

Functional Requirements Minutes Monday March 11 1992

Called to order by chairman Dave Bagby at 11:15. Carolyn Heide secretary.

IEEE 802.11-92/50 Functional Requirements, Dave Bagby editor

Submission presented by Dave Bagby.

We tried not to change the contents of the results of the Irvine meeting (document 92/40), but to make it self-consistent, and define the terms it used. Also, we tried to flesh out the stuff. Although it seemed that once the definitions were expanded little or no text needed to be added to the bullet points.

Definitions:

- MSDU: lifted from LLC (ISO version) lower level interface - what expects to be received from the MAC
 - wireless medium (WM): tried to keep this media independent.
 - station (STA): important, key words are "any device". Note that could imply access point = station.
 - coordination function (CF): expands into two types, the DCF and the PCF
- Raphael Rom: DCF should be that the "same CF is active in every STA"

- BSS/ESS: changed from 'service area' to 'service set' because we are not addressing geography here, only logical groupings.

Wim Diepstraten: why "common" CF vs CF?

Dave: BSS should say "a single CF"

- distribution system (DS): "logical" means "conceptual".

unknown: logical excludes physical.

Ken Biba: Can logical be removed from the sentence?

Chandos Rypinski: We are trying to distinguish between the H/W set and the methodology set. If its not logical, its conceptual, but not particular H/W.

Ken: We are arguing functional components. One of them is a DS, that is a functional piece, so drop the word logical to define the system.

Dave: The word logical will be removed.

- distribution system medium (DSM): doesn't matter whether its different from the WM. The words "for BSS interconnections" will be removed.
- distribution system services (DSS): the interface of the DS - the DS must provide a set of services and these must be defined. How they are implemented may not need to be standardized if the service set and interface are defined.
- access point (AP): has become very simple.

Discussion:

Wim: When another BSS is accessed by an STA it will use the DS, and then does it not become an AP? Aren't all stations access points then?

Dave: DS must be used to go from one BSS to another through the ESS.

Ken: Alternate wording "any STA connected to a DS providing DSS to a BSS".

John Corey: Another station on the WM which uses the DM would be an AP. That's every station!

Dave: If a station uses the DSS, it is an AP, but that does not mean that every station is an AP.

Ken: Challenge is determining where DSS gets implemented. Under this definition a station on a WM is an AP even if not physically connected to the DSM. APs must have the requirement that they are connected both to the DSM and the WM. How we include the notion of invoking the DSS may be a problem.

Bruce Tuch: Agrees with Ken. Uniqueness of the DS interface to the DSM is not covered here.

Dave: The new word 'invokes' is the problem. We should use the words used in the station definition.

Nathan Silberman: Agrees. Also - DSS should not be within an ESS, could be a connection into the same BSS without extending it.

Bob Buaas: To Ken - is the DSS included as a null set? This thing called an AP might want to be just a forwarder (to handle hidden stations).

Ken: Yes. An AP must have connections to both sides, so a DSM may just be a queue inside an AP (the null DSM is covered by this then). It is not really null, but perhaps just a queue. Intuitively, an AP is a connection from a BSS to the DSM.

Wim: Then it shouldn't be an STA.

Dave: Was trying to avoid defining the other medium for the DSM.

Ken: We need to define an STA for the DSM as well. That way you can say that if you are a DSM station and a WM station you are an AP. Whether the DSS is implemented in an STA or an AP only is not known yet.

Rajeev Krishnamoorthy: Could define AP as a station capable of implementing all DSS functions. There can be only one AP per DSS?

Dave: Number of APs per DSS is not defined and should not be.

Rajeev: A base set of services must be supported by an AP, this could be used as the definition of an AP.

John: Logically, the DSM brings up a problem in RF (IR too?) - the process of extending the service area introduces media expansion units, i.e. repeaters. These definitions don't cover these physical media extension units. Is there a need to define the capacity to have physically transparent units at this functional layer? We need to understand that at the functional level in order to make the PHY group cognizant of what happens at this level.

Don Johnson: Defining an AP as "a device which provides an interface point to the DSM" would parallel the STA definition.

Dave: Suggest that word-smithing is required on the AP definition.

Ken: Don't use the word 'device', to keep at the functional level. Create an STA' (i.e. STA prime) which defines an STA on the DSM.

Don: The word 'device' is used in the STA definition already.

Ken: The DSM interface is important to the definition too. "any STA which implements STA' and part of DSM" fully defines the AP in a functional manner also. Must be an STA or its not anything. If it isn't an STA, an STA' and a DSS it isn't anything. PHY level extensions may be required ultimately, providing for them before the system is defined would be confusion. Define the system first largely based in the MAC.

Chandos Rypinski: PHY extension - in general these are useful but don't affect the network upstream, so shouldn't muddy the waters with them now.

Dave: To talk about extending the PHY implies one is defined already. A PHY and an extended PHY are the same at this definition stage.

John: It must be understood that the DSM is not a transparent PHY extension.

Dave: These definitions specifically do not say that.

John: Things like power level control are MAC additions which may cause ramifications upstream. If I read the DSM definition I may think this means PHY extension. It should be explicitly implied that this is not - I could think that a repeater which has no MAC level functions fits the definition of an AP.

Nathan: John has a good point. Other group experience says we need to define this right at the beginning. This committee needs to be driven by the fact that the core of our function is the media

Dave: Can accommodate range extension and PHY extension in the DSM concept. Rather than say it is not a PHY extension, say it is a simple one. If the DSS should cover simple extension as well as one that includes complicated DSS functions, is the definition we have now general enough to include simple and complex types - range extenders and sophisticated telephony systems.

Ken: LAN fundamental extension is connecting 2 LANs together. Only after MAC had been invented could repeaters be used for extension. Until the system is invented, don't preclude PHY level repeaters, but focusing on them can be needlessly diverting. Greater controversy is the ambiguous definitions in how put a MAC over a non-compatible media. System evolution implies that we can't anticipate no change of PHY in the future. The ESS definition is our extension.

Dave: The PHY level extension discussion is uncomfortable - it pulls us back to area vs set. Range may be extended at some point, but that is to geographical. It is a PHY level issue.

Bruce: Agrees with Dave. PHY extension will happen but its just a different type if BSS according to density and capacity, and it is a PHY issue. There might be PHY demands on the MAC, but that will come.

Richard Parker: Is a BSS fully connected? Is every STA in a BSS capable of talking to every other. NO - then isn't a BSS kind of vague? Then inter-connecting them becomes vague. Can a CF allow more than one STA to communicate on the same media? It's too restrictive a definition.

Dave: Inter-connectivity is dependent on CF, these definitions don't preclude anything.

Richard: Can a CF allow more than one conversation simultaneously on the same media?

Nathan: We are confusing PHY and media. Sometimes what we call PHY is media. The MAC definition must include media characteristic consideration. Must not wind up with PHY extensions as an afterthought, considering the wireless media.

Dave: Don't assume the DSM is wired.

Nathan: The par says when we talk about wired it is an 802 conformant media.

Bob: Adding weight to Ken's comment - we are trying to get clarity, and we have got some. So recommends we table the AP definition discussion by making a working group to define AP.

