Issue Identification: 3.1 (Topic: Marketing).

What is the impact of the MAC implementation complexity in regard of 'time-to-market ?

Alternatives:

1) - See the CODIAC protocol proposal - Reference #1

References:

1) - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - The CODIAC protocol can be implemented in many levels of complexity. Where time-to-market is of primary concern; a simple implementation could be chosen to accomplish this.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: Date first opened.
May 1993: Alternative #1, Reference #1 and Argument_pro #1.1

Issue Status: Open

Issue Identification: 4.5 (Topic: Network Types).

Can a station be a member of an ad-hoc and non-ad-hoc network at the same time?

Alternatives:

1) - Yes
2) - No

References:

1) - P802.11-93/40 - The Wireless Hybrid Asynchronous Time-bounded MAC Protocol

2) - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - There is a need for the standard to support this alternative.

1.2) - Yes. Station A can be registered with a controller/AP, and associated with that AP - a member of an infrastructure network. Station B may be registered with that controller/AP, but not associated with the AP, it is registered only for the purpose of conversing with other wireless stations - it is not a member of the infrastructure network. These two stations can converse without station A having to dis-associate from the AP, so it retains its membership in the infrastructure network while forming an ad-hoc network with station B.

2.1) - Multiple association has security impacts.

2.2) - At any point in time a STA is a member of one, and only one, BSS. A STA may be within range of both types of networks, but will participate in one or the other.

Con:

Related Issue Identification:

1) - 4.1 (Network Types)
2) - 4.3 (Network Types)

Issue Originator: Dave Bagby

Issue History:

January 1993: Date first opened.
March 1993: Alternatives #1 and 2 - Reference #1 - Argument_pro # 1.1, 2.1 and 2.2 - Attempt to close the Issue; failed in MAC group; result: yes-9, no-8, abstain-0.
May 1993: Reference #1 - Argument_pro #1.2

Issue Status: Open

Issue Identification: 5.3B (Topic: Distribution Systems).

What logical functions are needed to provide the defined infrastructure services?

Alternatives:

1) - These services are defined in closed Issue 5.3A as: association, re-association, disassociation, authentication, privacy, integration, and network management.

References:

1) - P802.11-93/9 - 802.11 DS Service Transactions

2) - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - For any of these services which require exchange of information over the wireless medium, the CODIAC protocol proposes using MDATA frames. Because delivery of these frames is critical, they are transferred in the four-step transaction in the same manner as client data. These frame formats are yet to be fully defined.Association, re-association, disassociation, and integration all require an AP. These services are supported by the AP bit which is set in frames sent by the AP, which also serves to notify stations of its presence.

Con:

Related Issue Identification:

1) - 5.3 (Distribution Systems)
2) - 5.3B (Distribution Systems)
3) - 5.3A (Distribution System)

Issue Originator: Dave Bagby

Issue History:

January 1993: First opened - Reference #1 - Related Issue IDs #1 and 2.
May 1993: Alternative #1 - Reference #2 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 5.9 (Topic: Distribution Systems).

How to determine that Access Points (APs) are present?

Alternatives:

1) - Discover:
- Listen (APs beacon) - hard for ad-hoc networks
- Ask (talk then listen) - may cause unnecessary traffic.

2) - Pre-configured knowledge
- Disadvantages from installation and configuration viewpoints.

3) - All frames are marked with an AP bit which indicates that they originate with an AP (Reference #3).

References:

1) - P802.11-93/9 - 802.11 DS Service Transactions

2) - P802.11-93/40 - The Wireless Hybrid Asynchronous Time-bounded MAC Protocol

3) - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

General:

1) - The WHAT Protocol (see Reference #2) handle this in two ways:
a) Each MPDU that is transmitted by an Access Point is marked with a bit that indicates it was transmitted or relayed by an Access Point. A Station observing a Basic Service Set (BSS) that includes an Access Point will very quickly learn that the Access Point is present; and can attempt to sign on using a broadcast with the appropriate NETID.
b) When the network is idle, Access Points send out periodic Announce frames. Announce frames are also marked with the AP bit, so a receiving Station can distinguish an ad-hoc Basic Service Set from one that includes an Access Point.

Pro:

1.1) - Discover, Listen, if nothing is heard, then ask.

3.1) - If a station listens and does not hear frames from an AP, it can send a broadcast RTS with the Hierarchical bit set, which indicates that the RTS is intended for an AP only - this will cause any AP present to identify itself (Reference #3).

Con:

Related Issue Identification:

Issue Originator: Dave Bagby

Issue History:

January 1993: Date first opened - Alternatives #1 and 2 - Reference #1.
March 1993: Reference #2 - Argument_general #1 - Argument_pro #1.1
May 1993: Alternative #3 - Reference #3 - Argument_pro #3.1

Issue Status: Open

Issue Identification: 6.1 (Topic: Security).

What is the support requirements for :
a) - Security,
b) - Authentication,
c) - Registration, and
d) - Privacy ?

Alternatives:

References:
1) P802.11-93/69 - Security in Wireless LAN

Arguments:
Pro:

Con:
1.0) - This issue may have to be re-opened since it sets the scope for subsequent issues.

Related Issue Identification:
1) - 6.2 (Security)
2) - 6.6 (Security)
3) - 6.8 (Security)

Issue Originator:

Issue History:

May 1992: Date first opened

July 1992 - The support for Authentication and Registration is specified in the Functional Requirement Document (IEEE P802.11-92/57), section Security. A related new issue to address Authentication and Registration was opened (Issue 6.4).

In addition, a new issue was opened (Issue 6.5) to address Security and Privacy.

May 1993 - Reference #1, Argument_Con #1.0

Issue Status: Closed - 07/92 (Editor note: Candidate for re-opening)

Issue Identification: 6.4 (Topic: Security).

How will Authentication and Registration be specified in the 802.11 Standard ?

Alternatives:

1) - Submission P802.11-93/8 (see Reference #1) provides an initial high level frame work for addressing wireless network security in general which includes Authentication and Registration.

2) - Submission P802.11-93/2 (see Reference #2) proposes a high level scenario of the Registration procedure taking place between an Access Point (AP) and a Station (STA). Security features such as Authentication, access control and data masking key exchange are addressed.

3) - Authentication and Registration procedures using 802.10b could be provided as an annex to 802.11. Possible implementation might use RSA, DSS, IS-54 or something else. Request submissions by interested parties on actual implementations consistent with 802.10b SDE.

4) - No specification of Authentication or Registration at MAC level (Impact on Issue 6.1).

References:

1) - P802.11-93/8 - Wireless Network Security
2) - P802.11-93/2 - Registration Scenarios for Wireless LAN MAC Protocol.
3) - P802.11-93/28 - IEEE 802.10 Standard for Interoperable LAN & MAN Security
4) - P802.11-93/69 - Security in Wireless LAN

Arguments:

Pro:

3.1) - Strong feeling within the committee that 802.10 will be adequate to address 802.11 Security issues.

3.2) - The use of 802.10 mechanism is appropriate. However, a definition of a 802.10 minimal functionality and parameters remain undefined.

4.1) - The reason is that implicit authentication as provided by a MAC level confidentiality service is sufficient.

Con:

Related Issue Identification:

1) - 6.1 (Security)
2) - 6.5 (Security)

Issue Originator: Larry Van Der Jag

Issue History:

July 1992: Date first opened
January 1993: Alternatives #1 and 2 - References #1 and 2.
March 1993: Alternative #3 - Reference #3 - Argument_pro #3.1
May 1993: Alternative #4, Argument_pro #3.2 and #4.1, Closure of the Issue by adopting Alternative #3; result: yes-18, no-0, abstain-1.

Issue Status: Closed - May 1993

Issue Identification: 6.6 (Topic: Security).

Is there any additional work on Security that needs to be done by 802.11 in addition to the work that is done by 802.10 ?

