

July, 1995

RTS/CTS Patent Issue

DOC: IEEE P802.11-95/109A

## Summary of RTS/CTS Patent Issue

A D1 Letter Ballot comment on section 5.2 (now 6.2) suggested that RTS/CTS be removed from the 802.11 MAC due to patents identified by Apple Computer but not available for license. The ballot comment did not cite patent numbers — the assumption is the 2 patents identified in an Apple document from 1993.

This submission presents a technical opinion, *NOT a legal opinion*, that the Apple patents do not apply to the 802.11 MAC:

- Patent 4,689,786 is not relevant to 802.11 because its claims depend upon self-assigned network addresses.
- Patent 4,661,902 (the '902 patent) is not relevant to 802.11 because its claims related to RTS/CTS are too narrow and because 802.11's use of RTS/CTS more closely resembles prior art networks than those in LocalTalk™ (which is the basis of the '902 patent).

Presentation

Slide 1

Michael Fischer, Digital Ocean

July, 1995

RTS/CTS Patent Issue

DOC: IEEE P802.11-95/109A

## Limitations on the '902 Patent

The '902 patent is not a fundamental patent on collision avoidance LANs

- The basic mechanisms were in use much earlier than March, 1985 when the patent application was filed:
  - CSMA: since the early 1970s (Aloha)
  - Collision avoidance: since the mid 1970s (HyperChannel)
  - RTS/CTS packets in a LAN protocol: since 1977 (ARCNET)
  - RTS/CTS exchanges to detect collisions indirectly when using a medium where the PHY transceiver cannot detect collisions directly: since about 1980 (Cambridge Ring)
- Information on the RTS/CTS packet exchange mechanisms of ARCNET and the Cambridge Ring were published and publicly available long before March, 1984.
- Therefore, the scope of the '902 claims relating to RTS/CTS are quite narrow (or the claims are invalid due to prior art).

Presentation

Slide 2

Michael Fischer, Digital Ocean

July, 1995

RTS/CTS Patent Issue

DOC: IEEE P802.11-95/109A

## Differences in RTS/CTS Mechanisms

The RTS/CTS mechanism in the 802.11 MAC has significant differences from the '902 patent:

- '902 uses RTS before all data frames, including broadcasts; 802.11, like ARCNET, uses RTS only before unicasts
- '902 uses a 3-stage exchange (RTS-CTS-Data); 802.11, like ARCNET, uses 4-stages (RTS-CTS-Data-ACK)
- '902 has no collision avoidance mechanism, just a method of reducing collisions of data frames; 802.11 uses the RTS/CTS information as input to a virtual carrier sense mechanism that provides collision avoidance
- '902 uses a unique end delimiter to know end of "carrier;" 802.11 uses a CRC-protected length in the frame header

Presentation

Slide 3

Michael Fischer, Digital Ocean

July, 1995

RTS/CTS Patent Issue

DOC: IEEE P802.11-95/109A

## Recommendation on RTS/CTS issue

### Conclusion:

The use of RTS/CTS in the 802.11 MAC is significantly different than the RTS/CTS mechanism claimed in the '902 patent. If the claims of the '902 patent were interpreted broadly enough to cover 802.11, they would be invalid due to prior art disclosed in networks operational in the 1970s.

### Motion:

The unresolved D1 letter ballot comment on calling for removal of RTS/CTS from the 802.11 MAC due to Apple's patents be resolved as "not accepted," leaving the draft standard unmodified.

Presentation

Slide 4

Michael Fischer, Digital Ocean