John: Requests clarification: in BSS the CF means within a single PHY? Do you have to go through a DSS to coordinate more than one PHY?

Dave: I didn't assume one way or the other.

John: If so, then range extension doesn't apply. If we say the CF is managing a single PHY. In 802.3 we have gone to hubs managing multiple media. We want to avoid the happening to us here.

Ken: We are confronting this issue up front unlike other groups. A repeated PHY is just another instance of changing PHY. As long as we stay conformant they are supported by this architecture. I was assuming the all STAs in a BSS have the same PHY.

Dave: I had assumed that all STAs in a BSS had the same PHY. That may not be a necessary assumption, so more work may be needed.

Don: Total inter-connectivity should be required in a BSS. If you can't all communicate then you are an ESS. It must be part of the definition.

Dave: The AP definition must be fixed - maybe a group to do so would be good. There is the PHY extension issue too. Is one PHY per BSS required (or one PHY per CF say Wim and John). BSS has one CF, so they are the same.

KS Natarajan: Check the use of media vs medium throughout the definitions. That affects the definition of STA and everything else.

Dave: I think there are mistakes there. One STA transmits on one medium.

KS: Do you need "and receives" ?

Dave: Yes, maybe it is a null function, but this does not preclude this. (Chan - for sleep mode that is required).

Ken: Definition of BSS - leave it the way it is because, for example an 802.3 network that has some thinnet STAs and some thicknet, they all use the CF with just digital translation between the PHY. This is any single STA has only one PHY, but they share a single CF. The MAC and PHY interface have been split to facilitate this.

Wim: The definition of DSS uses MSDU instead of MSDU.

Registration and authentication: Dave says help! How can these be defined precisely?

Bob: There are better definitions, but they didn't get in on time. However they still aren't ready.

Dave: We could discuss this, but only for a limited time. Or we could just leave them as is and come back to them when we have better.

Raphael: Registration carries a lot of connotations with other people. An offline mechanism for inputting keys is one definition. This is not what we mean. Perhaps we need - there are services from the BSS and ESS, and to get them you have to identify yourself. If you go from one BSS to another, some forwarding service - you must be registered in the old and new - is keeping track of you and providing services. Authentication is a mathematical process that ensures you are who you claim you are. If 2 STAs decide that they need the talk privately and they want to exchange a private key, they may want to authenticate each other. It extends to more than this, but this is the basic idea.

Bob: Registration - the most trivial is a couple of people in a room who want to work together, recognition of each other is the basic idea. In its most complex, in a ESS, the authentication function has to have some complicated cryptographic public key and the process of registration may also become complex.

John: It would help if we understand what registration is between - an AP to an STA? Who is registering to what? the CF manages the media, so the address of the STA that comes into the BSS has to register its number with the BSS. That needs to be in the definitions - is it registering its address with the BSS, or is it something higher?

Ken: Argues ... registration = authorization, authentication = identification. Entering, getting recognized, and getting permission.

Bob: Proposes substance of the discussion, don't try to get the words here, because they depend on the previous definition that are not finished yet.

Chan: Would yield his turn to lunch. Other words can be found and he would be happy to contribute to an offline group to do so.

Rajcev: 1. is authentication part of the MAC?; 2. could both these be defined by the CF?

Dave: that expands the CF to more than we wanted. Because of roaming, these concern us where they don't concern other MACs.

Lunch break from 12:45 until 2:30

General Discussion:

Jim Schuessler: The functional requirements document does not specify that the DSS is or is not 802.11 conformant. It should specify. The par does not state that the DSS must be 802 standard. We should not do anything that limits us to 802 only.

Dave: It doesn't state anything that limits us.

Francois: Note that 92/40 defines an 802.11 conformant system within an ESA.

Bruce: Where does interoperability start and end? At the AP interface? This has significant impact in product marketing decisions. This decision should be made by this committee.

Dave: An AP has a split personality. On the WM side interoperability is required by the par. On the DSM side it is still to be decided.

Bruce: Is the interface exposed?

Don: We should state whether we are going to interoperate with other MACs through MAC bridges. One way of distributing that information must be the 802 way (MAC bridges).

Jim: Should say something about using 802 conformant equipment to make an ESS.

Vic: The 802 rules are that we should use all available 802 standards. If we have a need for this DSS then we must first look at all standards, such as 802.1 for bridging. If we can't use them then we should talk to the 802.1 people, and see if they can change. Don't forget, 802 has a MAC service layer and a big MAC layer boundary. All inter-MAC communication must be done below the LLC layer (ie MAC bridging), the LLC layer interface is consistent. How about between stations that use LLC but are not in same BSA?

Dave: The problem is that in all previous standards, once you are on the wire everyone else can see you. This is not true here.

John: We cannot design a new physical media to media set outside of 802.

Vic: Only if you have good reason why there is no 802 way to do it.

Chan: What if the connection between APs is a non-802? My belief is that if we are stuck with 802 for AP connections we are prematurely closing the door on alternatives which are attractive for commercial product building.

Bruce: First we must decide if the DS interface is exposed - if it is we must define it.

Dave: Would like to table this discussion and go on with the document. Doesn't believe this is a functional requirements issue. (Many, many people disagree.)

Chan: We have to take (at a minimum) some neutral stance - saying we are restricted to 802 conformance is one of the most destructive decisions we could take. We must leave it open.

Nathan: examples: MAC layer remote bridges can use any media; hubs - each company has a different bus and they interconnect via custom equipment. It will cost us money and performance if we must be tied to 802.

John: The CF is the only thing that joins a BSS. This could be a global set.

Dave: Two BSSs joined by a DSS into an ESS - if constrained to an 802 distribution system, this is very difficult.

John: No, you could use anything and connect via a MAC layer bridge. We must BSSs that the interface is exposed, and the functional specification must say that we are going to define this interface. With this interface defined we don't care what the DSS is.

Specific Requirements Sections

- General Requirements

Jim: Why is multicast specified and if it must be, shouldn't we say BSSs too?

John: Is that an Ethernet address type?

Ken: Broadcast is a subset of multicast. What should really be here is "group addressing". Or how about all 802 addressing modes? Or how about "multicast including broadcast services"?

Vic reads the definition from 802 of multicast and broadcast - but people objected because it BSSs too wired. Dave proposes that we leave this is for now

- Data Service Types:

Ken: Datagram and packet are used and undefined here. Use MSDU for packet. We are not going to define a connection oriented service, so all we have is datagrams.

Dave: We are not precluded from doing that, but we have not agreed to do so.

John: When we talk about time bounded delivery, that is the class where connection oriented will come into play. A time bounded connectionless service may exclude a large market segment.

Dave: Isn't the concept of connection above the MAC?

John: No it's not.

Ken: Yes it is. The market survey did not bring out a need for connection oriented service.

Dave: if you think it should be added, you need to submit another proposal.

Rajeev: If you require continuity of service and time bounded service, your DSS becomes very stringent.

Bill Stevens: Are there other services which we might address, so we should not exclude connection oriented services?

Dave: I'm sure there will be additional discussion of services with many rejections.

Bill: This is an open-ended process? We will consider new functional BSSs throughout time?

