Wireless Sensor Network MAC Protocols

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Channel Access Type

Carrier Sense Multiple Access / Collision Avoidance

Time Division Multiple Access

- **listen to the medium**
- **RTS (Request to Send)**
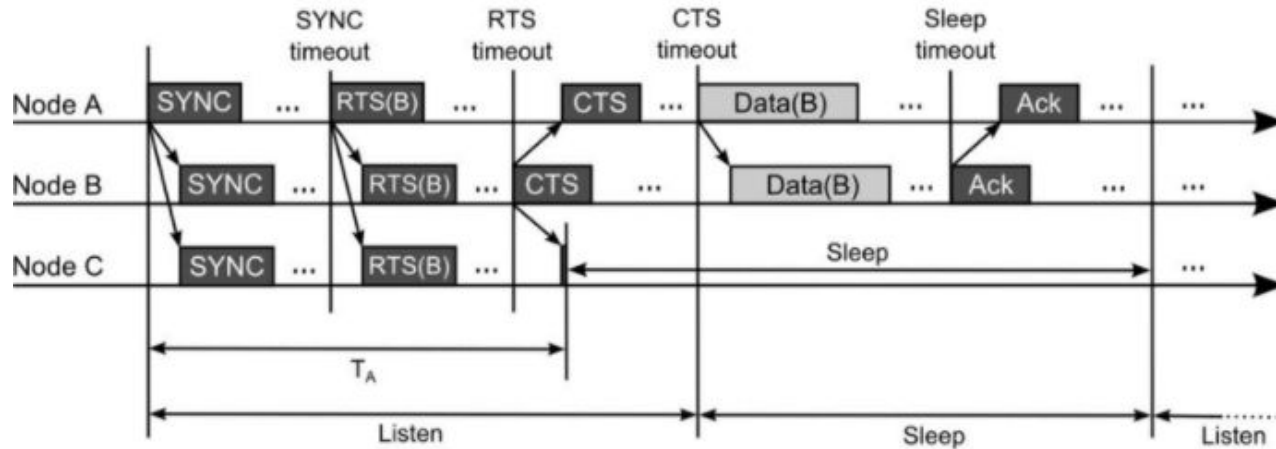- **CTS (Clear to send)**
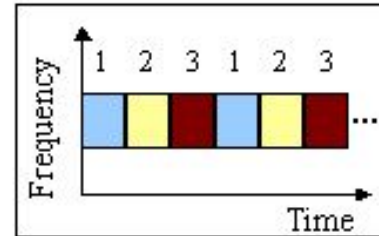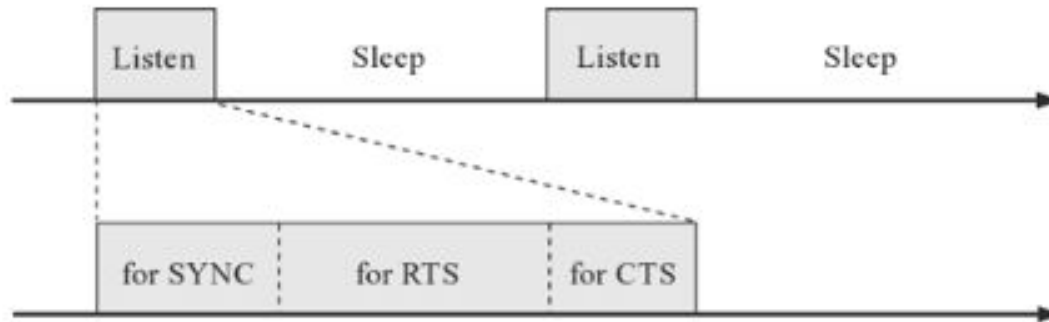
MAC Protocol - SMAC