Alternatives:

1) - Yes
2) - no

References:

1) - P802.11-93/28 - IEEE 802.10 Standard for Interoperable LAN & MAN Security
2) - P802.11-93/69 - Security in Wireless LAN

Arguments:

Pro:

1.1) - The answer should be yes: SDE can not serve the needs of a large majority of (wired/wireless networks) users because it forces them to retrofit SDE on their installed base. SDE is also overkill. Only a MAC level confidentiality service can provide the appropriate level of security at the appropriate levels of cost and (lack of) complexity. Such a service provides "authentication by implication" which is sufficient at MAC level.

2.1) - It is believed that document P802.11-93/28 (Reference #3) has answered that question, no, to majority of threats, but denial of services from Issue 6.3 still needs to be addressed, or this issue belongs somewhere else.

Con:

Related Issue Identification:

1) - 6.1 (Security)
2) - 6.5 (Security)
3) - 6.3 (Security)
4) - 6.4 (Security)

Issue Originator: Robert Crowder

Issue History:

July 1992: Date first opened
March 1993: Alternative #1 and 2 - Reference #1 - Argument_pro #2.1
May 1993: Reference #2, Argument_pro #1.1, Closure of the Issue by adopting Alternative #1; result yes-20, no-0, abstain-0.

Issue Status: Closed May 1993

Issue Identification: 6.7 (Topic: Security).

How does Re-association interact with Authentication?

Alternatives:

1) - Via third party Authentication service.
2) - IEEE 802.10 standard provides this interaction
3) - There is no interaction

References:

1) - P802.11-93/9 - 802.11 DS Service Transactions
2) - P802.11-93/28 - IEEE 802.10 Standard for Interoperable LAN & MAN Security
3) - P802.11-93/69 - Security in Wireless LAN

Arguments:

Pro:

1.1) - The standard should support the ability for a Station (STA) to ask the Distribution System (DS) to establish Authentication for itself to a requested set of Access Points (APs).

2.1) - The use of Security Associations set up in the Security Management Information Base, (SMIB) of 802.110 could provide for a way to effectively and efficiently handle re-associations for both authentication and privacy.

2.2) - 802.11 will define authentication transactions and 802.10 provides the mechanism for negotiation or finding pre-established security associations. Pre-authentication transaction mitigate possible performance impacts.

3.1) - Same as 6.8: (re-)association is medium access function, not a systems function. Therefore, there is no link between (re-)association and "authentication" or "access control". However, the results of authentication operations performed at, say, the application layer, can be used in the MAC layer to provide implicit authentication (if I have the right key than obviously I have been authenticated). Implicit authentication works within a logical group: changing groups may require re-authenticating to the new group.

Con:

Related Issue Identification:

1) - 6.8 (Security)

Issue Originator: Dave Bagby

Issue History:

January 1993: First Opened - Alternative #1 - Reference #1 - Argument-pro #1.1.
March 1993: Alternative #2 - Reference #2 - Argument_pro #2.1
May 1993: Alternative #3, Argument_pro #2.1 and #3.1, Closing of the Issue by adopting Alternative #3; result: yes-16, no-0, abstain-3.

Issue Status: Closed - May 1993.

Issue Identification: 6.8 (Topic: Security).

How does Re-association interact with Privacy?

Alternatives:

1) - IEEE 802.10 standard provides this interaction

2) - The only interaction is if the Access Point (AP) cannot support the current privacy algorithm. In this case it impacts the reassociation transaction (which could fail).

References:

1) - P802.11-93/9 - 802.11 DS Service Transactions
2) - P802.11-93/28 - IEEE 802.10 Standard for Interoperable LAN & MAN Security
3) - P802.11-93/69 - Security in Wireless LAN

Arguments:

General:

1) - Because the Privacy level can change dynamically, there is no gain by trying to pre-determine the Privacy level at the same time than third party Authentication.

2) - If a Re-association transaction includes the current Privacy level, it is very cheap to check that the new Access Point (AP) supports this privacy level.

Pro:

1.1) - The use of Security Associations set up in the Security Management Information Base, (SMIB) of 802.110 could provide for a way to effectively and efficiently handle re-associations for both authentication and privacy.

Con:

Related Issue Identification:

1) - 6.7 (Security)

Issue Originator: Dave Bagby

Issue History:

January 1993: First Opened - Reference #1 - Arguments-general #1 and 2.
March 1993: Alternative #1 - Reference #2 - Argument_pro #1.1
May 1993: Alternative #2, Reference #3, Closure of the Issue by adopting Alternative #1; result: yes-16, no-0, abstain-3.

Issue Status: Closed May 1993.

Issue Identification: 6.9 (Topic: Security).

Shall the 802.11 standard specify one or more publicly available privacy algorithms which all stations shall be required to support?

Alternatives:

1) - Yes
2) - No

References:

Arguments:

General:

1) - While support of 'all' privacy algorithms is ok, all stations are required to support a public algorithm.

2) - If (1) above is true, which algorithm (s) is the default? - possibly a 'null' security algorithm (see Argument_pro #1).

Pro:

1.1) - One privacy option shall be 'null'.

1.2) - The minimal requirement shall be a 'null' privacy option. In addition the 802.11 committee will request the list of standardized algorithms from 802.10 and evaluate if there is an algorithm that 802.11 needs to include in the minimal supported set (or possibly offer one on their own to 802.10 for cataloging should 802.11 decide to proceed with this option).

Con:

Related Issue Identification:

Issue Originator: Bob Crowder

Issue History:

March 1993: Date first opened - Alternatives #1 and 2 - Argument_general #1 and 2 - Argument_pro #1.1.
May 1993: Argument_pro #1.2, Closing of the Issue by endorsing alternative #1; result: yes-16, no-0, abstain-3.

Issue Status: Closed May 1993.

Issue Identification: 6.10 (Topic: Security).

Shall the minimal Security algorithms set be expended to include a Privacy equivalent to wired LANs?

Alternatives:

References:

Arguments:
General:

Pro:

Con:

Related Issue Identification:

Issue Originator: D. Bagby

Issue History:
May 1993: Date first opened.

Issue Status: Open

Issue Identification: 9.2 (Topic: Performance).

What are the area coverage implications of MAC timing constraints?

Alternatives:

1) - No timing constraints are imposed by this protocol that would limit coverage area of LAN dimensions.

References:

1) - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - On the assumption that this issue arose from the Ethernet maximum cable length specification which is driven by the timing constraints of CSMA/CD.

Con:

Related Issue Identification:

1) - 10.4 (Topic: Coordination)

Issue Originator:

Issue History:

May 1992: First opened

May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 9.3 (Topic: Performance).

Is the same MAC must work in a minimum system and maximum system (network size independence)?

Alternatives:

1) - Yes

References:

1) - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - Not just to work in minimum and maximum system, but to work efficiently in both is the goal of the CODIAC protocol (Reference #1).

Con:

Related Issue Identification:

1) - 5.5 (Topic: Distribution Systems)

Issue Originator:

Issue History:

May 1992: Date First opened

May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 10.1 (Topic: Coordination).

~~What is a Coordination Function (CF) ?~~
What Coordination Function (CF) will be specified in the standard?

Alternatives:
1) - A Distributed Coordination Function (DCF).
2) - Point Coordination Function (PCF)

References:
1) - P802.11-93/40 - The Wireless Hybrid Asynchronous Time Bounded MAC Protocol.

2) - P802.11-93/70 - A Distributed Access Protocol Proposal Supporting Time Bounded Services.

Arguments:

Pro:

1.1) - A Distributed Coordination Function (DCF) should be specified as the default mode of operation. A DCF is simple to implement, sufficient for asynchronous service, and well suited to ad-hoc networks. A Point Coordination Function should be added as an optional extension when Time-bounded service is required. The WHAT protocol (Reference #1) is an example of this approach.

1.2) - A Distributed coordination function (CF)
A Distributed Coordination Function should be specified as the primary mode of operation. A DCF based on CSMA/CA + Ack as proposed in this document (Reference #2) has good medium sharing characteristics without added control overhead. The throughput efficiency is high and stable for high loads. It is well suited for Ad-Hoc operation, and allows overlap of infrastructure and Ad-Hoc, even on the same channel. It does fully support single channel PHY's.