Dave: At some point enough is enough, but there is currently no known deadline.

It is agreed to change both "datagram" and "packet delivery service" to "MSDU delivery service".

Wim: We don't use the terms connection or connectionless. Isn't that a well known term within 802 that we should continue to use?

Ken: The intent here was a connectionless service. Make it "two classes of connectionless service".

Chan: We must have an isochronous service somewhere. But what comes out of the MAC need only be the time bounded services. It will probably be on a completely separate stack from the 802 stack. The text as it stands now is good because it does not preclude that.

Dave: Add connectionless or not? (He gets no comments) So it will BSSs as is.

- Coordination Functions:

John: More than one CF per BSS?

Dave: There is thought that if you assume some sort of neutralized infrastructure in the room and some other CF that is completely different (cannot be used in the same space) - how do we resolve this problem? The concept is that we might have to change modes to coexist, dynamically.

Bruce: Why two BSSs CFs to begin with?

Dave: We will come to this when we discuss DCF vs PCF.

John: At any point in time only one CF is active in the BSS, but you can switch between CFs.

Ken: A coordination function that can be PCF and DCF simultaneously is precluded?

Dave: If you can invent one, the whole requirement to switch between would go away.

Richard: Can an STA be in more than one BSS?

Dave: You would actually have two stations, symantically, but maybe living in the same box. Well, yes it could be in two of them, it depends on the set.

Bruce: This whole document is very abstract, isn't DCF and PCF implementation oriented? This is specifying the implementation.

Dave: There are some of both, this is simply a representation of what we did last meeting. But wait, we will come to that discussion when we hit the table on page 7. The table is the same as last time and large discussion is coming up on the subject so lets defer it for while.

- *MAC/PHY interface*:

Richard: Does this mean you don't know whether or not it is exposed?

Dave: This means there will be a defined specification, but if you don't expose that interface you don't need to conform to it.

Richard: That says we haven't decided whether or not it is exposed. It is ambiguous.

Dave: Exposed here refers to an implementation not the standard.

- *Security*:

We still don't have definitions here, as was clear from this morning's discussion. 802.10 doe's not define the encryption model - we don't have the luxury of doing that if we want to maintain interoperability. We must figure out how.

That covers the specific requirements sections, except we still have the table on page 7 to discuss, which has been postponed because of the anticipated length of that discussion.

General Discussion:

Jim: Additionally there was a hand written page that was attached to 92/40 which is not covered in here.

Dave: No concensus was achieved about those items, they are kept for reference only. Filling those numbers in will have to happen but it hasn't been done at this point.

Jim: Is the functional requirements a superset of the par? For instance error rate is not in the functional requirements.

Dave: Because the functional requirements references that par they are all there.

John: Why did BSA become BSS? Once we leave the geographic connotation we could eliminate DSS and ESS entirely.

Dave: The CF concept attempts to divorce use from area. It is not area we are talking about - trying to talk about fractals in a container gets us nowhere in terms of what coverage you get from given transeiver.

John: In 802.3, if you attach two Ethernet systems are you taking two BSSs and making an ESS. The concept does not apply in wired, so why in wireless?

Dave: Because we want to avoid the continuous analog system frame of mind.

John: 'Set' implies that the area is infinite, and that is wrong.

Don: I think without the area we have lost the definition entirely.

Wim: We came up with BSA and ESA because of the physical limits and the need for larger area coverage. This is lost when we talk about sets.

KS: Both set and area can exist in one definition - that would be more useful.

Nathan: Something did get lost in this 'set' definition - if you knew nothing about WLANs you wouldn't get it. The issue is the propagation coverage.

Jim: In support of sets - this document is for us, it is not a draft standard. The set concept is powerful because you can have two BSSs in the same physical area. The CF definition is very important and we need to revisit it.

Chan: In the beginning there was the concept that STAs could form a network without an infrastructure. This was a BSA. Addition of an infrastructure created the ESA. Another point - the extent of a BSS - that possibly could be infinite from the set definition but when we define the CF, that will limit itself. A global network under one LLC will be of the general magnitude of a whole building worst case. From then on you're inter-networking. The CF function will bound it, not the definition of the BSS.

Dave: The CF definition implies that all stations in the world cannot be covered by that one CF (although not bounded by area).

John: A hub with 5 Ethernets is analogous to multiple Bss's in the same area. When that hub is bridged to the next floor we don't have an ESS, so why do we need it here?

Chan: Some greater extent is involved before your must bridge. The scope of the common control cannot be forever due to time consideration. The multiple Ethernets is not a valid analogy.

Dave (not as chairman): As a user of a little mobile device, say a tablet, I might work for a company that has several different facilities. I want to be able to access basic data when in any of the facilities. They could be hooked together to form an ESS so that I am in the same network no matter where I am. The DSS is what enabled me to go from one to another without losing connectivity.

John: This is not a MAC problem. 3 Ethernets in the same hub is the same problem - the operator moves addresses from one network to the other all the time. I think this, handled by the CF, does not require an ESS. Cell overlaps and roaming is what we are trying to handle. This document is so theoretical it is too removed from what we are going to implement - it will not help in defining the standard. We have to define BSS and ESS as being an area, even if they overlap.

Dave: Area leads you to assume you must belong to something. This is not necessarily so.

John: If we get rid of ESS and DSS and say that the CF can coordinate between CFs, we can simplify greatly.

Dave: CF and DSS are two different things to me. I think CF controls media access, that's all.

John: There is no need to define things that the other 802 standards don't seem to need.

Richard: The confusion is about whether they can talk directly or with connection. The STAs are separated into little blocks - everybody is connected to everybody else.

Chan: This is not my understanding - this is so in terms of radio propagation maybe, but STAs can be sorted by logical means. All you need is assurance of path for those who can communicate. We have to have something for little systems and wide area ones. There are limits that force you to internet sooner or later. Terms must exist for when there is or is not infrastructure to provide this service.

Richard: Just because everyone cannot reach everyone else does not mean we require infrastructure, MAC layer bridges can do that.

Wim: Perhaps we should go back to basics.

Dave: The BSS is basic because it has a limited range. Personally I say yes, at the MAC level in the original discussion it was clear that the ESA was necessary for logical range extension. The word 'set' made sense because, particularly with multiple PHYs, they could all live in the same area. Sets get you around that - does set really make sense or create more problems?

Wim: Cable analogy - look at a BSA as cable-connected stations. Look at each channel as a different cable. On each cable they all use the same CF and they all see each other. Together they make up a network, but each is isolated from the other. In a BSA ... (interrupted)

Robert Gauthier: The problem with BSS is that the area tie is lost - how about a set of stations with a limited physical range controlled by a common CF.

John: Using the 802.3 analogy. The BSS is an 802 LAN - everybody registered to the same CF. Eliminate ESS and DSS and say that interlan connection is at MAC level. If ESA and BSA are

removed from physical area, lets kept the analogy as close as possible to the wired 802.3 . The speed of switching CF is slower due to portability, but once you are communicating, we are the same as a wired lan.

