IEEE 802.11
802 LAN Access Method for Wireless Physical Medium

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TITLE: REVISIT TO CHANNELIZED MAC PROPOSALS

INTRODUCTION

The following set of contributions were presented by C. Rypinski to 802.11 in September 1991:

802.11/91-94 "Selection Basis for Architectural, Modulation, Channelization and Frequency Reuse Methods"

802.11/91-95 "Sequentially-used Common Channel Access Method" (includes section on no-infrastructure operation)

802.11/91-96 "Access Method for Channelized System Using Distributed Logic and Not Requiring Infrastructure"

802.11/91-97 "Channelized System Access Method Using Infrastructure Control"

All of these proposals had in common the message-based asynchronous transfer completing one message transaction at a time.

In 91-94, a matrix was drawn for the 16 alternative combinations of:

Narrowband vs. spread spectrum

Single vs. Multi-channel

Infrastructure vs. no infrastructure

Low vs. high rate.

The doable intersections of this matrix were covered by one of the following three proposals (95, 96 & 97).

The single channel plan of 91-95 was selected for advocacy because of the apparent complication of dealing with channel management in the MAC without sufficient offsetting benefits.

Because of the persistent and continued interest in 802.11 for channelization by frequency hop pattern and other means, attention is called again to 91-96 and 91-97 for infrastructure absent and present.

Brief Description of Channelized MAC

The underlying PHY was based on Dr. J. Cheah's[1] proposed 12-pattern direct sequence spread spectrum plan using 31-chips/symbol. One of the derivable channels was defined as a setup/paging channel available from all access-points and the other patterns would each be assigned to access-points to allow simultaneous independent use of all access-points. A resuse factor of 9-11 was assumed.

The contrast with PCS code division plans is their use of long symbols and a code per trunk. In this plan the orthogonal (nearly) codes are used to separate overlapping site coverages.

The same message structure can be used with or without infrastructure. Stations contend for access on setup channel and switch to a negotiated data transfer channel where continued use is does not limit the access of others. Failures are dealt with by try-again mechanisms.

Comments

The 91-97 proposal captures many of the advantages of the 91-95 single channel method.

- With spread spectrum, the radio is still the width of the allocation.

- The access is asynchronous and consecutive.

- Few traffic assumptions are built into the protocol.

The total capacity is about the same whether it is many slower channels used simultaneously or one fast channel used consecutively for a fraction of the time. The latter is more flexible and the former allows greater radio range.

These proposals address simultanously-used low-rate channels however derived in the PHY, and they consider frequency reuse. The problem of wandering users in a multi-site system requires specific provisions in protocol of the air interface to enable management of this movement. Such features are in these proposals.

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1.   "A Proposed IEEE 802.11 Radio LAN Architecture," Jonathon Y. C. Cheah, Hughes Network Systems, San Diego, IEEE 802.11/91-7 (Pages 13-18 show 31-bit 12-vector correlation diagrams)