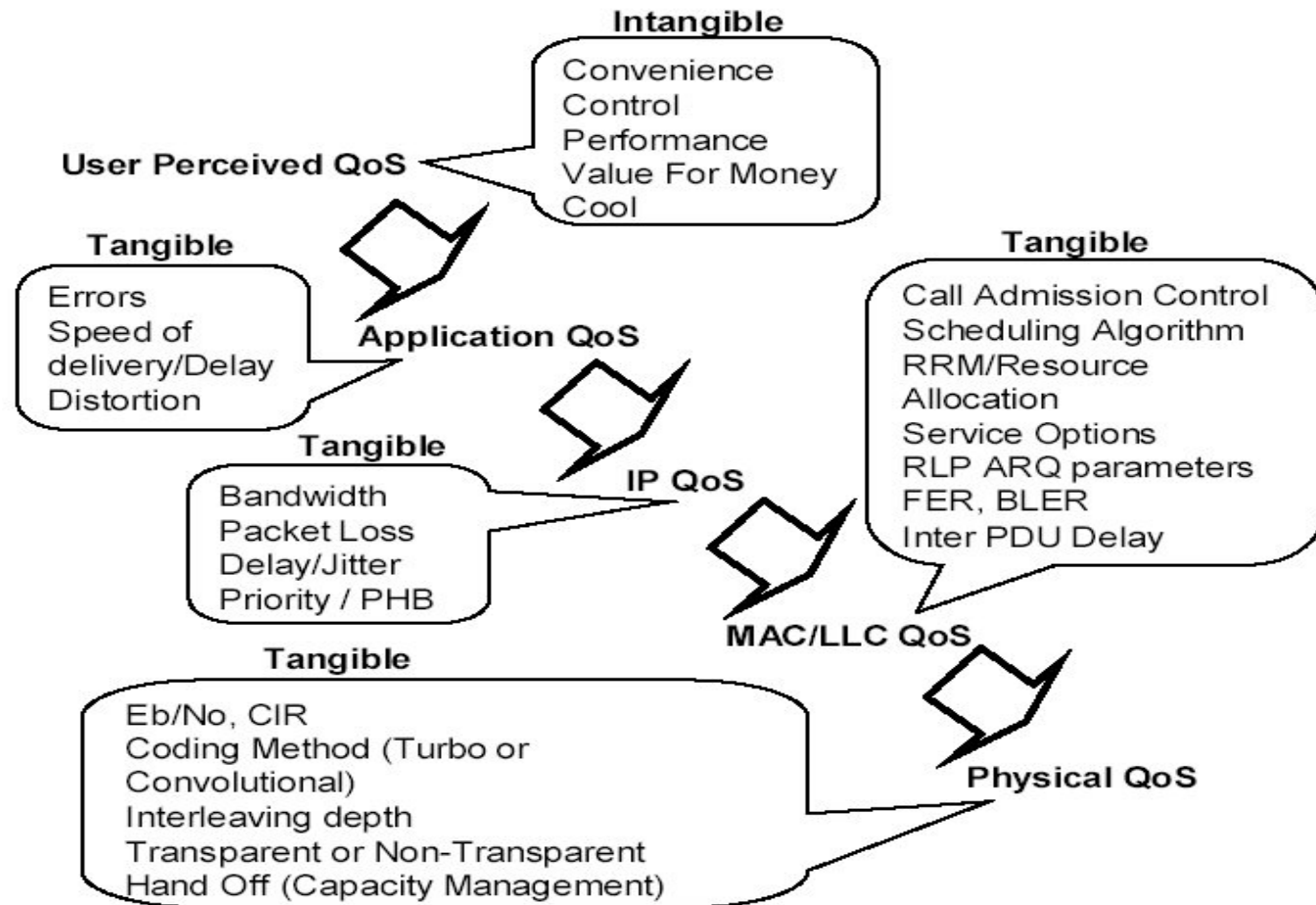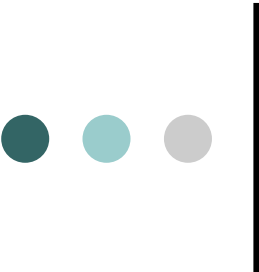# QoS for Wireless Data Networks: From MAC Perspective