Nathan: 1. define what set means - in math it is group of objects with common properties. What are they - media, coverage, area. 2. wired parallels, one network = one network, is a difference make parallels dangerous. A DSS is like a multipoint computer. Let's go back to why we invented the BSA and ESA originally - it was because of distance coverage.

Dave: The problem is having lost the word that said all members of a BSS can talk to each other. The BS? and ES? came from range, this is true. One station bouncing back and forth between AP coverage is a scenario which is not analogous to wired systems.

John: Have you changed CFs when you bounce like that?

Dave: I changed BSS, but I stayed in the same ESS. My movement didn't affect anyone else.

John: You have changed ESS to be a multipoint CF?

Dave: Assume the CF is in the AP. Two BSSs in the same room used as redundancy, or separated by walls - above the MAC layer you can't tell the difference.

John: In a PCF, where the CF is in one STA, everyone in the BSS is controlled by the AP. How did I switch to a new BSS? The CF did that, so the DSS was not relevant, the CF handled it. Sounds like roaming!

Dave: But this is all the same network - the change was below the LLC.

Chan: You are looking at one AP as being one LAN - I don't look at it this way. Moving from one AP to another should not be a network event, it should be a distribution event. Most networks are designed so there is only one path from source to destination. If there are more it must be possible to take advantage of that.

John: But the CF - do I change CFs and re-register when I change APs?

Chan: Maybe - we haven't defined whether the CF is in an AP.

John: We have taken too much of an implementation oriented definition. The PCF does not allow you to move from one to another without becoming a roaming issue. How do I get consistency - am I getting bridged?

Richard: We are talking about four things with two names here.

Dave: CF separated because of assumptions about CFs living in APs only.

John: Roaming (ie dynamic changes) are the only differences between this a wired system.

Bruce: This is just what terms we use to conceptualize this - what the CF does or the DSS does.

John: We have invented terms we don't need - LAN terminology is already sufficient for this.

Dave Leeson: Each person has a different part of the elephant in mind. We have semantic problems here, not a lack of understanding or functional definition. Not everyone in a BSS can communicate all the time, for instance - I allow for this intuitively when you say all members of a BSS can communicate with each other. We want to avoid having each part of the network having to have huge function because of semantics. At each discussion point we must stop and decide if we have a real disagreement or a semantic problem. The area concept doesn't bother me because I know what we mean when we're talking about them. If we develop new words we must be very careful - we should try to use existing words first.

Vic: what about segment - 802.3 already uses segment as wire between repeaters. Basic service segments can be colocated.

Dave: I don't see the need to change that. I will not put myself in the situation of a generic 'fix it'. Tell me how to change the document and I will do it. Don't just tell me to do it.

Chan: Let the present definitions stay as stands. As presently written nothing is excluded, by tinkering we will just change the set of dissatisfied people.

Don: It can do for now, and we can change it later.

Motion #1: With respect document 92/50 - accept the definitions up to registration, as written, restricted to what we discussed so far.

Moved by: Chandos Rypinski
Seconded by: Bob Buaas

Motion Discussion:

Bruce: Against the motion - this not a completed document.

Chan: The affect of this motion is to have the document act as a guide to further definitions. We have discussed this enough.

Wim: This means that whatever we have reached up to now cannot be changed anymore? I am hesitant to change it - between the Irvine meeting and now there haven't been any changes and this is not good. We need to form a task group. If this motion means we can't change it again I don't agree.

Dave: We can change it, but by making a motion with the change. We are trying to move from water to jello, not jello to cement. I have a problem with the motion because there are some things I have to modify per our discussion earlier today.

Nathan: Based on the discussing here there are too many open issues to do so yet. Will propose later that we list the issues and assign people to fix them.

Dave Leeson: Request to 'lay the issue on the table'.

Nathan: Seconds that quest.

Chairman rules the "lay" request out of order.

Vote to recess (20,3,6). Recess at 5:40 until Tues PM.

Tuesday PM March 12 1992

Called to order by chairman Dave Bagby after lunch. Carolyn Heide secretary.

Dave did some work between yesterday and today to put the changes discussed so far in to 92/50, this might clarify the motion.

- in WM - change media to medium
- same in STA
- in DCF: use word same instead of common
- in BSS: medium to media
- in DS: removed logical
- in DSM: medium from media
- in DSS: MSDU
- in STA: medium from media.

- par doc number inserted correctly
- added "include broadcast" to multicast
- changed packet and datagram to MSDU
- another media to medium change

So, we return to motion discussion:

Dave: Some of yesterday's discussions revolved around CF and BSS, and that sort of stuff. The problem is that you have to understand a CF controls literally when you can receive and transmit, not where data flows in a network. When two STA's communicate through another (they cannot get to each other directly) they are still part of the same BSS.

Wim: The STA passing data between the other two could be a DSS functioning in that STA.

Dave: Second case is a typical peer-to-peer, implying that all 3 are in range of each other. The key is that you abstract the CF function from where it is implemented. It could be implemented in any one of the STAs or all of them. It could move around among the STAs - this concept has nothing to do with the physical packaging. The upset was over removing the concept of area - when you talk about area it leads you into other assumptions that tend to exclude some cases (or make them difficult). This is what we want to avoid. I am for accepting these definitions as they are because this is why I did it that way

John: I understand what you mean. In your CF are you also coordinating multiple channels (parts of the spectrum for instance) - can the CF assign channels, not just coordinate the transmit and receive within a channel?

Dave: So far, the CF definition has not said yes or no. Conceptually, yes - whether a channel is frequency or time domain, or you want to channel reuse - whatever the CF is, it tells you when to transmit and receive.

John: Does it also tell you where to transmit and receive?

Dave: This is a fuzzy line - not really addressed yet. We have a requirement (in the par?) that we must work with a single channel PHY (poorly defined channel), or at least not exclude multiple PHYs. There will be lot of discussion about what is a channel. The MAC and PHY may use the term differently.

John: If you are controlled STAs sharing the same channel, you have distribution of the CF - the CF is responsible for who transmits when and in a multiple channel situation also where. I don't see enough words in this document to allow some of these other architectures. Next item - from this document to the next layer, the PHY group needs some more words that are more specific. Without some words that are more physical, it is difficult to talk about filling up a space with signal. Whether in the functional requirements or the architecture document, those terms must come out somewhere.

Dave: (as chairman) I am trying not to respond here because you have the floor and we should not be having a private discussion.

John: As the chair, do you feel that we need to be adding these terms to the functional requirements or something else.

Dave: I don't believe the intent of this document is to contain all of the functional requirements or a be limit. It contains all we can think of now - we will add things (by vote) as they come up later.

Wim: Currently I'm still hesitant about the physical definitions that we would need - leaving area out of BS?'s. That is where we started and that is where we will have to go back to get the physical definitions. I think we should expand whatever definitions we have with whatever we are going to need. Another thing - previously I thought the CF was everything which controls the transmission and reception to/from the medium. Including the frame structure, because you use the destination address to determine it is time to receive, also the CRC to determine validity. The CF is then the access procedure plus all the other rules applied to it, like the frame structure, which controls the way the receivers are using that information. Is this true?

