



# MAC PROTOCOLS DEDICATED TO WSN/IOT

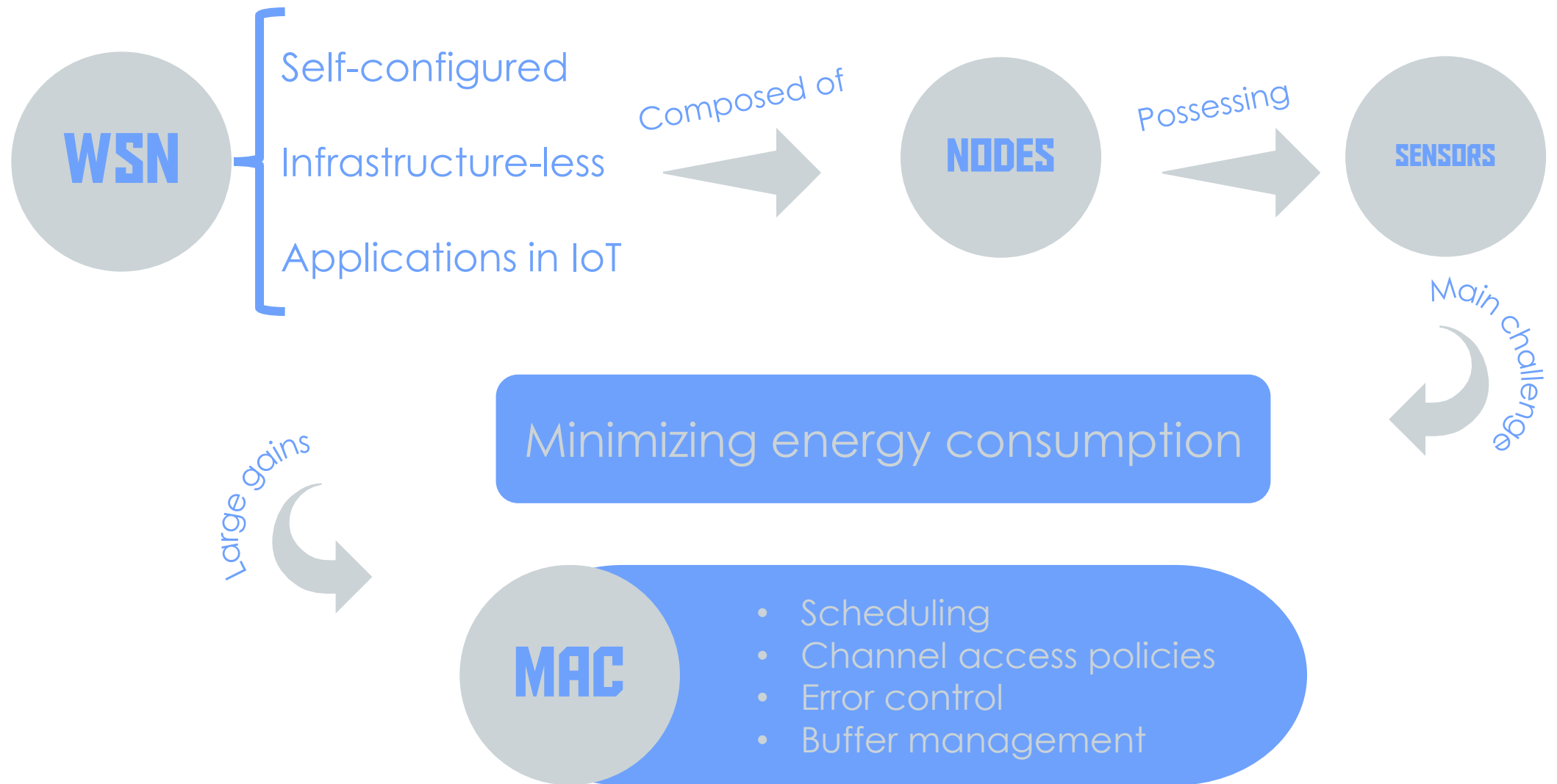
Agathe Lièvre – 5ISS – 2021/2022