Jen-Chu Liu

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A hierarchical framework for wireless QoS [1]

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# QoS issues and enhancements for IEEE 802.11 wireless LAN

- The IEEE 802.11 standard covers both MAC layer and PHY layer

- QoS limitiations of 802.11 MAC
  - DCF:
    - only support best-effort services
    - Not any QoS guarantees
  - PCF:
    - Need efficient polling scheme
    - Contention period vs. Contention free period
    - Transmission time of the polled stations is unknown

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QoS issues and enhancements for IEEE 802.11 wireless LAN(cont.)

- Two main enhancement schemes
  - Service (bandwidth, delay, jitter) differentiation based enhancement schemes
    - Station-based
    - Queue-based
  - Error control based enhancement schemes
    - ARQ
    - FEC
    - Hybrid

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Classification of Service Differentiation Based Schemes
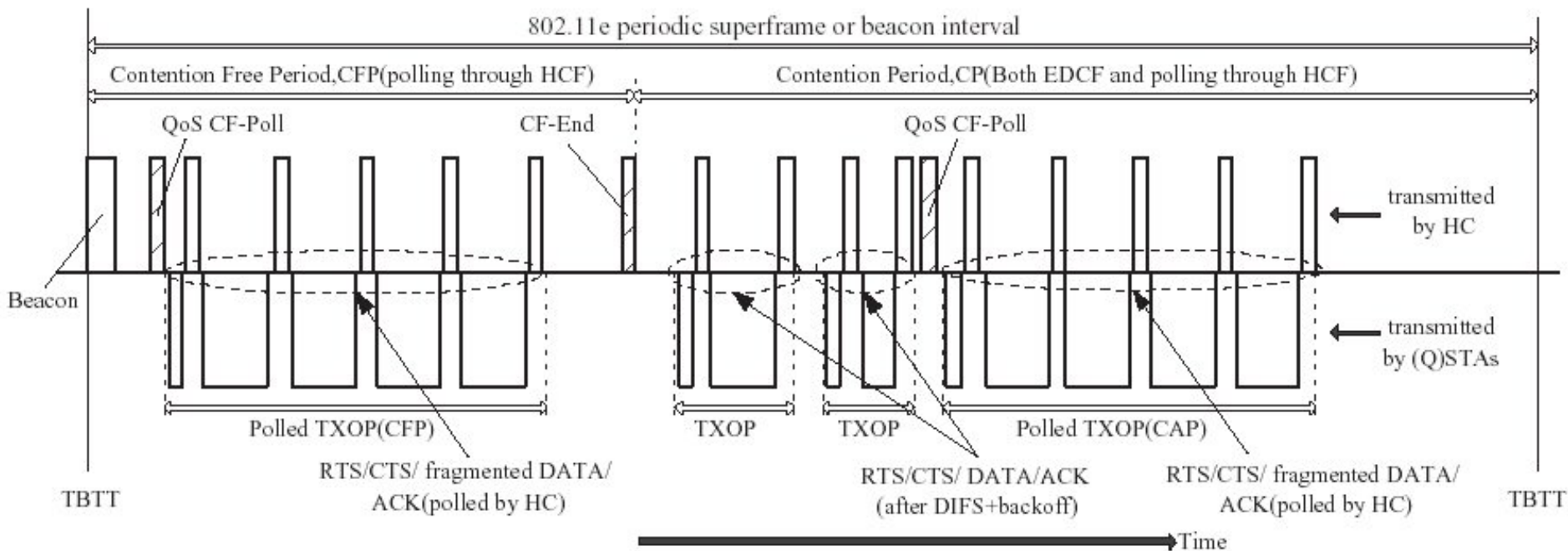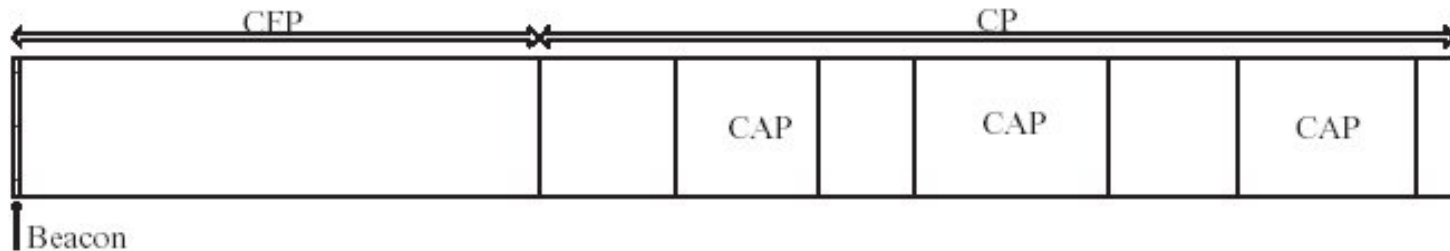
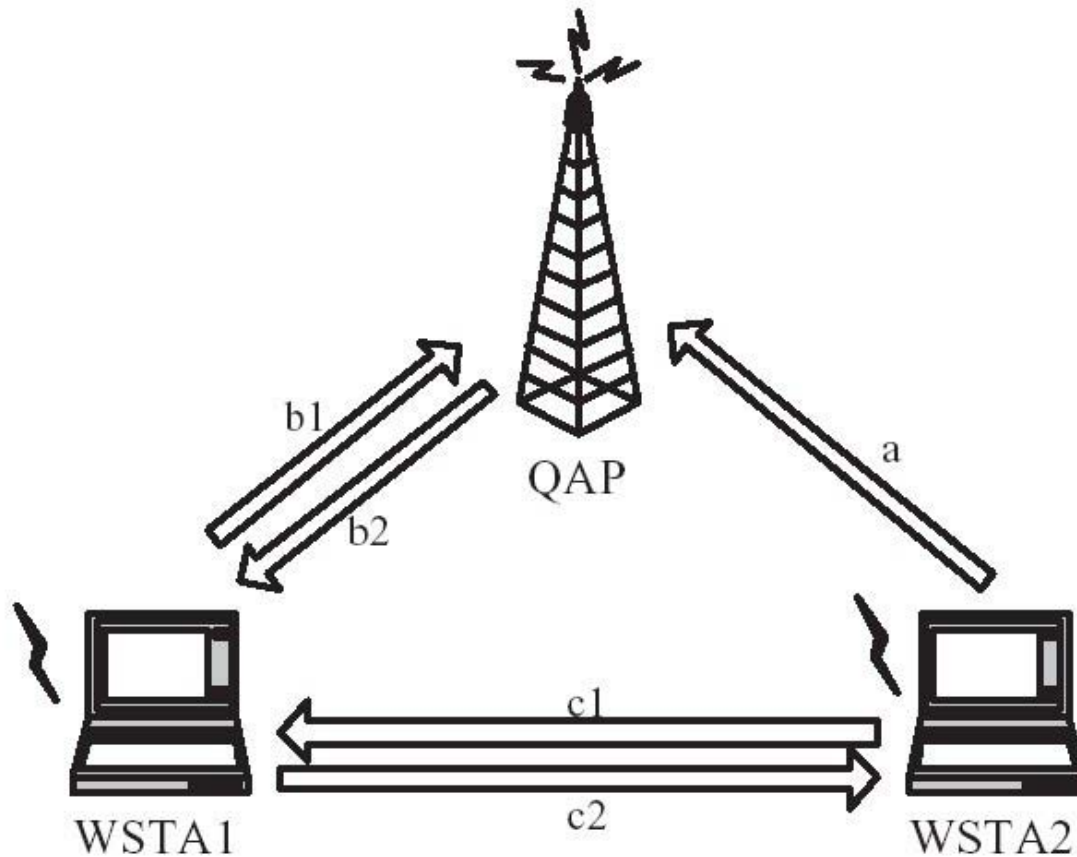Jen-Chu Liu, MNETLAB, NTHU
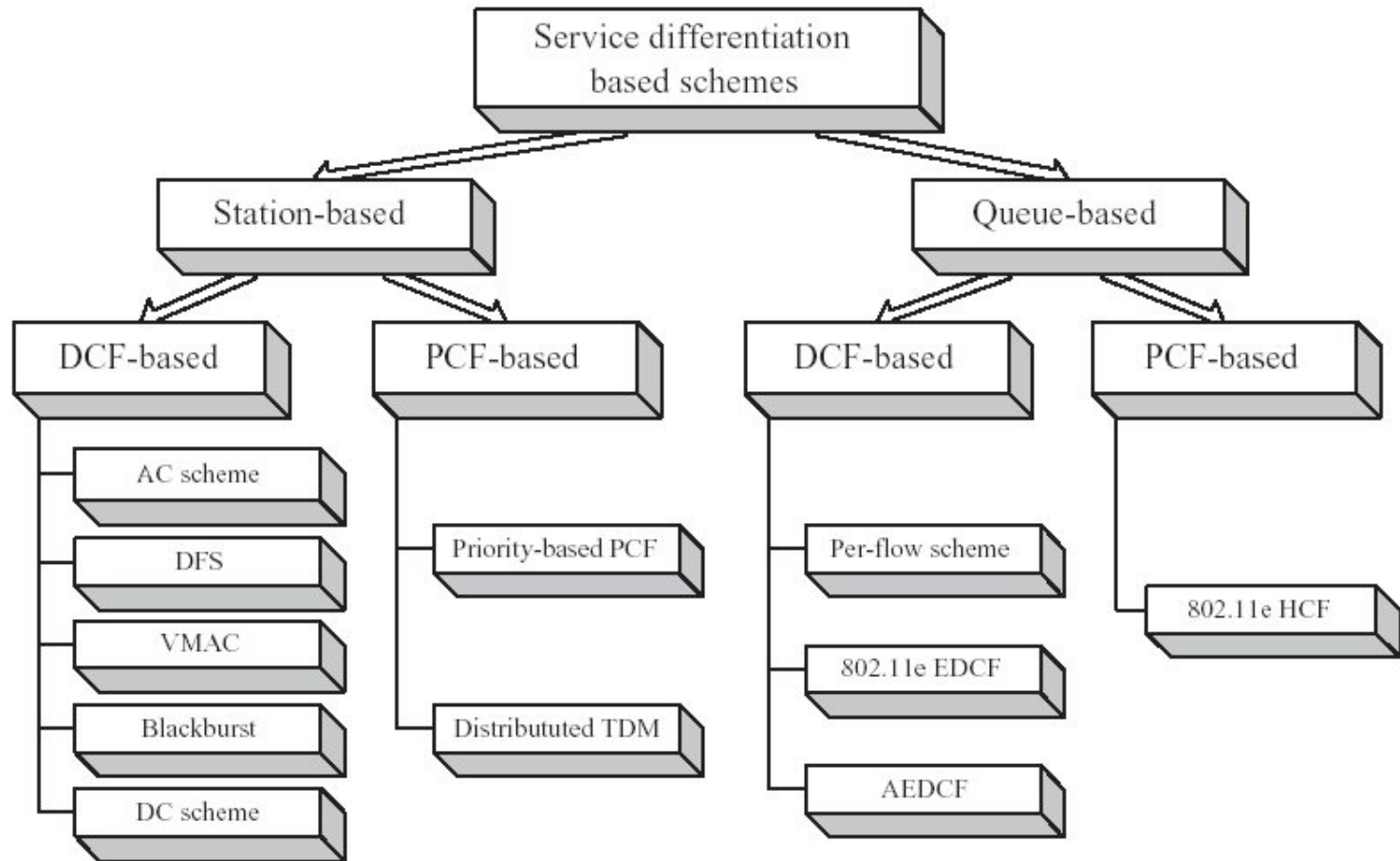
IEEE 802.11e