2.1) - A Point Coordination Function (PCF) can be built on top of the proposed CSMA/CA access method (Reference #2), allowing full coexistence and efficient sharing between Asynchronous and Time Bounded Services. Reserved but unused Isochronous bandwidth is fully available for the Asynchronous service, without any control overhead. The proposed Time Bounded Service (Reference #2) implementation using the CSMA/CA access method with priority does not burden the implementation of an Asynchronous Service only MAC.

Con:

Related Issue Identification:

Issue Originator: Larry Van Der Jagt

Issue History:
May 1992: First opened
July 1992: Rephrase the Issue
March 1993: Alternative #1 - Reference #1 - Argument_pro # 1.1
May 1993: Alternative #2 - Reference #2 - Argument_pro #1.2 and #2.1

Issue Status: Open

Issue Identification: 10.2 (Topic: Coordination).

What are the event that causes switching between multiple Coordination Functions (CF) ?

Does multiple Coordination Functions (CF) need to be specify ?

Alternatives:

References:

Arguments:

General:

1.0) - Spliting of the Issue into 2 related issues:

10.2A - What are the event that causes switching between multiple Coordination Functions (CF) ?

10.2B - Does multiple Coordination Functions (CF) need to be specify ?

Pro:

Con:

Related Issue Identification:

1) - 10.1A - (Coordination)
2) - 10.1B - (Coordination)

Issue Originator: Larry Van Der Jagt

Issue History:

May 1992: First opened

Issue Status: Open

Issue Identification: 10.2A (Topic: Coordination).

What are the event that causes switching between multiple Coordination Functions (CF)?

Alternatives:

1) The following functions causes switching between multiple CFs:

- Hand-off: The process of passing control of the Mobile Station's activities from one Coordination Function to another, whether or not the Coordination Functions are members of the same Administrative Domain or not.

- Ranging: The act of a Mobile Station which is transiting from one Service Area to another while Signed-on and in session.

- Roaming: A form of Registration used for Mobile Stations which will use a network on a temporary basis.

2) - There are no multiple CF's needed as basic access method.

3) - Switching from Distributed Coordination Function (DCF) to Point Coordination Function (PCF).

References:

1) - P802.11-92/126 - The Use of Terms for Expressing the Concepts of "Roaming", "Hand-off", "Registration" and "Identification" in WLAN Systems.

2) - P802.11-93/70 - A Distributed Access Protocol Proposal Supporting Time Bounded Services.

3) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

2.1) - A Point Coordination Function (PCF) can be used as described for the Time Bounded Service (Reference #2), but it is built on top of the DCF. So the DCF is the basic CF. Therefore Switching is not applicable.

3.1) - Request for Time-bounded service from a station to a controller which supports Time-bounded services.

3.2) - Detection of high traffic causing high rate of collisions.

Con:

Related Issue Identification:

1) - 10.2B (Coordination)

Issue Originator:

Issue History:

May 1992: First opened
November 1992: Alternative #1 and Reference #1.
May 1993: Alternatives #2 and #3 - References # 2 and #3 - Argument_pro #2.1, #3.1 and #3.2.

Issue Status: Open

Issue Identification: 10.2B (Topic: Coordination).

Do multiple Coordination Functions (CF) need to be specified?

Alternatives:

1) - Yes
2) - See Alternative #2 of Issue 10.2A
3) - Both Distributed Coordination Function DCF) and Point Coordination Function (PCF)

References:

1) - P802.11-92/126 - The Use of Terms for Expressing the Concepts of "Roaming", "Hand-off", "Registration" and "Identification" in WLAN Systems.

2) - P802.11-93/70 - A Distributed Access Protocol Proposal Supporting Time Bounded Services.

3) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

2.1) - See Alternative_pro #2 of Issue 10.2A

3.1) - Both Distributed Coordination Function (DCF) and Point Coordination Function (PCF) are required to support efficient operation with network size independence for asynchronous service. PCF is required for TBS, but this should not be forced on small population and ad-hoc networks.

Con:

Related Issue Identification:

1) - 10.2A - (Coordination)

Issue Originator:

Issue History:

May 1992: First opened
November 1992: Alternative #1 and Reference #1
May 1993: Alternatives #2 and #3 - Reference #2 and #3 - Argument_pro #2.1 and #3.1

Issue Status: Open

Issue Identification: 10.3 (Topic: Coordination).

What are the issues surrounding the Point Coordination Function (PCF) and Distributed Coordination Function (DCF) arguments ?

Alternatives:

1) - No issue related to overlapped ad-hoc and infrastructure network.

2) - The following is a list of issue addressing the overlapped of ad-hoc and infrastructure network:
   a) - PCF is required for Time-bounded services (TBS) support.
   b) - DCF facilitates ad-hoc networks better because it does not require a controller.
   c) - PCF is better than DCF for minimizing power consumption of portable stations.
   d) - PCF is better for high population networks, deterministic media access to avoid collisions.
   e) - DCF is lower overhead and possibly lower access delay (in small population BSAs).

References:

1) - P802.11-93/70 - A Distributed Access Protocol Proposal Supporting Time Bounded Services.

2) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - By using DCF as the basic CF, with a PCF on top of it for Time Bounded service, there is no issue related to overlap of Ad-Hoc and infrastructure networks. For the same reason there is no issue for the MAC to operate on a single channel PHY, because of the medium sharing characteristics of the DCF.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 and #2 - References #1 and #2 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 10.4 (Topic: Coordination).

- What are the requirements concerning service area ?

Editor's note: Ref: 92/40 -'Other Functional Requirements Issues' - re-phrase from the 'Area' statement.

Alternatives:

Arguments:

Pro:

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened

Issue Status: Open

Issue Identification: 11.3 (Topic: Access Point).

Is there a need for multiple Access Points (APs) per Basic Service Set (BSS) ?

Alternatives:
1) - No

References:
1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - Although no need is envisioned, no reason for preclusion is seen. With the CODIAC protocol (Reference #1) only one controller per centralized mode BSS is required, but any number of stations could be APs.

Con:

Related Issue Identification:

Issue Originator:

Issue History:
May 1992: Date first opened
May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 11.4 (Topic: Access Point).

Can it be stated that in the case of the presence of a station acting as an Access Point (AP), it always contains the Point Coordination Function (PCF) if a PCF is present?

Alternatives:

References:

Arguments:

Pro:

Con:

Related Issue Identification:

Issue Originator: D. Bagby

Issue History:

May 1993: Date first opened

Issue Status: Open

Issue Identification: 13.3 (Topic: Management).

What support will the standard provide for power management:
- Direct Current (DC) power ?
- Radio Frequency (RF) power ?

Alternatives:
1) - Sign-on at turn-on.
2) - Coordinate turn-on with Access Point (AP).

Arguments:

General:

1.0) There is a need split the Issue into 2 related issues:
- 13.3A) - What support will the standard provide for DC power management?
- 13.3B - What support will the standard provide for RF power management?

Pro:

1.1) - Registration function has to exist anyhow.

2.1) - Station (STN) behaves predictably - Access Point (AP) can hold store and forward MAC Service Data Units (MSDUs)

Con:

1.1) - Access Point (AP) doesn't know if the station has gone - i.e.; when to free buffers.

1.2) - Must have fast registration to avoid power waste.

2.1) - MAC is more complex.

Related Issue Identification:
1) - 13.3A (Management)
2) - 13.3B (Management)

Issue Originator:

Issue History:
May 1992: First opened
July 1992: Alternatives, Pro, and Con provided by John Deane.
May 1993: Argument_general #1.0 - splitting of the Issue into two related issues 13.3A and 13.3B

Issue Status: Open

Issue Identification: 13.3A (Topic: Management).

What support will the standard provide for DC power management?

Alternatives:

1) - Implementation dependent

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - Some implementations are more concerned with power consumption than others. The CODIAC protocol (Reference #1) allows implementations to trade off power consumption requirements with overhead and access delay. These features are described in the main text of this document.

Con:

Related Issue Identification:

1) - 13.3 (Management)
2) - 13.6 (Management)

Issue Originator: C. Heide

Issue History:

May 1993: Date first opened - Alternative #1 - Reference #1 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 13.3B (Topic: Management).