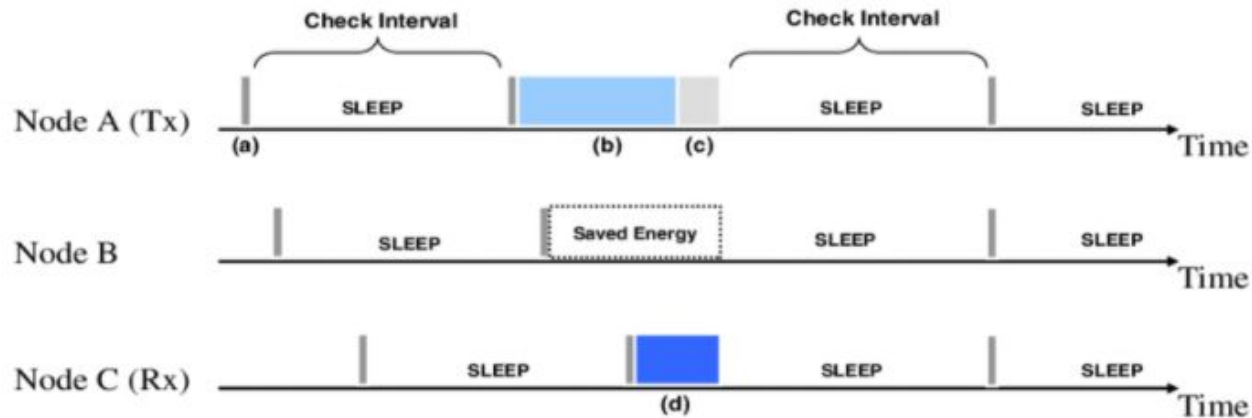- CSMA/CA
- Synchronous
- 2 phases

MAC Protocol - TMAC

- CSMA/CA
- Synchronous
- 2 phases
- Early sleeping state
- FRTS

MAC Protocol - BMAC

Check Interval

Node A (Tx)   SLEEP   SLEEP   SLEEP   Time
(a)   (b)   (c)

Node B   SLEEP   Saved Energy   SLEEP   SLEEP   Time

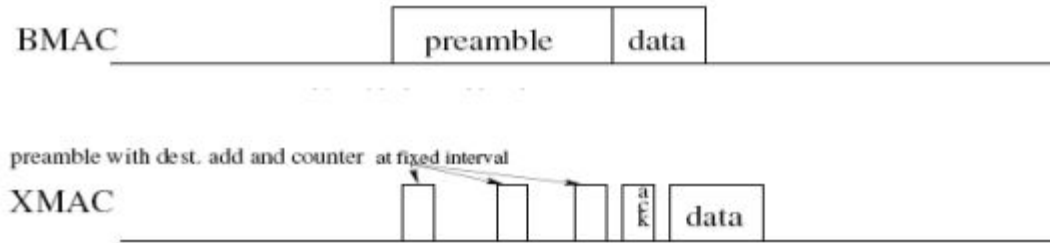Node C (Rx)   SLEEP   SLEEP   SLEEP   Time
(d)

(a) – Minimum Recognition Time
(c) – Sending The Data Field
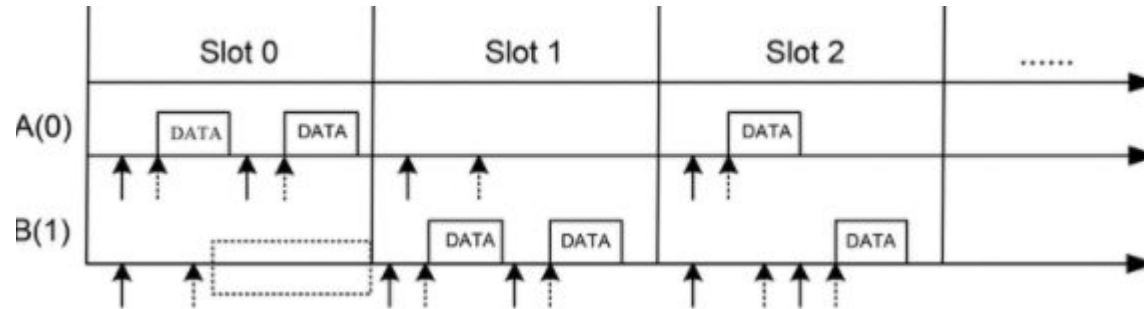(b) – Sending The Entire Preamble
(d) – Receiving The Packet