- Current status: Draft version 7(2004.01.31~)
- Main new features of 802.11e:
  - Hybrid coordination function, HCF
  - Direct communication (side traffic)
  - Wireless addressing resolution protocol
  - AP mobility
  - MAC-level FEC

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Hybrid Coordination Function

Direct communication
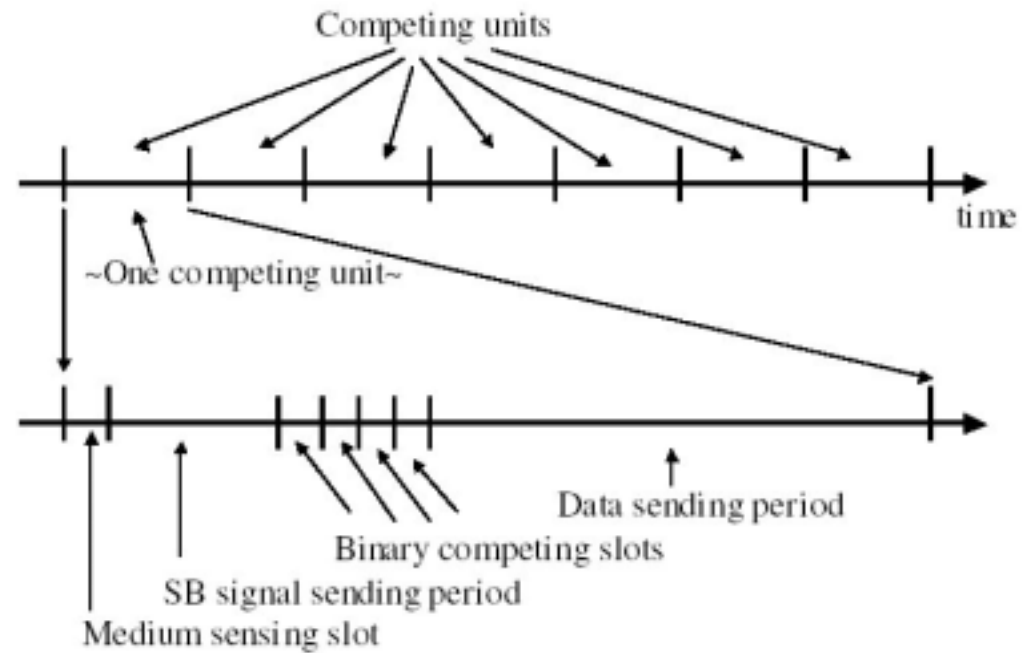
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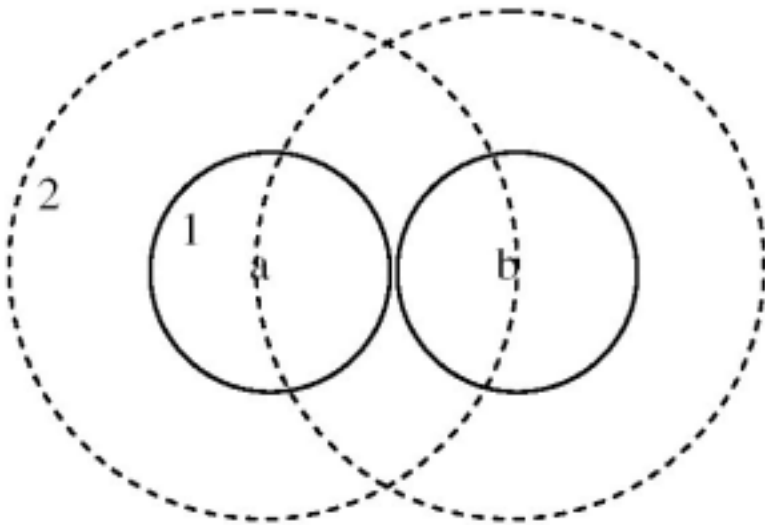
QoS MAC for Ad Hoc Networks

○ Collision free or collision prevention

○ Power control
- Spatial reuse
- Network throughput

○ Power saving

○ Topology control
- Network connectivity

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CSMA/IC [5]

Competing units

~One competing unit~

Data sending period

Binary competing slots

SB signal sending period

Medium sensing slot

time

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Variable Radius Ad Hoc Network [6]

(a)   (b)