What support will the standard provide for RF power (signal strength) management?

Alternatives:

1) - Modify the structure of the CODIAC protocol proposal (Reference #1) superframe structure.

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - (Reference #1) - One way in which the centralized mode may be used to aid in signal strength management - Change the structure of the superframe a little. It is still composed of periods delimited by synchronization frames, but do two RSYNCs and two DSYNCs, each containing the same superframe number. Send an RSYNC from the first transceiver, get the request list from it. Send an RSYNC from the second transceiver, get the request list from it. Use the quality-of-signal information associated with each request to determine which transceiver is better for communicating with which station. Then do a DSYNC from one transceiver and service the stations that have better quality from it, then a DSYNC from the other and service the other stations. This method has high overhead, because the request period was done twice. The total data period is only longer by one extra DSYNC.

This leads to the conclusion that the superframe can be composed of as many request periods and data periods as desired. The sync frames should contain a superframe numoer, so that stations know when to retransmit because they didn't get serviced in this superframe.

Con:

Related Issue Identification:

1) - 13.3 (Management)
2) - 13.6 (Management)

Issue Originator: C. Heide

Issue History:

May 1993: Date first opened - Alternative #1 - Reference #1 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 13.4 (Topic: Management).

- Is MAC/PHY exchange needed to supply network management information ?
Editor's note: Ref: 80 (92/58R1)

Alternatives:

Arguments:

Pro:

Con:

Related Issue Identification:
- 12.1 (Topic: (Interfaces)

Issue Originator:

Issue History:

May 1992: First opened

Issue Status: Open

Issue Identification: 13.5 (Topic: Management).

- What are the logical and physical functions required to communicate to the Management layer ?
- What is the relationship between MAC, PHY and network Management ?

Editor's note: Ref: 88 (92/58R1)

Alternatives:

Arguments:

Pro:

Con:

Related Issue Identification:

1) - 13.2 (Topic: Management)
2) - 12.1 (Topic: Interfaces)

Issue Originator:

Issue History:

May 1992: First opened
November 1992: Related Issue #2

Issue Status: Open

Issue Identification: 13.6 (Topic: Management).

How will the MAC standard address Power Consumption ?

Alternatives:

1) - See Alternative #1 of Issue 13.3A

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) See Argument #1.1 of Issue 13.3A

Con:

Related Issue Identification:

1) - 13.3 (Management)
2) - 13.3A (Management)

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 13.7 (Topic: Management).

Is MAC support required for Power Control ?

Alternatives:

1) - Yes - Assuming that Power Control means control of signal strength.

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - See Argument_pro #1.1 of Issue 13.3B

1.2) - Determining signal strength requires the interpretation of the MSDU content exchanged with a given station. The PHY must not be required to do this. While the MAC may not be aware that communication 'improvement' is directly related to signal strength, it is, however, a MAC support.

Con:

Related Issue Identification:

1) - 13.3 (Management)
2) - 12.1 (Interfaces)
3) - 13.3B (Management)

Issue Originator:

Issue History:

May 1992: First opened
November 1992: Related Issue #2
May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1 and #1.2

Issue Status: Open

Issue Identification: 13.8 (Topic: Management).

Is MAC support required for antenna diversity ?

Alternatives:

1) - Yes

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - See Argument_pro #1.1 of Issue 13.7.

Con:

Related Issue Identification:

1) - 12.1 (Interfaces)
2) - 13.7 (Management)

Issue Originator:

Issue History:

May 1992: Date first opened
November 1992: Related Issue
May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 14.4 (Topic: Connection Types).

Ability to establish peer-to-peer connectivity without prior connection (eg. without "knowledge of the presence of your peers").

Alternate Issue text: - can a station initiate communications with another station without knowing that it is present, and what its wireless address is?

Alternatives:

1) - Yes

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol

Arguments:

Pro:

1.1) - (Reference #1) In the RTS frame contains the 48-bit address of the intended destination station. In distributed mode this frame is broadcast, so the destination station can respond if it is there. In centralized mode the RTS is sent to the controller, and it can use its knowledge of registered stations to determine the wireless address of the destination. Also, use of the AP bit and the Hierarchical bit allow stations to identify APs without any prior knowledge.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternate Issue text - Alternative #1 - Reference #1 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 15.4 (Topic: Services).

What are the services or functions unique to wireless networks ?

Alternatives:

1) - The "mobile Connectivity" requirement is unique to wireless networks. The requirement refers to the ability to transparently handle intermittent connectivity as a unit transitions cells.

2) - "Hidden Station" characteristic is also a unique problem to wireless LANs.

3) - The 802.11 standard must provide a level of security equivalent to wired network physical security to avoid compromizing security assumptions of existing LANs.

4) - Overlapping networks.

References:

- P802.11-92/128 - IEEE 802.11 Distribution System Services Functionality

Arguments:

Pro:

3.1) - The Alternative (#3) is expected to be low cost.

3.2) - The Alternative (#3) is acceptable as long as the feature is optional. Making the Alternative mandatory may prevent exportation of 802.11 compliant systems.

Con:

3.1) - The implementation of the Alternative (#3) may be costly at higher PHY rates.

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened

November 1992: Alternatives #1 and 2 and Reference.

January 1993: Alternative #3 - Arguments-pro #3.1 and 3.2 - Arguments-con #3.1 - Taken a 'straw poll' regarding Alternative #3:

- How many would like Alternative #3 as a mandatory minimum requirement?: result - 5
- How many would like Alternative #3 as an optional minimum requirement?: result - 12
- How many do not want Alternative #3?: result - 1

May 1993: Alternative #4.

Issue Status: Open

Issue Identification: 15.6 (Topic: Services).

What is the algorithm for managing the partitioning of capacity between Time-bounded and Asynchronous services ?

Alternatives:

1) - Implementation dependent.

2) - The AP should partition the capacity mix.

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

2) - P802.11-93/70 - A Distributed Access Protocol Proposal Supporting Time Bounded Services.

Arguments:

Pro:

1.1) - That should be left to the discretion of the implementation. The CODIAC protocol (Reference #1) allows different implementations to tailor servicing of stations to their needs while still remaining compatible.

2.1) - Given an Isochronous framing Period (IFP) the bandwidth per Isochronous connection is defined by a maximum frame size. This is the maximum that a station can occupy per IFP, but a variable length up to the reserved maximum is possible. An AP should limit the maximum assigned total Isochronous bandwidth such that at least one maximum size Asynchronous frame does still fit in the IFP period.

In addition an AP should reserve some spare capacity to allow stations with existing connections to re-associate with the AP, so that the connection can be maintained.
New connection setups can be refused when the system is already using the reserved (for re-association) capacity.

Con:

Related Issue Identification:

Issue Originator: Chandos Rypinski

Issue History:

May 1992: First opened
May 1993: Alternatives #1 and #2 - References #1 and #2 - Argument_pro #1.1 and #2.1.

Issue Status: Open

Issue Identification: 15.8 (Topic: Services).

Do all stations and all infrastructures support the Time-bounded service ?

Alternatives:

1) - Alternatives are dependent of the definition of 'support'
2) - Yes
3) - no

References:

1) - P802.11/92-107 - Alternatives to Issues Related to Time-bounded Services.

2) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

3) - P802.11-93/70 - A Distributed Access Protocol Proposal Supporting Time Bounded Services.

Arguments:

Pro:

1.1) - The issue is inter-related to how the Time-bounded interface is defined (see Issue 15.3 - What protocols above the MAC would drive the Time-bounded Services?).

1.2) - Possible related new issue: 'Do we define the MAC to service existing 'clients' of the MAC or do we define a MAC that is independent ?'.

1.3) - Sub-issue: 'Where is the Asynchronous / Time-bounded multiplexer resides (below or above the MAC)?' - See picture from Document P802.11-91/21.

1.4) -

a) - Stations:

The CODIAC protocol (Reference #2) requires that all non-controller stations be well behaved in both operating modes. This means a station must be:

i) - capable of communicating in both modes;

ii) - capable of communicating by the distributed mode rules only, but it must be quiet in the presence of a controller; or

iii) - capable of communicating by the centralized mode rules only, but it knows it must be quiet when it does not hear a controller.