- CSMA/CA
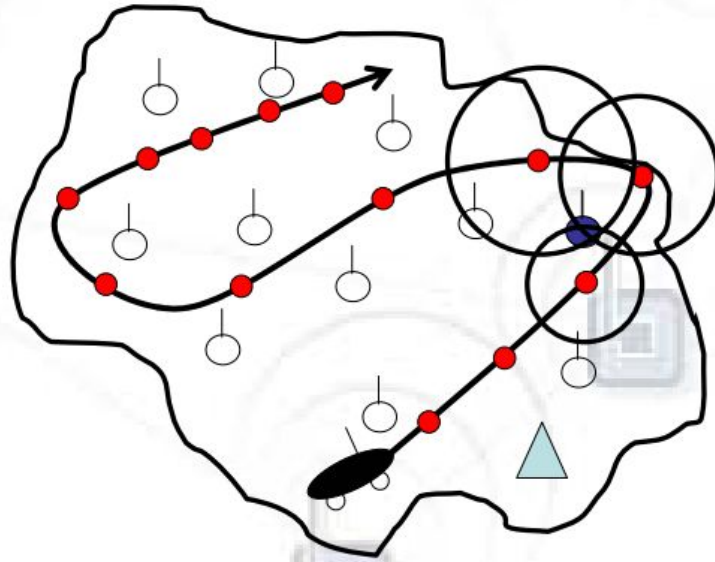- Asynchronous
- 2 phases
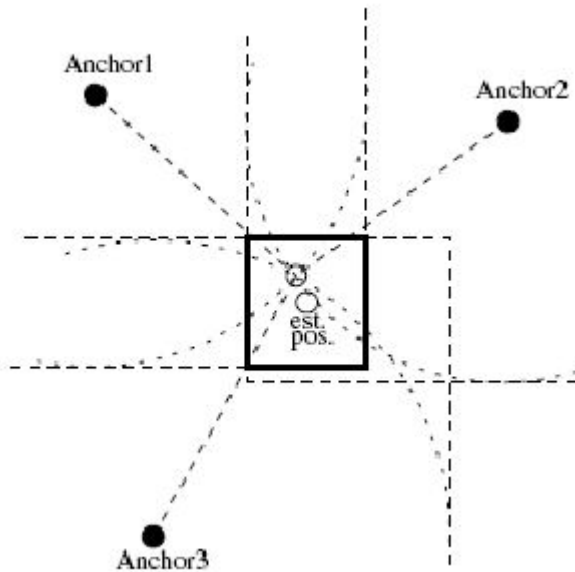- Long preamble

MAC Protocol - XMAC

- CSMA/CA
- Asynchronous
- 2 phases
- Reduced preamble length

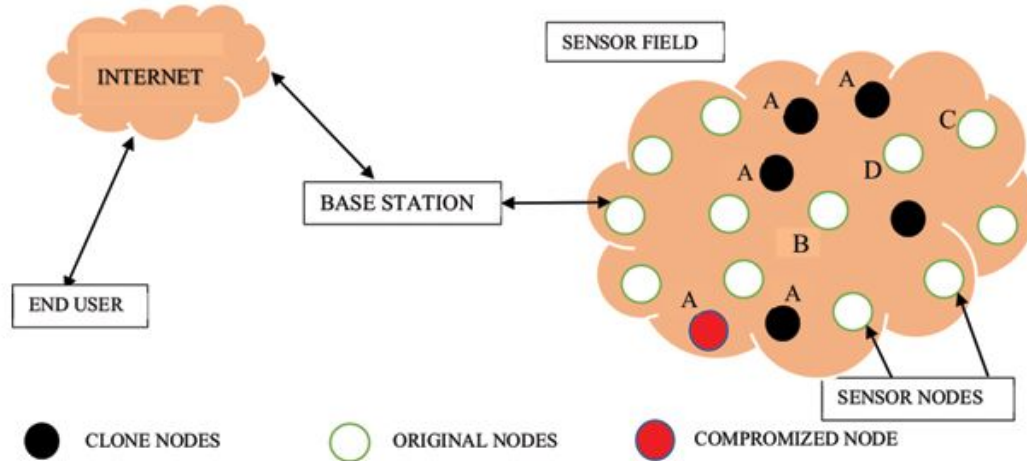# MAC Protocol - ZMAC

- CSMA/CA & TDMA
- Depending on the

Localization

- RSSI
- Lateration

- Static Beacon
- Mobile Beacon
- Bounding Box

Security

- Identity Theft
- Node Replication
- DDoS

- Node authentication
- Key establishment
- AES encryption
- Key revocation
- Comparison of wavelengths

Power Consuption

Protocol	Energy Saving	Advantages	Disadvantages
S-MAC	Power Saving over CSMA/CA	Low energy use when traffic is low	Sleep Latency Issue
T-MAC	Less than half of energy use of S-MAC	Adaptative Active time	Early sleeping issue
B-MAC	Battery Power Saving	Low Overhead when network is ideal	Over Hearing, bad performance in high traffic
X-MAC	Wakes up periodically to save energy	Ease and decoupling of transmitter-receiver rest schedule	Data transmit to neighbors in mistake
Z-MAC	Better Energy Saving	Low collision rate	Clock synchronization

Thanks for your attention