Dave: The equation in my head is that $MAC = CF + \text{other stuff}$. How much you and I think the other stuff is, is still to be determined. CF is a small thing that lets us abstract the concept of when to talk from the rest of the MAC functions.

Wim: In view of the MAC group procedure, would accepting the motion mean that we close the issue?

Dave: (explains that MAC group adopted an issue procedure that might resolve conflict. See the MAC minutes for details) Personally, the MAC subgroup can be driven by this decision as this is group contains all of 802.11, they could come back and object.

Richard: Feels that these definitions are self-contradictory between a BSS and a CF and a DSS. The DSS has to do with the LLC and the CF has to do with inter-STA communication. These are different concepts. The arrangement of the inter-operability of devices is merely a concept of medium access, while the DSS concept deals with inter-company functions over which we don't want to extend the service set/area.

Don: We are discussing a motion to accept a document. There is a term that involves set/area contention. I think we need to vote about area or set to resolve this and we need to defeat the current motion to do this.

Nathan: CF - are we in conflict with the intent of the FCC regulation? There is an issue where you cannot coordinate the access to the medium. We should consider this.

Chan: 1st: the assumption that the LLC is involved hasty - it is undetermined whether multiple sites involve the LLC and we shouldn't consider this yet. 2nd: multiple independent users - the assumptions that colocated users have same CF is not necessarily valid. It is questionable whether CF is the function or the instance of the function.

Dave: Question to Nathan - conflict with FCC rules? These are logical concepts and can't be governed by a body that regulates the building of physical things.

Nathan: This CF coordinates when a device transmits. Other entities use the medium so there must be equal opportunities for all units. If we coordinate we remove the equal opportunities of others.

Dave: Speaking for myself, I believe CF is a logical abstract thing.

Carolyn Heide calls the question, Bob Buaas seconds. Vote to call the question (21,0,7)

Approved: 3

Opposed: 18

Abstain: 7

Motion # 1 fails

The agenda showed going to full working group after the break. In full working group it is still needed have Simon Black's liaison reports (he says 5 minutes, and each of the MAC and PHY reports (they say 10 minutes each). So, it is decided to reconvene the full working group at 5:30 PM.

There are several things we need to deal with here, for instance Wim's submission. We identify the major subject so we can schedule our time here:

1. The table on page 7 of 92/50 (Dave for Wim),
2. Access Point Definition (Nathan)
3. Mobility as a heading in here (John)
4. Area vs set (Carolyn)

General Discussion:

Dave: What do we want to do with this document? It is not intended to cover everything. The effort to flesh out the list has caused controversy. Our goal was to get a set of items that we could agree we have to do. At this interim meeting we can't establish anything binding because we don't have a quorum and this is not a plenary. But we can make a recommendation of some kind. We ought to leave this meeting saying here's a document we think that 802.11 should adopt. Does anyone think there is another goal?

Jim: Originally we were trying to go to letter ballot. Can we do that without a quorum?

Vic: The plenary gave us permission to put this out for letter ballot without a quorum.

Jim: Then we should try to do this.

John: First, what is the next phase of this document? Do we have an outline of what's supposed to be here? What goes here and what into architecture?

Dave: Your question assumes that there is a defined set of things to go into this document. So far it has simply been what members think, we can add to this document as time goes on. What goes in an architecture document, I haven't got a clue, I can't even think of an example.

John: I use that term because I saw it here (on 92/45a). In our last meeting we said that what's not how's should go into this document. That is why I went back to area - we need a what for area. We also need a what for mobility - it is one of the topics which must be fleshed out. Even though we don't have all the requirements, we should have the topics in the doc TBD - that means that we don't have to vote to re-open the document to fill these in.

Chan: The mobility requirement is in the par and we argued it ad nosium already. The par is in the requirements document so it is covered.

Francois: Caution about the TBD on a letter ballot document. There were a lot of no votes last time because of them

Bruce: Having TBDs could be a problem. From the PHY prospective we need a functional requirement document for specifications of operating environment, for instance.

Don: Is there a restriction as to this discussion?

Dave: To make progress, lets restrain ourselves to discussing the current contents. We may want to remove, but if we get into just add, there may so much we won't make any progress.

Bruce: If this goes to letter ballot as solved here - what does it mean to get a letter ballot on an incomplete document?

Dave: Incomplete? it says now we will do xxx. If the membership says yes, then adding yyy is ok later.

Bruce: But the set xxx may not be complete enough to do anything, so why vote on it? Probably you could start from here, but not finish.

Wim: At the last meeting we tried to set ground rules and definitions, and first attacked the most controversial issues. There are an awful lot of things left to fill in. In my mind we must come up with whatever is required in functional requirements. Finalize that document, make it more complete - when we conclude an area has to be changed then we return to the group to change it. Whether this meeting gets to letter ballot should not be the goal - the goal should be a reasonably complete document.

Nathan: We are lacking an objective of this document - something, or something that allows us to progress? We need a roadmap of where we're going and where we expect each step to lead us. We are running in circles now. This document is still incomplete, although useful.

Francois: Contributions can be brought to the next meeting to complete the document. Maybe we should ask Vic what is a functional requirements document in 802 generally? Is this document a requirement of 802 or 802.11?

Vic: It came from the chair of 802, that in order to be able to make a standard in a reasonable time, it would be reasonable to know what you want to produce. Then when you discuss details you don't run in circles at that time. First we need to know here we are going, and use this to measure proposals against.

Francois: Does this document go outside of 802?

Vic: We are a public committee. Anyone can buy it. You can buy any of our documents.

Chan: It is not public in the sense of a standard. You may be sure that the press will have a copy.

Wim: But 92/50 is already available for anyone anyway.

Chan: You can't propose an answer if you don't have a question. Part of our problem here is that too many people are trying to shape the questions to suit their desired answer. This must not be done or we will never get a functional requirements document. It is procedurally necessary with respect to 802. It is not surprising we can't get there in one step.

John: An example of someone else's functional requirements document would help.

Vic: I have asked the chair of 802.3 for their specification for PHYs, but he hasn't given it yet.

Chan: The par is close to a functional requirements document.

Vic: We kept the par open deliberately. We would like to narrow down that set of possibilities to get on with our work.

John: Any definitions in the par should be explicitly called out here, providing a reference back to it.

Dave Leeson: An example document would help.

Bruce: Agrees with Chan. Avoid "how", go for "what". We should go for a ballotable form of the document. It doesn't allow the PHY group to do any work as it stands now.

Dave: The fact the document has no status is a problem. In MAC we decided we must progress anyway - if what we get in unconstraining then we can polish it. About copying par stuff - we discussed that last time, to avoid having different definitions in the 2 documents we just referenced the par, not repeated its contents. Either way of proceeding will cause problems, so I don't care. The desire to talk about "what" not "how" - there are different opinions about what is what and what is how. If I hadn't had anything to do with this document I would like send it out for ballot to get good information back. Although that's what we thought last time with Ken's document. If we must stay here until we get consensus, we will be stuck due to the change over of people from meeting to meeting. Lack of progress is becoming frustrating to people.

Simon Black: this document is general currently. It is difficult to think of a functional requirement that can avoid numerical bounding and specifics. It should define the services that the standard shall deliver - what we have here is good and general but at some point must become specific.