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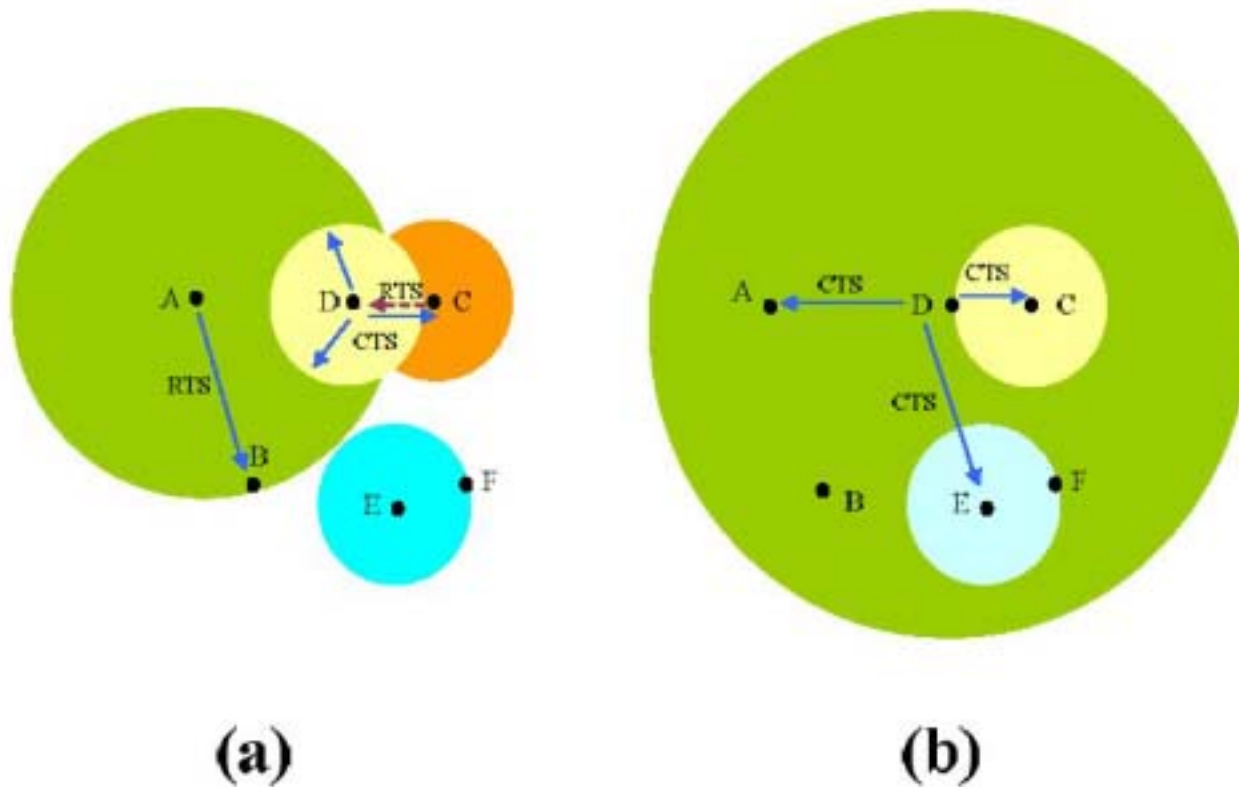
Discussion

- PCF vs. DCF
- Does 802.11e work well in ad hoc networks?
- How to design a proper QoS MAC that suit with both infrastructure and ad hoc networks?

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Discussion (cont.)

○ QoS in a integrated wireless networks
  ● Cooperation between WLAN and ad hoc networks?
○ How to cooperation with other layers?

References

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4. Tiantong You, Chi-Hsiang Yeh, H. Hassanein," ***A new class of collision prevention mac protocols for wireless ad hoc networks,***" ICC '03, May. 2003.
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7. Tiantong You, Chi-Hsiang Yeh, H. Hassanein," ***BROADEN: an Efficient Collision-Free MAC Protocol forAd Hoc Wireless Networks,***" LCN'03. 2003.
8. Chi-Hsiang Yeh ,Tiantong You," ***A QoS MAC Protocol for Differentiated Service in Mobile Ad Hoc Networks,***" LCN'03. 2003.

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