gain access to home networks.

The meetings section currently considers four different types of meeting:

1) Conference
2) Conference room
   a) Business/board meeting
   b) Technical meeting
3) Sales meeting
   a) on-site
   b) off site
4) Spontaneous meeting (eg hallway meeting)

After some further thought I would like to offer a slightly simplified categorisation:

1) Conference meeting
2) Structured meetings
   a) Business meetings
   b) Professional meetings
3) Spontaneous meetings
   a) Working groups

A conference meeting is typically a large structured group comprising between 30-500 participants with characteristics as indicated in Rick's paper (802.11/91-101).

A 'Structured' meeting would typically be a formal, or semi-formal meeting involving 5-30 people. More formal meetings would have a consise agenda and a secretary. A board meeting would be a fair example of this type of meeting. A structured meeting could also be less formal and concern a 'professional' group. Most of us take part in such meetings — from a group of engineers holding a technical meeting to a group of journalists holding an editorial meeting. Such meetings have a clear purpose, but may not necessarily have a structured agenda. The number of people involved would again be between 5 and 30 — but would tend to be towards the lower bound of this range. Structured meetings take place in on-premises meeting rooms with participants seated around a table. Meeting rooms are likely to be between 10 and 50 square metres in size. While the variety of platforms will be wide and varied, company buying policy will introduce some uniformity (in manufacturer at least). Meetings of this style tend to be more discussion than presentation orientated, with much cross communication. This is particularly true for professional meetings. Communication will be orientated to the business of the meeting and there will be little, or no secondary communication. Unlike the conference meeting, communication will not necessarily be bounded by the meeting — applications and data might be drawn from a company wide LAN for presentation, distribution or discussion in the meeting. The following services might be used:

1) Access to applications
2) File sharing and distribution
3) Print server
4) Database access
5) Access to WANs — 'electronic conferencing'
6) Multi-media capabilities — eg image distribution.

I consider the former 'sales meeting' classification to be a specific case of the structured meeting — but possibly more presentation orientated. In addition, communication in such a meeting would probably be contained within the meeting itself.

My final class of meeting is a spontaneous or workgroup meeting. The meeting might involve solving a problem, drafting a document, or simply reviewing and exchanging data — such as a budget or project plan. Such an *ad-hoc* meeting would typically involve less than 5 people. It could take place almost anywhere — around a desk in the office, in a meeting room or study, even in a hotel room, or airport lounge. The primary service in such a meeting would be file sharing and distribution, but on a company premises might involve access to applications, print servers and databases.

With these classifications in mind I would like to propose an alternative configuration table:

	Working Groups	Structured	Conference
Number of Stations	≤ 5	5 – 30	30 – 500
Station Density	1200 stations/hectare	600 stations/hectare	2500 stations/hectare
Dimension[1]	< 5m	5 – 50m	50m
Applications	File transfer Shared file access Print server Database access	File transfer Shared file access Database access Print server Access to WANs Image distribution Application access	File transfer Shared file access Database access E-mail Print server Access to WANs Voting Image distribution

Notes:

1) I am taking dimension to mean the largest linear distance between two communicating stations.

With a need for access to services outside the meeting facility in some cases, the MSDU destination distribution will not be contained entirely within the WLAN service area. The destination distribution figure in the application table is therefore not 100%. Also in the same table the applications listed do not correspond well to those listed in the text. I am assuming that a meeting journal might be a specific case of shared file access. Information distribution would typically be file transfer. Information retrieval is the same as information distribution. As I noted in an earlier comment, many of these appications are the same as have been delt with in other 'vocational' areas — for example offices.