

IEEE 802,11
802 LAN Access Method for Wireless Physical Medium

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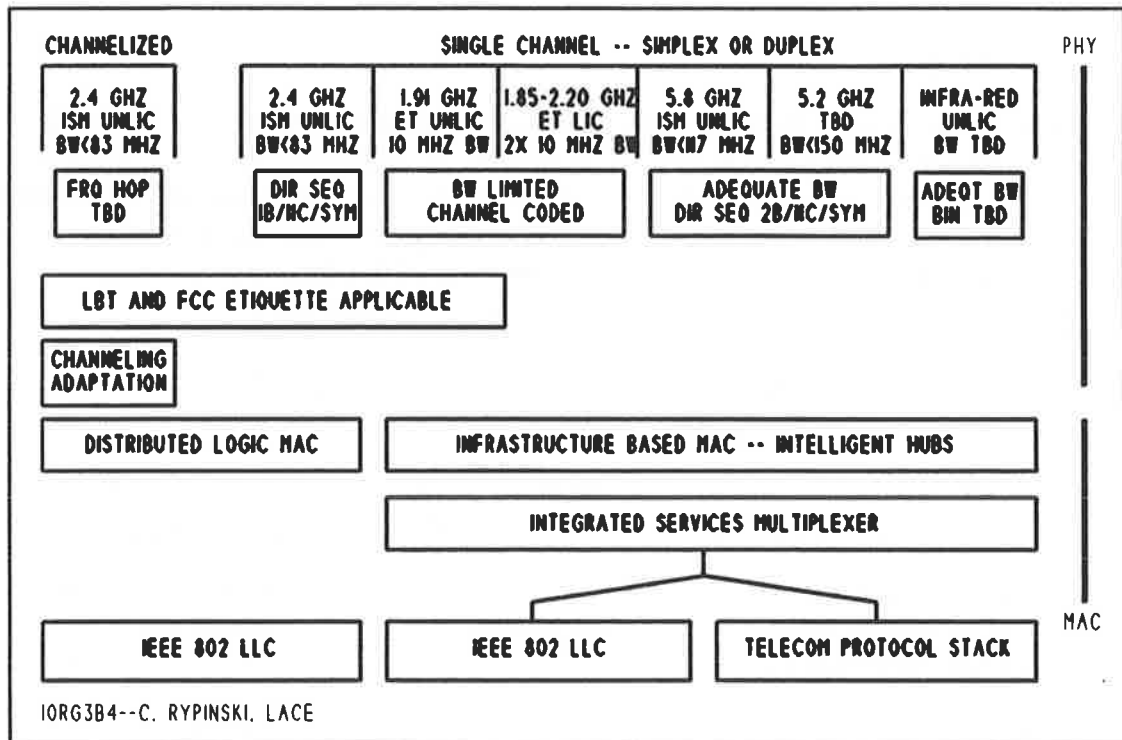
TITLE: REORGANIZATION OF 802.11 GOALS AND ISSUES INTO SETS**SUMMARY**

It is recommended that the work and issues resolution process of IEEE 802.11 be reorganized by categories each of which is a set of related functions. In this way much of the contention, which is about which category will survive, may be converted into parallel questions of how best to execute each category. These categories are shown in summary below and more completely in the body of the document.

SETS OF PHY-MAC CHARACTERISTICS				
Sort by Frequency Band, Bandwidth and Transfer Rate				
Characterization:	"bubble wrap" Ad hoc	Campus area Organized	Premises Area Organized	
Station peak transfer rate:	1/2	1/2/4	8/16/24	Mbps
Peak rate characterization:	1	4	16	Mbps
Frequency:	2.4 I	1.9	5.2/5.8	GHz
Available bandwidth:	83	10	117.5	MHz
Infrastructure	Atypical but infra allowed	Commonly but with ad hoc & pr-pr	Always but ad hoc supported	

REORGANIZATION OF 802.11 GOALS AND ISSUES INTO SETS

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The above figure shows all known wireless PHY possibilities on the top horizontal axis, and reads downward for each of them. The next rank of PHY is broken into types of channel modulation/coding. One purpose is to show the degree of commonality that might be obtained from each of the PHY and MAC types.

REORGANIZATION OF 802.11 GOALS AND ISSUES INTO SETS

PROBLEM DESCRIPTION

Using a somewhat random approach to creating issues causes many of them to be on details and others to be of such great scope that a choice excludes a major part of the offerings to 802.11. A further difficulty is that a selection on one issue is interlocked with several other issues, and the interlock patterns are not consistent. It appears that a large constituency has formed around a 2.4 GHz 1 or 2 Mbps PHY and others around higher rates and other frequencies. Accepting that it is necessary for 802.11 to achieve a 75% consensus to finally decide anything, the Committee now faces a possibility of paralysis where a particular viewpoint which is dissatisfied can block any action with a 30% constituency. The necessary compromise is to categorize the work to recognize the largest and most important groups so that they may work in parallel instead of as opponents.

SETS OF PHY-MAC CHARACTERISTICS				
Sort by Frequency Band, Bandwidth and Transfer Rate				
Characterization:	"bubble wrap"	Campus area	Premises Area	
	Ad hoc	Organized	Organized	
Station peak transfer rate:	1/2	1/2/4	8/16/24	Mbps
Peak rate characterization:	1	4	16	Mbps
Frequency:	2.4 I	1.9	5.2/5.8	GHz
Available bandwidth:	83	10	117.5	MHz
Modulation class:	FH/DS	D/ChCd	DS/ChCd	
MAC class:	LBT/pr-pr	Etq +	Managed	
"M-M" connection services:	none	limited =<2xB @ 4	ISDN nxB @ 16 Mbps	
Voice-only services:	intercom	compressed	PSTN type	
Infrastructure	Atypical but infra allowed	Commonly but with ad hoc & pr-pr	Always but ad hoc supported	
Note:	Infra-red and 23 GHz are additional categories that can and should be added when appropriate.			