This means that for non-controller stations "supporting" (where "supporting" means not precluding other stations from using TBS) TBS with the CODIAC protocol is a given, because TBS is provided by centralized mode operation .

For controller stations, whether they can operate in both modes should be an implementation decision. However if a station requests TBS, there should be a specific negative response to that request if the service cannot be provided (not yet defined).

b) Infrastructures:

Yes, where the definition of support is to handle in a well behaved manner - i.e. where a station requests TBS there should be a negative response to that request if the service is not provided. If support = provide, then No.

Summary - in agreement with Pro arguments 3.1 and 3.5

2.1) - All stations support it - as all MACs are the same but the functions above the MAC are out of 802.11 scope.

2.2) - Responding 'no' to the question imply that the creation of an option is required (see Issue 1.4 - related to options).

3.1) - The lack of time-bounded service support should not preclude offering of time-bounded by other stations.

3.2) - The station implementation cost may be an issue.

3.3) - Constraints to fit, at the minimum, the existing 802.2 pieces. Additional capability may be provided as well.

3.4) - Distribution System implementation based on existing 802.x LANs (which do not have inherent support for Time-bounded services) must not be excluded.

3.5) - If a station ask for an optional service, it is preferable to receive an explicit response indicating that the service is not supported rather than ignore the request.

3.6) - Responding 'yes' to the question imply the use of infrastructure that does not exist today.

3.7 - Time Bounded Services are only supported in Infrastructure networks, and will need an AP. Not all stations within an ESA with infrastructure need to support Time Bounded Services. Its service is optional, and dependent on the PHY isolation.

When Time Bounded service is supported within an ESA, then all AP's covering the area of operation need to support Time Bounded Services to assure continuous operation, but there can be a mix of stations that do and do not support Time Bounded Services.

Con:

2.1) - See Arguments-pro #3.1
2.2) - See Arguments-pro #3.2
2.3) - See Arguments-pro #3.3
2.4) - See Arguments-pro #3.4
2.5) - See Arguments-pro #3.5
2.6) - See Arguments-pro #3.6
3.1) - See Arguments-pro #2.1
3.2) - See Arguments-pro #2.2

Related Issue Identification:

1) - 15.3 - Service
2) - 1.4 - 'Standard' Process

Issue Originator: Simon Black

Issue History:

May 1992: First opened
September 1992: Arguments 1 to 9
January 1993: - Alternatives #2 and 3 - Arguments-pro #2.2, 3.5 and 3.6 - Arguments-con #2.5, 2.6 and 3.2.
May 1993: References #2 and #3 - Argument_pro #1.4 and #3.7

Issue Status: Open

Issue Identification: 15.9 (Topic: Services).

How will the standard address the MAC ability to service various traffic:
- Data,
- Voice, and
- Video ?

Alternatives:

1) - See the CODIAC Protocol proposal - Reference #1

2) - Data service is always available

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

2) - P802.11-93/70 - A Distributed Access Protocol Proposal Supporting Time Bounded Services.

Arguments:

Pro:

1.1) - The CODIAC protocol (Reference #1) supports asynchronous and time-bounded services. The centralized mode can be implemented to support the requirements of various TBS time constraints.

2.1) - The MAC can support different Time bounded service levels, depending on the PHY speed and characteristics. The MAC should support a range of PHY speeds. The Time Bounded Service levels can distinguish between Voice and Video, or any lower multiple of the primary Time Bounded Service (as a integer multiple of the IFP)

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened

May 1993: Alternatives #1 and #2 - References #1 and #2 - Argument_pro #1.1 and #2.1

Issue Status: Open

Issue Identification: 15.11 (Topic: Services).

What are the classes of Time-bounded service will the 802.11 standard specifies in addition to the required Asynchronous service ?

Alternatives:

1) - Class 1: Best effort delivery, connectionless (i.e File transfer or Email) (the asynchronous service).

2) - Class 2: Time based reservation class (i.e. Video Conference).

3) - Class 3: Non-time-based reservation class, connection oriented (i.e Image browsing)

4) - Basic Voice Service class would be the default when supported

References:

1) - P802.11/92-109 - Communications Requirements of Multimedia Applications: A Preliminary Study.

2) - P802.11/92-110 - Wireless Networking Requirements of Multimedia Applications

3) - P802.11-93/70 - A Distributed Access Protocol Proposal Supporting Time Bounded Services.

Arguments:

Pro:

4.1) - Due to the variable frame size flexibility of the methodology described in this paper (Reference #3), this will automatically serve all lower ranges, although they can be specified as separate levels (using a longer IFP, being an integer multiple of the basic IFP).

A separate Video class may be needed.

Con:

Related Issue Identification: Issue 15.1 - Topic: Services

Issue Originator: Tim Kwok

Issue History:

September 1992: First opened - Alternatives #1 to #3
May 1993: Alternative #4 - Reference #3 - Argument_pro #4.1

Issue Status: Open

Issue Identification: 16.4 (Topic: Mobility).

What does graceful degradation mean ?

Alternatives:

1) - As a station moves out of range of a PCF its performance may degrade, but in doing so it should not interfere with the operation of other stations still in the PCF.

2) - As traffic increases in a BSA performance of each individual station should degrade gradually, the BSA should not just hit a point where it ceases to function.

Arguments:

Pro:

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened
May 1993: Alternatives #1 and # 2.

Issue Status: Open

Issue Identification: 17.2 (Topic: Addressing).

What level of reliability for Broadcast (Multicast) Addressing is required ?

Alternatives:

1) - These are not inherently reliable delivery mechanisms.

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - Multicast and broadcast reliability is directly tied to the MSDU error rate, as they cannot be acknowledged. This is the case for all LANs, wired and wireless.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened
May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 17.3 (Topic: Addressing).

What is the extent of Multicast ? ~~(Basic Service Set (BSS), Extended Service Set (ESS)).~~

Alternatives:

1) - Basic Service Set (BSS)
2) - Extended Service Set (ESS)
3) - Both BSS and ESS

References:

1) - P802.11-93/40 - The Wireless Hybrid Asynchronous Time-bounded MAC Protocol

2) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

3.1) - A Station should be explicitly control the scope of multicasts. The WHAT protocol (Reference #1) provides this capability with the 'hierarchical' bit.

3.2) - Both ESS and BSS multicast should be supported, a station should be able to explicitly control the scope of multicast (this supports the position of document 93/40 on the WHAT protocol-Reference #2). The hierarchical bit provides this capability.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened
March 1993: Alternative #2 - Reference #1 - Argument_pro #3.1.
May 1993: Reference #2 - Argument_pro #3.2

Issue Status: Open

Issue Identification: 17.5 (Topic: Addressing).

What is meant by addressing?

Alternatives:

1) - Size
2) - IEEE 802

References:

1) - P802.11-93/40 - The Wireless Hybrid Asynchronous Time-bounded MAC Protocol

2) - P802.11-93/22 - Further Exploration of Transactions and Name Spaces

3) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

2.1) - Wireless Stations should be identified by 48 bit unique IDs that are compatible with other IEEE 802 standards. All asynchronous service MPDUs carry the full 48 bit address in the WHAT protocol (see Reference #1). Time-bounded MPDUs use a short local identifier. However, the Call Setup message for Time-bounded connections contains the full 48 bit addresses of the source and destination.

2.2) - IEEE 802 addressing is required (supports the position of document 93/40 on the WHAT protocol - Reference #1). Wireless stations should be identified by 48 bit unique IDs that are compatible with other IEEE 802 standards. The 48 bit addresses of source and destination stations are contained in the four step transaction of the CODIAC protocol (Reference #3).

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened
March 1993: Reference #1 and 2 - Argument_pro #2.1
May 1993: Reference #3 - Argument_pro #2.2

Issue Status: Open

Issue Identification: 18.3 (Topic: Data Rates).

Will the standard support PHY with variable rates ?