Francois: It's not the lack of ideas of what's supposed to be in here. All the comments from before (ie the last letter ballot) were because we don't know what should be in here (48 pages of comments!)

Chan: Numerical numbers are in fact important. If we adopt numbers now, (which we must sometime) we will not get anywhere because we can't agree on what the terms mean let alone on what the values should be.

Nathan: This document is very good, very general. We get lost because it doesn't relate to the specific details of the specific media we are dealing with. Too general a document will not help.

Dave: There are a lot of things that we don't have in this document - but because those things aren't in this document doesn't make it worthless. We started with a blank sheet of paper - we need a lot of painful progress to be made. People seem to say that since it's not what I like, reject it. If that's all we can accomplish maybe we should dissolve this group because we are wasting a lot of time and money of important industry people. This document doesn't prescribe a lot of things - at some point it maybe how instead of what, and we need to sort that out. That happened because of the particular people together at that time. There has been a lot of discussion about what it doesn't do and none about what it does do. Let's here about what it does do.

Simon: People have stated that they value this document for tackling the general issues. It is a valuable starting point. Even if we can't put the technical refinement on it now, people have said it is a good ground work now.

Wim: I haven't heard anyone complain that this document is worthless. But there are different ideas about what state it should be in before it goes out to letter ballot, and where we need to go with it. We have a difference of opinion about when this document can be considered finished. The current debate is getting somehow negative and I don't understand that. You suggest that what is going on is people pushing their own implementation - I don't think that is the case. Controversial things have been identified because the document is too "how". I don't agree about that people are pushing for their personal opinion.

Dave: Sorry, but I had to poke you to get progress.

Simon: I argue whether this document is for our guidance - if so do we really need to letter ballot it? Is it worth the hassle just for own use?

Dave Leeson: I don't care about the formalities. A useful tool will become obvious as will a useless one. Lets just use it. Just discussing terminology is just frustrating since there is no arbitrary judge of finished-ness. The objective is the tool not the words.

Nathan: We have made a lot of progress. This document has a lot of value.

John McKown: How could we force rapid progress? The academic model - give tools and assignments, and students come back with something. Also hand out examples and say when we meet again everyone will propose items. Then when we meet again everyone must propose hard numbers. There are perhaps forces which would be content to see this committee go on forever.

John: We are not close enough to get a letter ballot with this. People who have not been in the meeting would not understand it, it would be defeated. Who should explain these items better, I don't know. Not having these items fleshed out will take us back to square one by failing the ballot. This terminology has created an open architecture that is not clear. The definitions are helpful but we need more (not today), what we do need is drawings and examples explaining more thoroughly. To get to the next step we must give enough information to the voter to get concepts understood.

Dave: There was a desire to not make the document lengthy. That would become a book tutorial on all the information passed in 802.11 forever. What balance to strike between keeping people who don't attend up to speed and being too verbose? It is good enough for me to understand the concept.

10 minute break. (that became 30 minutes)

Francois: This document lacks details because we were trying to avoid the arguments from last time. If we put the detail back in we will get back to the non-agreement state. Simple sentences were our attempt at acceptability.

Jim: Repeats that tools prove themselves by their value, as will this.

Motion #2: Not to put 92/50 (as it exists at the end of this meeting) out for letter ballot, instead to submit it for approval by vote by the 802.11 membership in attendance at the 802.11 July plenary.

Moved by: Jim Schuessler
Seconded by: Chandos Rypinski

Motion Discussion:

Bruce: It's not ready for letter ballot yet. Lets move on.

Jim: In other committees we have agreed on functional requirements - the only thing that was ever balloted was the draft standard.

Nathan: I support the motion - it will allow us to make faster progress. I object to this being a long document. It should provide a frame to which we can provide the details of the standard. If a company cannot make a 25 word mission statement, they don't know what they're doing.

Francois: Contributions to the document between now and July?

Jim: By the end of the working group plenary this Thursday - It should stay static between now and then.

Dave: Contributions can be brought but they will not what is voted on.

Jim: Be careful not to delay the process further.

John: Is there any requirement that the membership have a copy before that meeting?

Vic: Will work with Dave to see to it that it gets out 1 month before July meeting.

Dave Bagby calls the question. Chandos Rypinski seconds. Vote to call the question (31,0,2).

Approved: 30

Opposed: 0

Abstain: 3

Motion #2 passes

Vic states that now that this motion has passed we must work day and night this week to get a good document out. he asks for the utmost cooperation from all.

Dave suggests that we return to our list of topics, and Don says that's a good idea because we came close to agreement on the definitions.

Original Motion #3: To use the word area instead set, in terms bs? and es?

Modified Motion #3: bsa = the area within which members of a bss may communicate.
esa = the area within which members of an ess may communicate
and esa is greater than or equal to the bsa".

Moved by: Don Johnson
Seconded by: Wim Diepstraten

Motion Discussion:

John: This is to replace the BSS and ESS definitions or augment?

Don: To replace.

Rajeev: Its not clear to me why there is a versus here when both definitions have some value. Can't we have two definitions? By the nature of wireless you have components that can talk and areas that are covered.

Don: Only has heard two definitions - so we only need two terms. If there is another need for a set, then that's ok.

Rajeev: If you define BSS As the set of components, you could derive BSA from that? If you can do that then what's the problem?

John McKown: Set is a general term meaning whatever you want - it could mean area. It can't restrict you. If you want area back the burden of proof is on you. Surely the definition of area depends on you. So you are talking about a logical area.

John: Why BSA? My answer is that BSA came from the par, so we must have a way to refer to it. The PHY group thinks in measurable areas. Set refers to a community of, is not physical or related to area. BSS and BSA are different things. We must match this document and the par.

Nathan: BSS can be included but doesn't describe area. It is a subset of this thing. We need a term to describe a set or a number of sets which cover an area.

Dave: Proposes a friendly amendment - leave BSS as it exists but add a definition for BSA "BSA = the area within which members of a BSS may communicate".

Don: What about ESA? Could it be an area larger than a BSA which is extended via a DSS. It needn't contain discrete BSAs.

Dave Leeson and Dave Bagby together build: what if ESA became "ESA = the area, equal to or greater than the BSA, within which members of an ESS may communicate".

The mover and seconder accept the amendment.

Dave Bagby calls the question; Bob Buaas seconds. Vote to call the question (10, 6, 14) fails.

Dave Leeson: This is a favourable step - if there is concern that BSS and ESS preclude BSA and ESA this motion should resolve that.

John: The ESS does not have to be physically connected. An ESS is bound by the LLC according to the definition we have. This now causes ESA to violate the par intention, because you can extend as long as you can extend the LLC via MAC layer bridges.

Bob: If the idea is to connect 2 BSAs with a MAC layer bridge - consider that if the user is currently being served by the first BS? and moves to another BS? which is connected by a MAC layer bridge, the bridge will now fail. It is important in the definitions of ESS and ESA .

Dave: I was involved in writing the par, here is what it says. "BSA = in which each station can communicate with any other station in the bsa; ESA = in which each station can communicate with any other station via the defined and managed distribution system". With the definitions we have here you get exactly the same thing. The intent of the par was that the DSS is what you add to a BSA to get an ESA. The DSS inter-twinkles BSAs to create an ESA.