REORGANIZATION OF GOALS AND ISSUES INTO SETS

It is now proposed that the 802.11 goals be reorganized so that issues will be less global thereafter, and more easily resolved within a narrower context. The sort order (but not necessarily the arrangement of the Text box) is by frequency band, bandwidth and peak bit transfer rate. The different capabilities of each band correspond to particular categories of service scope as shown in the Text Box shown above.

ACTION

The next step is to assume initially that all issues apply equally to the three categories shown. Each category (bw, campus, premise) will now sort the issues into the following categories:

Exclude	Accept	Redraft-accept	Common to all 802.11
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The immediate consequence are:

- 1) a number of issues will be found to be related to only one type of PHY or MAC. These need only be considered in the context of where they are used, but not across the table.
- 2) a number of issues will be relevant to some or all of the categories, but the choice made for each may be different for one or two of the categories.
- 3) the issues with regional and global significance can be recognized, and the Committee obliged to address them.
- 4) some issues will result in subcategories within a category where the issue cannot be resolved by choice but only compromise.
- 5) the contrast between viewpoints can be made apparent by the category instead of by the issue.
- 6) it is possible that each category would have its own PHY and MAC subgroups that might work more harmoniously with each other because of shared goals.
- 7) If it should develop that one of categories is sufficiently marginal in a technical particular, the damage resulting from that discovery will be limited to that category and not incapacitate the whole 802.11 Committee.

IMMEDIATE (802.11-SIZED) REGIONAL ISSUES

There are a number of issues that are already included in 83Rn, some of which are closed, which should be reconsidered, redrafted and resolved. They are types of issues which bridge the categories above. Two examples are presented below.

The Common/Multiple MAC

If a common MAC is an unreachable goal, this process will make it possible for work to go forward. The obvious consequence is multiple MACs. A channelized medium will create serious problems for a MAC optimized for a common channel medium. A MAC designed for worst-case access delay in support of connection-type services will be different than one that is purely statistical.

Should this classification be adopted, then the issue must be readdressed:

Shall 802.11 design: a) one MAC with PHY adaptation layers, b) one MAC per PHY or c) only one type of PHY and MAC.

True Connection-type Services

The 802.11 Committee has agreed to support connection-type services. The presence of an option to not support connection-type services has no agreed upon meaning. In the limit, this is interpreted as leave to ignore the requirement and postpone the "how" problem to posterity. Also, a rather weak "voice intercom" capability has been offered as an example of qualifying connection-type services.

Any definition of connection-type service which is at variance with IEEE 802.9 will require thorough justification. This does not mean that all bandwidths have to be supported, but the setup, addressing and D-channel signaling must be recognized and accommodated. The notion that 802.11 can do its job ignoring requirements for extension of connections to/from the public network is very short-sighted.

The difficulty of using a valid definition for connection type services is that mediums with probabilistic access delay or with small bandwidth relative to the virtual circuit bandwidth cannot support a connection-type service. The requirement is thus exclusionary to PHY/MAC definitions which have a substantial constituency in 802.11. This creates a large added load on those who adocate schemes with future capacity reservation and deterministic worst-case access delay.

The only apparent resolution is for the category that does not have a possibility of supporting connection-type services is to admit it, and ask exemption.

The form of the issue might be as follows:

Shall PHY-MACs with either less than 4 Mbps transfer rate or without defined and required infrastructure be excused from the requirement to support connection-type services?

This type of candor would save the Committee a lot of effort on attempting impossible tasks.

CONCLUSION AND MOTIONS

Contingent upon acceptance of the Motion presented in 93/199 defining two new PHYs, the following motions are offered and recommended for acceptance.

MOTION 1

The issues before 802.11 be restructured into three parallel groups (now called "categories") corresponding to bandwidths, operating frequencies and minimum transfer rates of 83 MHz at 2.4 GHz for 1 Mbps, 10 MHz at 1.91 GHz for 4 Mbps and 117 MHz at 5.8 GHz for 16 MHz assigning to each category those issues which are relevant including the possibility that each issue may be associated with none, some or all of the categories; and

that those issues which apply to all categories be assigned to a category of inclusive scope; and

that from this point on, each of these issues is evaluated autonomously in the context of its category allowing the possibility that different choices may be made on the same question for each category; and

that the 802.11 subgroups be reformed into categories before breaking into separate MAC and PHY groups; and

that any two categories may be allowed to combine into one provided that group can meet all of the 802.11 functional requirements; and

that a new category (e.g., infra-red) may be added when a constituency is identified and makes known its definitions; and

that the work in each category be carried on in parallel until that subgroup believes that it has produced adequate standards text, or that it cannot reach such a point.

MOTION 2

The PHY-MACs with either less than 4 Mbps transfer rate or without defined and required infrastructure function are excused from the requirement to support connection-type services?

MOTION 3

Unless excused by vote of 802.11, an 802.11 conformant PHY-MAC is required to support to and through the MAC connection-type services of at least two B channels and one D channel, except that it is not required that the connection-type services protocol stack above MAC level be equipped on all stations. [The MAC and PHY shall be the same whether or not connection-type services are equipped.]