Alternatives:

1) - Yes

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) (See Reference #1) - RSYNC frames could be issued at different rates within a superframe, or different superframes could be issued. PSYNC could be issued at one rate while communication was going on at another.
Little consideration has been given to this issue at this time. However, this is a very important issue. First generation wireless LANs will be released at lower speeds than forthcoming generations, but they must coexist - it is not desirable tell customers they must upgrade their equipment because the company across the hall installed a newer, higher speed LAN.

Con:

Related Issue Identification:

1) - 18.2 (Topic: Data Rates)

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 18.4 (Topic: Data Rates).

Will the standard allow PHY data rate to vary as function of signal quality ?

Alternatives:

Arguments:

General:

1.0) - If the standard allows PHY data rate to vary, the criteria for changing should be up to the implementer.

Pro:

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened
May 1993: Argument_general #1.0

Issue Status: Open

Issue Identification: 18.5 (Topic: Data Rates).

Is data rate 'agility' only a PHY matter ?

Alternatives:

1) - No

Arguments:

Pro:

1.1) - If stations are functioning at various speeds the MAC must maintain (somehow) the mapping of stations to speeds because the PHY cannot interpret address fields on MSDUs.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened
May 1993: Alternative #1 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 19.1 (Topic: Reliability).

Shall the 802.11 standard depend on the layers above the MAC for recovery from failed transmits ? If so to what extent ?

Alternatives:

1) - Partially

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - A retry mechanism should be implemented in the MAC as required to bring the MSDU loss rate up to the equivalent of wired LANs. (See Issue 19.5)

Con:

Related Issue Identification:

1) - 19.5 - Reliability

Issue Originator:

Issue History:

May 1992: First opened

May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 19.2 (Topic: Reliability).

Will the IEEE 802.11 MAC look like all other IEEE 802 MACs regarding delivery reliability?

How does Multicast affect this decision ?

Alternatives:

References:

Arguments:

General:

1.0) - Spliting of the Issue into 2 related Issues:

19.2A - Will the IEEE 802.11 MAC look like all other IEEE 802 MACs regarding delivery reliability?

19.2B - How does Multicast affect the decision made in Issue 19.2A?

Pro:

Con:

Related Issue Identification:

1) - 19.2A - Reliability
2) - 19.2B - Reliability

Issue Originator:

Issue History:

May 1992: Date first opened
March 1993: Spliting the current Issue into 2 related Issues: 19.2A and 19.2B

Issue Status: Open

Issue Identification: 19.2A (Topic: Reliability).

Will the IEEE 802.11 MAC look like all other IEEE 802 MACs regarding delivery reliability?

Alternatives:

1) - Yes
2) - No

References:

1) - P802.11-93/40 - The Wireless Hybrid Asynchronous Time-bounded MAC Protocol

2) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

General:

19.2A:

1.0) - Bit Error Rate (BER) explicitly defined in the PAR.

2.0) - BER is not delivery reliability.

3.0) - Undetected BER must be low; detected BER could be higher that other 802 MACs.

Pro:

19.2A:

1.1) - It must provide comparable level of service to client software.

1.2) - Related to 1.1 above - must be good enough to not 'upset' the upper layer clients.

1.3) - See Argument_pro #1.2 in Issue 19.5

Con:

Related Issue Identification:

1) - 19.2A - Reliability
2) - 19.5 - Reliability

Issue Originator:

Issue History:

March 1993: Date first opened - Alternative # 1 and #2 - Reference #1 - Argument_general #1.0 to #3.0 - Argument_pro #1.1 and #1.2.
May 1993: Reference #2 - Argument_pro #1.3

Issue Status: Open

Issue Identification: 19.2B (Topic: Reliability).

How does Multicast affect the decision made in Issue 19.2A?

Alternatives:

1) - Broadcast and Multicast will not be as reliable

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

General:

Pro:

1.1) - See Argument_pro #1.1 in Issue 17.2

Con:

Related Issue Identification:

1) - 19.2A - Reliability
2) - 17.2 - Addressing

Issue Originator:

Issue History:

March 1993: Date first opened
May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 19.3 (Topic: Reliability).

- How much overhead is acceptable to get reliable frames (error checking and correction) ?
Editor's note: Ref: 67 (92/58R1).

Alternatives:

Arguments:

Pro:

Con:

Related Issue Identification:

- 20.3 (Topic: Data Unit Structure)

Issue Originator:

Issue History:

May 1992: First opened

Issue Status: Open

Issue Identification: 19.4 (Topic: Reliability).

Can some minimum Bit Error Rate (BER) be assumed for a PHY ?
If so:

- What is it ?
- Is it constant or variable ?

Alternatives:

1) - Bit error rate: 10**5 - See Reference #1

References:

1) - P802.11-93/45 - Joint MAC/PHY Subgroup Minutes (March 1993)

Arguments:

Pro:

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened
May 1993: Alternative #1 - Reference #1

Issue Status: Open

Issue Identification: 19.5 (Topic: Reliability).

What kind of error recovery mechanisms are to be incorporated into the MAC ?

Alternatives:

1) - Positive ACK with low retries.

References:

1) - P802.11-93/40 - The Wireless Hybrid Asynchronous Time-bounded MAC Protocol

2) - P802.11-93/70 - A distributed Access Protocol Proposal Supporting Time Bounded Services

3) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - The 802.11 MAC should include a positive acknowledgement protocol with low level retries. This mechanism helps the MAC present approximately the same level of MSDU delivery reliability as other IEEE 802 protocols.

1.2) - Since the wireless medium is interference limited rather than noise limited, MAC level recovery is needed to restore the delivery reliability level to that defined by 802. This can not be accomplished by PHY level recovery.
Note that MAC level recovery is not particular to Broadcast/Multicast frames, which will result in a lower delivery reliability than the one specified in 802.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened
March 1993: Alternative #1 - Reference #1 - Argument_pro #1.1.
May 1993: References #2 and #3 - Argument_pro #1.2.

Issue Status: Open

Issue Identification: 19.6 (Topic: Reliability).

What is the strategy for capacity control ?

Alternatives:

1) - See the CODIAC Protocol proposal (Reference #1)

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - The CODIAC protocol (Reference #1) is in itself a strategy for capacity control. The purpose of the two operating modes is to allow efficient media use under different capacities, and in centralized mode each implementation's strategy for management of request periods and data periods in centralized mode is its strategy for capacity control.

Con:

Related Issue Identification:

Issue Originator: Wim Diepstraten

Issue History:

May 1992: Date first opened

May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 19.7 (Topic: Reliability).

Is a maximum number of stations to be specified ? if so how many ?

Alternatives:

1) - No - the number should not be specified.

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - That should be up to the implementation. In distributed mode the protocol will begin to break down at a certain number of stations, and the implementer should decide what action to take about that - whether to switch operating modes, or to make the degradation limit a parameter of the network.
In centralized mode, it is a function of the intended application. An application with huge numbers of stations with small payload and/or tolerance for large transfer delays can be supported, as can an application with smaller population with need of shorter transfer delays. The CODIAC protocol (Reference #1) can be set up to accommodate either, without loosing compatibility.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 19.8 (Topic: Reliability).

How will the standard address the MAC robustness in the presence of co-site dissimilar networks ?

Alternatives:

1) - Nothing different from handling any other kind of interference.

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - On the assumption that "dissimilar" means not so different that they don't see each other (e.g. IR and SS), and not so similar as to be able to recognize each other's MSDUs - Co-site dissimilar networks interfere with each other. There is nothing the MAC can do about this that is different from handling interference of any other kind.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 19.9 (Topic: Reliability).

How will the standard address the 'range' related to Data Density ?

Alternatives:

References:

1) - P802.11-92/40 - Functional Requirement Draft.

Arguments:

General:

1.0) - Clarification of the Issue: - There is a section in Document 92/40 "Functional Requirements Draft" (Reference #1), called Other Functional Issues. A category in that section is Data Density, and a bullet item in that category is Range. It is suggested that this issue was intended to mean: " Will the standard specify a minimum or maximum coverage area per station? and If so, what are the values?

2.0) - Need to split this Issue into two related Issues:

19.9A - Will the standard specify a minimum or maximum coverage area per station?

19.9B - If the standard specifies a minimum or maximum coverage area per station, what are the values?