Rajeev: Is ESA = BSA + BSA, or is it a superset of BSAs.

Don: Once you have set up an ESA, you don't have to talk about whether its constituents are in BSAs. A union of BSAs is not relevant to the definition - you enlarge your BSA area by added a DS, now you have an ESA, but it doesn't necessarily contain a BSA. There are 2 ways of extending area, for 802.1 bridges (could bridge BSAs, or even ESAs) the whole bridge's conglomerate looks the same to the LLC.

Nathan: Looks like ESA definition is inconsistent with the CF definition. PCF says that one BSA will control the operation of all others. The way CF is used in defining BSS is inconsistent.

unknown: We defined ESA in the par as a way out, so that if we came out with a MAC and PHY that wouldn't work with 802.1 bridges we could define our own.

Dave: Once an ESA is set up you don't see BSAs - if you're an LLC, the coverage area is just bigger. If you are down in the MAC working there is a difference because you now have a new set to handle, but is hidden from above. How can I build an ESA - interconnect BSAs with bridges, but errors will be created at the bridges during roaming. But if you use our distribution system this will not occur. A CF - it was our intent that a CF is local to a BSS. It all looks the same to the LLC whether there are many or one CF.

Bob: I was going to say much of what Dave just said.

Bruce: Me too. But also, doing MAC bridges between BSAs would satisfy the ESA definition as written without satisfying broader functions such as roaming. These definitions allow you to do anything, maybe something additional is needed to exclude things that don't work.

Dave Leeson: Should "in a BSS" be added to the definition of CF. Under DCF as defined now it says that the DCF is active in every STA, perhaps just in more than one would be better.

Dave: Lets not try to handle more than one definition at once.

Don: Bruce said most of it - ESA performs roaming within a wireless MAC, and an efficiency or coordination function. We can wordsmith later the difference between making an area larger with ESAs or with bridges. Where you need free roaming you need ESA.

Nathan: Has a logic problem - the place for CF is in the LLC definition, not here. It is inconsistent that the CF controls all the BSAs. If I have one CF that coordinates each STA in the BSS, that's not where I see it.

Richard: Sees a contradiction - does the CF only exist between things that the LLC can see in common? This excludes that coordination can be obtained between things that aren't available at the same LLC.

Dave: CF, what does it mean and what is its scope - that's too far from the motion at hand. We can return to CF discussion and I can clarify. About this motion on the floor - it is an improvement to what we had, in the spirit of improvement toward, but not achieved, perfection. Dave Bagby calls the question; Don seconds. Vote to call the question (29, 2,3) passes.

Approved: 29

Opposed:0

Abstain: 3

Motion #3 passes

General Discussion:

Nathan: Would like to add to list of major subject, CF inconsistency .

Dave: Let me try to express a concept - there is difference between 'same' CF and one thing controlling everything such as every BSA. Previously, if set-a uses CSMA and set-b uses CSMA, that is not the same instance of a CSMA. How can I coordinate this then - CFs can be created that are implemented only in an AP so the it can used for DSS access too. It is all dependent on what functionality you put into your MAC.

John: DCF should say "within a BSA" at the end of it. Then if you have different CFs, the CF does not extend to the ESA because of the DSS.

Wim: Agrees

Original Motion #4 - add to the end of DCF definition "within a BSS"
Modified Motion #4 - add to the CF definition "station operating within a BSS"

Moved by: John Corey
 Seconded by: Bob Buaas

Motion Discussion:

Dave Leeson: CF word "same" means same type, maybe or maybe not same parameters, if they are adjustable. I can imagine two BSSs connected into an ESS where the two had very different CFs.

Dave: Supposing we have CF types 1,2,3. The word "same" means they are all instances of 1. Can you roam from a 1 to a 2 - who knows, lets avoid the issue by using the word "same".

Dave Leeson: proposes a friendly modification - this would also apply to PCF? Do they belong under the definition of CF rather than in separate DCF and PCF definition?

John: CF doesn't extend to the ESA, a BSS is a BSS because of a homogeneous form of CF. But once connected into an ESS, independent BSSs can keep separate CFs - nothing precludes that. The CF defines the BSS, it doesn't extend beyond the BSS at any time for any reason. It may have to coordinate frequency use between BSS for spatial area management.

Wim: Progress being made - can we amend the motion that the same change be made to PCF?

Bob: (Wim yields to him) Move these words up to CF. Believes that the point of a CF is to manage a BSA, and adding these words complicates the issue.

John and Bob accept amend the motion to say in CF "station operating within a BSS".

Dave Leeson calls the question; Bob Buaas seconds. Vote to call the question (28,1,3) passes.

Approved:23 Opposed: 0 Abstain: 9 **Motion #4 passes**

Wednesday AM March 13, 1992

Chairman Dave Bagby calls meeting to order at 8:40am, Wednesday. Jim Schuessler secretary.

Items yet to be covered: AP Definition, CF verses Network Type table, Authentication and Registration and Mobility (Physical).

Dave had a chance to draw some diagrams this morning. He shows two BSSs and then connects them through a DS. (sec: Unfortunately, I can't yet put "ink" into minutes.) Dave explains an AP as a combination of 802.11 Network Interface (Station), DSS and DS Media Interface. He introduces the concepts of Bridging as distinct from DS.

Discussion:

Wim: Comments that the internetworking can be done by an 802.x LAN.

Dave: Shows an 802.x LAN hanging off the 802.11 DS directly.

Wim: Station 6/DSS/NIC to 802.x LAN is really a BRIDGE.

(ad hoc comments that this is not possible by others)

Robert Gauthier: I don't think STA-6 is really a station.

Dave: Ah Ha - By our definition, STA-6 is a station.

Assembled Crowd: No way.

Dave: I'm sorry, you're correct STA-6 should be DSMT - Distribution Service Media Interface.

He then adds an overlay of another BSS. Asserts that current definition of AP is correct.

Wim: STA-1 to STA-4 path invokes DS.

Dave: Give me another word for INVOKE

Chan: No, STA-1 does not invoke DS to STA-4. STA-1 puts an address into the air which DS uses to get data to STA-4. It is the mission of the receiving point to analyze the addresses to determine if the data is addressed to it.

Robert: Does an AP provide DSS?

Dave: We can have further discussion about where DSS resides.

Robert: Perhaps invokes is just too strong a word.

Dave: Perhaps, but is the concept wrong? Do any of the definitions make our job impossible?

Wim: We need better wording in the definitions.

Dave: (Puts definitions foil on overhead.) All of our discussion seems to revolve around "invokes" in the AP definition.

Don: Would say: A station that provides an interface to the DS.

Chan: An AP includes the functionality of the STA and an interface to the DS network.

Dave: "What's the skin that wraps around an AP" is our problem here.

Simon: Doesn't matter....

Dave: It's a station. Can get to DSS functionality.

Don: An AP provides an access (interface) to the DSS.

Dave: (puts words on foil) AP: Any STA that provides access to DSS.