Pro:

Con:

Related Issue Identification:

1) - 19.9A - Reliability
2) - 19.9B - Reliability

Issue Originator:

Issue History:

May 1992: Date first opened

May 1993: Reference #1 - Argument_general #1.0 (clarification of the Issue) and #2.0 (splitting of the Issue into 2 related Issues: 19.9A and 19.9B).

Issue Status: Open

Issue Identification: 19.9A (Topic: Reliability).

Will the standard specify a minimum or maximum coverage area per station?

Alternatives:

References:

Arguments:
General:

Pro:

Con:

Related Issue Identification:
1) - 19.9 - Reliability

Issue Originator: C. Heide

Issue History:
May 1993: Date first opened

Issue Status: Open

Issue Identification: 19.9B (Topic: Reliability).

If the standard specifies a minimum or maximum coverage area per station, what are the values?

Alternatives:

References:

Arguments:
General:

Pro:

Con:

Related Issue Identification:
1) - 19.9 - Reliability
2) - 19.9A - Reliability

Issue Originator: C. Heide

Issue History:
May 1993: Date first opened

Issue Status: Open

Issue Identification: 19.10 (Topic: Reliability).

How will stability under heavy load be addressed ?

Alternatives:

1) - See the CODIAC Protocol proposal (Reference #1)
2) - See the CSMA/CA Protocol proposal (Reference # and #3)

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

2) - P802.11-93/70 - A distributed Access Protocol Proposal Supporting Time Bounded Services.

3) P802.11-92/51 - A Wireless MAC Protocol Comparison.

4) - P802.11-9X/YY - Performance of the CODIAC protocol (editor's note: the number of this document is requested - Carolyn Heide)

Arguments:

Pro:

1.1) - The centralized mode of the CODIAC protocol (Reference #1) remains stable under heavy load by increasing transfer delay. This is further explored in document "Performance of the CODIAC protocol" (Reference #4).

2.1) - The CSMA/CA protocol (Reference #2) is demonstrated to be stable under high load. Reference to document IEEE P802.11-92/51 (Reference #3) for simulation results.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 and #2 - References #1 to #4 - Argument_pro #1.1 and #2.1.

Issue Status: Open

Issue Identification: 19.11 (Topic: Reliability).

How will the transmission lost be addressed ?

Alternatives:

1) - Positive ACK and Retransmission (see Related Issues #1 and #2).

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - Issues 19.1 and 19.5 cover this issue. - The CODIAC protocol (reference #1) proposes positive ACK and retransmission to bring the transmission loss rate to approximately the same level of MSDU delivery reliability as other IEEE 802 protocols.

Con:

Related Issue Identification:

1) - 19.1 - Reliability
2) - 19.5 - Reliability

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 20.2 (Topic: Data Unit Structure).

Can the MAC handle different preamble lengths from different PHYs ?

Alternatives:

1) - No

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - If different PHYs must generate different preamble lengths then preamble should be handled by the Medium Independent Layer, which is on the PHY side of the MAC/PHY interface. The preamble would be stripped off by the time the frame is seen by the MAC.
To facilitate MAC independence from preamble length, perhaps the preamble should not be considered part of the MAC frame.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 20.3 (Topic: Data Unit Structure).

What is the MAC frame structure ?

Alternatives:

1) - The use of ATM as a sub-mac frame structure for wireless LAN. Contentions:
- Time Bounded services must have a guaranteed bandwidth mechanism.
- ATM is one such wired (fiber) LAN structure meeting this.
- WLAN must be able to work with ATM backbones.

2) - All frames of the CODIAC protocol proposal (Reference #1) have the following format:

a) - Preamble: 8n bits where n is to be determined
b) - Start delimiter (SD): 8 bits
c) - Destination Identifier (DID): 16 bits
d) - Frame Type (Type): 8 bits
e) - Control flags (Control): Access Point (AP), Sequence, Out-of-sequence, Retry, Hierarchical - 8 bits
f) - Information (Info): optional - 8m where 0 < = m < = to be determined.
g) - Frame Check Sequence (FCS): CRC 32 - 32 bits
h) - End Delimiter (ED): 8 bits

Notes:
i) - Minimum frame length (12 + n) octets
ii) - CRC coverage: Fields c) to f) included.
iii) - For details refer to Reference #1, section 4. - Frame Format

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - Bandwidth on demand - more efficient for MPEG for instance which as a reliable bit/sec. rate.

1.2) - Maps easily for future WANs (B-ISDN based).

1.3) - It is "modern & new".

2.1) - The frame structure is designed with the following goals:
(1) - to minimize the frame size while keeping a consistent frame structure;
(2) - to have a minimum size destination identifier at the start of the frame to allow destination determination of frames as quickly as possible;
(3) - to provide a level of error detection suitable to the high bit error rate of the wireless media.

Con:

1.1) - ATM designs are based on two assumptions which are not true for WLAN:
- The bandwidth is plentiful (i.e. some efficiency can be sacrificed for self routing characteristics).
- The channel is reliable

1.2) - Use of specific ATM-MAC is an inefficient and unnecessary constraining structure for WLAN.

1.3) - Present frame based (fixed length) MAC proposal meets Time Bounded service needs.

Related Issue Identification:

Issue Originator: Jim Schuessler

Issue History:

May 1992: First opened
November 1992: Alternative #1, Argument-pro #1-1 to 1-3; Argument-con #1-1 to 1-3.
May 1993: Alternative #2 - Reference #1 - Argument_pro #2.1.

Issue Status: Open

Issue Identification: 20.4 (Topic: Data Unit Structure).

How is the MAC time preservation ordering of SDU to end systems (LLC requirement) will be addressed by the standard ?

Alternatives:

1) - No change in the order of MSDUs - See CODIAC Protocol proposal (Reference #1).

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - The CODIAC protocol (Reference #1) is a stop-and-wait ARQ, it does not change the order of MSDUs.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: Date first opened

May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 21.2 (Topic: Media).

How does the MAC robustness in the presence of non-reciprocal wireless medium will be addressed by the standard ?

Alternatives:

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

General:

1.0) - If this means stations may have different receive and transmit coverage area:
In CODIAC protocol centralized mode (Reference #1) , if the relationship between the controller and a station is asymmetric the station will not be able to register. Minimal bandwidth will be lost as it repeatedly tries to do so. In distributed mode the RTS/CTS exchange will fail, avoiding the wasted bandwidth of attempting to send the data itself.
If this means non-reciprocal traffic load:
The CODIAC protocol is flexible in the assignment and duration of the data periods in centralized mode, both at run-time and per implementation, creating no problems handling non-reciprocal traffic loads. This is a moot point for distributed mode as it has no directionality.

Pro:

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Reference #1 - Argument_general #1.0.

Issue Status: Open

Issue Identification: 23.3 (Topic: Conformance).

What is the point of conformance for an IEEE 802.11 PHY?

Alternatives:

Arguments:

Pro:

Con:

Related Issue Identification:

Issue Originator: 802.11 PHY Group

Issue History:
May 1993: Date first opened

Issue Status: Open

Issue Identification: 24.11 (Topic: PHY Types).

How will Hopping synchronization, acquisition and tracking be accomplished in the Frequency Hopping (FH) and their terms defined?

Alternatives:

Arguments:
Pro:

Con:

Related Issue Identification:

Issue Originator: 802.11 PHY Group

Issue History:
May 1993: Date first opened

Issue Status: Open

Issue Identification: 25.1 (Topic: Channel).

Will the standard provide a procedure to reserve medium channel capacity ?

Alternatives:

1) - Yes
2) - No

References:

1) - P802.11-93/40 - The Wireless Hybrid Asynchronous Time-bounded MAC Protocol.

2) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - The standard should provide the ability to reserve the medium. The WHAT protocol (see reference #1) uses this technique to allow Time-bounded MPDUs to have higher priority media access than asynchronous MPDUs.

1.2) - Not a lot of work has been done so far in this area, however this facility can easily be incorporated into the CODIAC protocol (Reference #2) by adding information to the request frame specifying a reservation of a particular length, or even making a "connection request" for a certain amount of bandwidth which could stand as a reservation of channel capacity until the connection is torn down, rather than having to issue a request every superframe.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: First opened
March 1993: Alternatives #1 and 2 - Reference #1 - Argument_pro #1.1.
May 1993: Reference #2 - Argument_pro #2.1.

Issue Status: Open

Issue Identification: 25.2 (Topic: Channel).

Must the MAC work on a single channel PHY ?
Will the standard support multiple channel PHYs ?

Alternatives:

Arguments:

General:

1.0) - The Issue needs to be splitted into 2 related Issues:
- 25.2A - Must the MAC work on a single channel PHY ?
- 25.2B - Will the standard support multiple channel PHYs ?

Pro:

Con:

Related Issue Identification:

1) - 25.2A - Channel
2) - 25.2B - Channel

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Argument_general #1.0: Splitting of the Issue into 2 related Issues: 25.2A and 25.2B.

Issue Status: Open

Issue Identification: 25.2A (Topic: Channel).

Must the MAC work on a single channel PHY ?

Alternatives:
1) - Yes

Arguments:
General:

Pro:

Con:

Related Issue Identification:
1) - 25.2 - Channel

Issue Originator: C. Heide

Issue History:
May 1993: Date first opened - Alternative #1

Issue Status: Open

Issue Identification: 25.2B (Topic: Channel).

Will the standard support multiple channel PHYs ?

Alternatives:
1) - Yes

Arguments:
General:

Pro:

Con:

Related Issue Identification:
1) - 25.2 - Channel

Issue Originator: C. Heide

Issue History:
May 1993: Date first opened - Alternative #1

Issue Status: Open

Issue Identification: 25.3 (Topic: Channel).

What is the channel definition:
- PHY ?
- Logical ?

Alternatives:

1) - The channel definition is given in the referenced document (Reference #1) and is considered a logical definition.

References:

1) - P802.11-93/20 - Wireless LAN MAC & PHY Specifications (Draft)

Arguments:

Pro:

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 - Reference #1.

Issue Status: Open

Issue Identification: 25.4 (Topic: Channel).

- Channels
  - Same channel/Access Point (AP)
  - Different channel/Access Point (AP)
  - Both of 1 & 2

Editor's note: Need help with this issue

Editor's note: Ref: 73 (92/58R1).

Alternatives:

Arguments:

Pro:

Con:

Related Issue Identification:

- 16.6 (Topic: Mobility)

Issue Originator:

Issue History:

May 1992: First opened

Issue Status: Open

Issue Identification: 25.5 (Topic: Channel).

What is the definition of MAC fairness of access ?

Alternatives:

1) - The definition of fairness of access is all stations having an equal opportunity to access the media. Things about a MAC that can make access opportunity unfair are:

a) - sensitivity to the near/far bias (capture effects);
b) - allowing one station to hold the medium once it has it;
c) - bias to a particular data path - AP to station; AP from station; or station to station;
d) - bias to a traffic type, TBS or asynchronous.

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - The CODIAC protocol (Reference #1) addresses these items:

a) - see Related Issue #1 (Issue 25.6).

b) - Maximum frame length controls this to in both modes. In distributed mode once a station has made a transaction, of up to maximum length, it must re-contend for the medium like all the other stations. In centralized mode the controller implementation controls this fairness. At the end of the request period it has the information required to divide up the data period bandwidth as it sees fit.

c) - In distributed mode there is no distinction between these data paths. In centralized mode the controller implementation controls this.

d) - In both modes the AP implementation controls this. An AP could deny a TBS request if it feels that the asynchronous traffic is being unfairly denied access by the amount of TBS traffic.

Con:

Related Issue Identification:

1) - 25.6 - Channel

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 - Reference #1 - Argument_pro #1.1.

Issue Status: Open

Issue Identification: 25.6 (Topic: Channel).

How will the standard address the MAC facilitation of 'access fairness' (insensitivity to near/far bias) ?

Alternatives:

1) - See CODIAC Protocol proposal (Reference #1)

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

Pro:

1.1) - In the CODIAC protocol (Reference #1) centralized mode sensitivity to the near/far bias will only come into play in the registration slots. If two stations attempt to register in the same slot and one of them has signal strength enough to obliterate the other, the winner will get registered and the loser will have to try again next superframe.
Summary - (1) the near/far bias can cause a minor delay in registration, but the protocol is insensitive to it for data transfer in centralized mode; (2) Distributed mode is sensitive to the near/far bias during the RTS/CTS exchange.

Con:

Related Issue Identification:

1) - 25.5 - Channel

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 - Reference #1 - Argument_pro 1.1

Issue Status: Open

Issue Identification: 26.1 (Topic: Priority).

- Does the concept of priority need to be addressed in the MAC ?
  - Different traffic priorities ?
- What is priority ?

Alternatives:

1) - See CSMA/CA Protocol proposal - Reference #1

References:

1) - P802.11-93/70 - A Distributed Access Protocol Proposal Supporting Time Bounded Services

Arguments:

General:

1.0) - There is a need to split the Issue into 3 related Issues:

26.1A - Does the concept of priority need to be addressed in the MAC?

26.1B - Does the concept of priority need to be addressed as different traffic priorities?

26.1C - What is priority?

Pro:

1.1) - Different access priority levels have been identified in the CSMA/CA+Ack proposal (Reference #1). The different priority levels are only used for inter-MAC operation, and is not available to the user/LLC. If needed, then different priority levels can be made available.

Con:

Related Issue Identification:

1) - 26.1A - Priority
2) - 26.1B - Priority
3) - 26.1C - Priority

Issue Originator:

Issue History:

May 1992: Date first opened

May 1993: Alternative #1 - Reference #1 - Argument_general 1.0 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 26.1A (Topic: Priority).

Does the concept of priority need to be addressed in the MAC?

Alternatives:

1) - See CODIAC Protocol proposal - Reference #1

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

General:

Pro:

1.1) - If the concept of priority is addressed in the MAC: The CODIAC protocol (Reference #1) lends itself very well to the implementation of priority in centralized mode. If priority is added to the RTS frame then the controller can service requests in prioritized sequence in the data period. The controller can also assign quantity of bandwidth to requesting stations in a prioritized fashion. Priority is not a concept which can be applied to the CODIAC protocol distributed mode.

Con:

Related Issue Identification:

1) - 26.1 - Priority

Issue Originator: C. Heide

Issue History:

May 1993: Date first opened - Alternative #1 - Reference #1 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 26.1B (Topic: Priority).

Does the concept of priority need to be addressed as different traffic priorities?

Alternatives:

1) - Implementation dependant.

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

General:

Pro:

1.1) - (Reference #1) - With respect to traffic types, in distributed mode TBS traffic is not supported so it is not relevant. In centralized mode the protocol does not give priority to either traffic type, but an implementation could do so, as TBS requests are marked.

Con:

Related Issue Identification:

1) - 26.1 - Priority

Issue Originator: C. Heide

Issue History:

May 1993: Date first opened - Alternative #1 - Reference #1 - Argument_pro #1.1

Issue Status: Open

Issue Identification: 26.1C (Topic: Priority).

What is priority?

Alternatives:

1) - Priority is a station having better access to the medium, in terms of access delay and/or time length of access, than other stations.

References:

1) - P802.11-93/54 - The CODIAC Protocol - Centralized or Distributed Integrated Access Control (CODIAC), A Wireless MAC Protocol.

Arguments:

General:

Pro:

Con:

Related Issue Identification:

1) - 26.1 - Priority

Issue Originator: C. Heide

Issue History:

May 1993: Date first opened - Alternative #1 - Reference #1

Issue Status: Open

Issue Identification: 28.1 (Topic: Physical Size).

How important is the physical size ?

Alternatives:

1) - The physical size should not be considered as an 802.11 functional requirement.

Arguments:

Pro:

1.1) - Although extremely important to some implementations, should not be considered as any kind of functional requirement for 802.11.

Con:

Related Issue Identification:

Issue Originator:

Issue History:

May 1992: Date first opened
May 1993: Alternative #1 - Argument_pro #1.1

Issue Status: Open