Chan: Like it to say: An AP includes the 802.11 MAC and PHY functionality and includes (provides) access to DSS.

Dave Leeson: DSS is a set of services, you really want DS here. There are other services besides this that the DS provides. Another question: Doesn't the first part of the sentence replace STA?

Dave: No, fine distinction between logical and physical here.

Nathan Silberman: Can't the AP be the DS itself, as in the case of the repeater?

Dave: This is why the model is good - it doesn't preclude this implementation.

Don: Upper definition should include DS as well.

Wim, Dave, Dave Leeson - Conversation about new wording.

New wording is: AP - Any entity that has STA functionality and provides access to the DS.

John Eng: Definition precludes repeater.

Chan: If the repeater is a linear PHY level, the committee should be silent on it. If it uses MAC function, then we should cover it.

Dave: We are talking about implementation here. Let me see hands of people that object to this wording. (none are raised) Good, lets go on.

Bob Buaas presents foil of new definitions.

Sign-On: The process by which on STA identifies (authenticates) itself to other STAs and exchanges operational parameters in order to participate in a BSS.

Registration: A manual process by which a STA gets its "identity" (address, signature and certificates, etc.)

Authentication: A higher layer process by which one STA convinces other STAs of its "identity"

Mobility: That property of a STA which it to retain its "identity" as seen by LLC regardless of its service location within one ESS.

Ken: Definition of ESS should imply directory services, etc.

Robert: Thinks it identifies itself to a CF instead of a STA.

Dave: Let's see if there is controversy about the other definitions. If so, I want to go on.

Chan: That's too bad, since there is so much that is good here.

Dave: Let's devote 15 minutes.

Continues the discussion of the definition of SIGN-ON. Robert feels strongly that you identify yourself to a CF, not at STA. Ken, Dave, Robert, Bob agree to remove the words "to other STAs". All other agree too.

Discussion moves on to the definition of REGISTRATION.

Ken: Objects to word "manual". "Out of band" or "off line" is better.

Wim: Brings issue with the word Registration itself. Thinks others thought this was a loaded word.

Dave: Thinks Bob's objective here is to use the word correctly - as per security experts.

Conclusion is to remove the word "manual".

Discussion moves to AUTHENTICATION definition. There is an issue with "higher layer" process by Ken, but he eventually capitulates. John thinks we should mention CF, since that is who we are identify ourselves to.

Discussion moves on to MOBILITY Definition.

Dave: We already have continuity of service within an ESS to the LLC - this is mobility. Others disagree. I guess we need the concept of motion here.

John: We need to convey the dynamic nature of mobility. We are different than the wired environment. I don't see this expressed yet.

Nathan: Mobility concept should contain continuity of service idea.

Chan: Motion is already in PAR. Let's not reopen that argument. The absence of motion here is OK.

Bob and Ken agree to withdraw the definition. Agreement from floor. Done on schedule! Time for a 10 minute break.

Discussion moves to Coordination Functions portion of functional requirements document which includes the CF Class / Network Type table.

Wim: Refers to his contribution doc. 92/53. Recaps history of what we were trying to capture in this table. Asserts that DCF - Distributed CF and PCF - Point CF are different implementations of CF. We seemed to have gotten an implementation assumption included in table. The assumption was that somehow a PCF was more efficient when forming an ESS and that DCF was not "practical" for it. Therefore this table is not valid and should be removed.

Dave: Summarizes. We ought to discuss removing this table.

Wim: Yes, let me put into motion:

Motion #5: To remove bracketed text in functional requirements document (brackets point to "The following ... paragraph and table.)

Moved by: Wim Diepstraten
Seconded by: Ken Biba

Motion Discussion:

Bob: Irvine discussion stated that if a STA desired to use an area, it had to determine if a PCF existed and if so, use it.

Ken: We do have implementation issues included here. Argues that requirement to use a PCF if it exists is GREATLY overly restrictive. We can't force coordination or use of PCF if it exists. We have far too much implementation stuff here and speaks in favor of the motion.

John McKown: Agrees. Proposes we include sentence above bracket.

Bill Stevens: Agrees by way of a great Texas story.

Dave: Speaks in favor of motion. Disagrees with Bob - "if the PCF exists, you must use it" The resolution of efficiency is a MAC group job at a later time.

Chan: In favor of motion. Believes forum is MAC group.

Bob: Happy to be disagreed with. Supports motion. Asks MAC Chair to add issue to agenda for that meeting.

Ken: We may want to deal with overlapping administration of BSS. Do we prevent it? Allow it? How you SOLVE it is a MAC issue.

Robert: Proposes to move bracket up one paragraph to include DCF or PCF sentence.

Amendment Accepted by Wim and Ken.

Bob: concerned we are losing concept of this here. Don't lose this issue. How do we address performance assurance?

Ken: Thinks this document is incomplete in several ways, but proposes we freeze it now and use the formal method to add to it later.

Approved:29

Opposed: 1

Abstain: 3

Motion #5 passes

This completes list of issues ahead of time! Dave wishes to start MAC Subgroup early since Ken needs to give a paper and needs to leave early.

Wim: Did we address Mobility enough? And others feel the document is not complete. Should we make an issues list and include it?

Dave: Yes, it is not complete, but we agreed to proceed with this knowledge. Urges those who believe it is not complete to write submission for next meeting.

Wim: Asserts that until this meeting is done we should spend more time on it, and add issues to the document. However, let Ken present in the MAC group first.

Motion #6: That since we have fulfilled our objective, we should adjourn the functional requirements subgroup.

Moved by: Chandos Rypinski
Seconded by: Robert Gauthier

Motion Discussion:

Simon: How do we add to this document?

Dave: They should be written up as submissions for the next meeting.

Ken: Amendment. Group can request 802.11 for time to reconvene at next meeting for opportunity to modify doc. We should know what these topics are so others can think about them in the interim.

Chan: Does not accept the amendment.

Bob: Will Chan consider amendment to create and issues list and THEN adjourn?

Chan: Agrees with the mechanism to add to the functional requirements document. He has submissions too. However, is inevitable that we will open issues to document at next meeting.

Vic: A motion to adjourn is not debatable, and we have already debated! (laughter)..

Chan: withdraws motion.

Motion #7: To create an issues list to the functional requirements document and process according to previously agreed method in the MAC subgroup.

Moved by: Bob Buaas

Seconded by: Ken Biba

Motion Discussion:

Nathan: Proposes friendly amendment to fix time when to address issues.

Bob: Proposes to handle it according to agreed method of processing issues.

Dave: Assumes Ken agrees. (Ken has left room.) Goes over method on foil.

Nathan: OK, so issues could be addressed at the next meeting.

Wim: Danger. There is possibility that we slow the process of getting a functional requirements document out.

Dave: If there is a problem there, we can just as easily vote ourselves an exception.

Francois: Actually it could accelerate it. The one meeting cycle gives people time to think and present issues.

Approved:34

Opposed: 0

Abstain: 6

Motion #7 passes

Motion #8: To adjourn.

Moved by: Bob Buaas

Seconded by: Chandos Rypinski

Approved:19

Opposed: 2

Abstain: 8

Motion #8 passes

Meeting adjourned at 11:00am