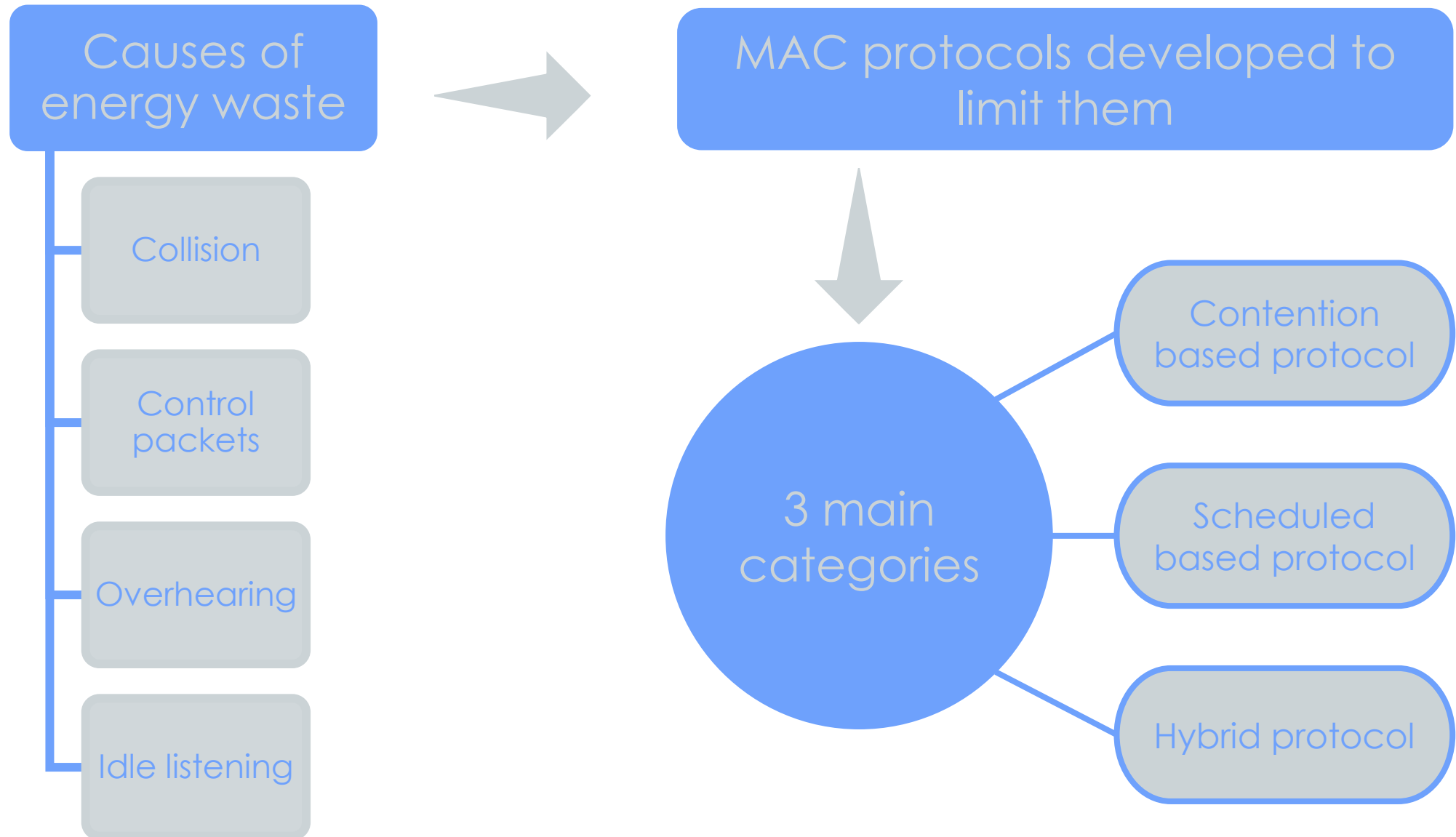
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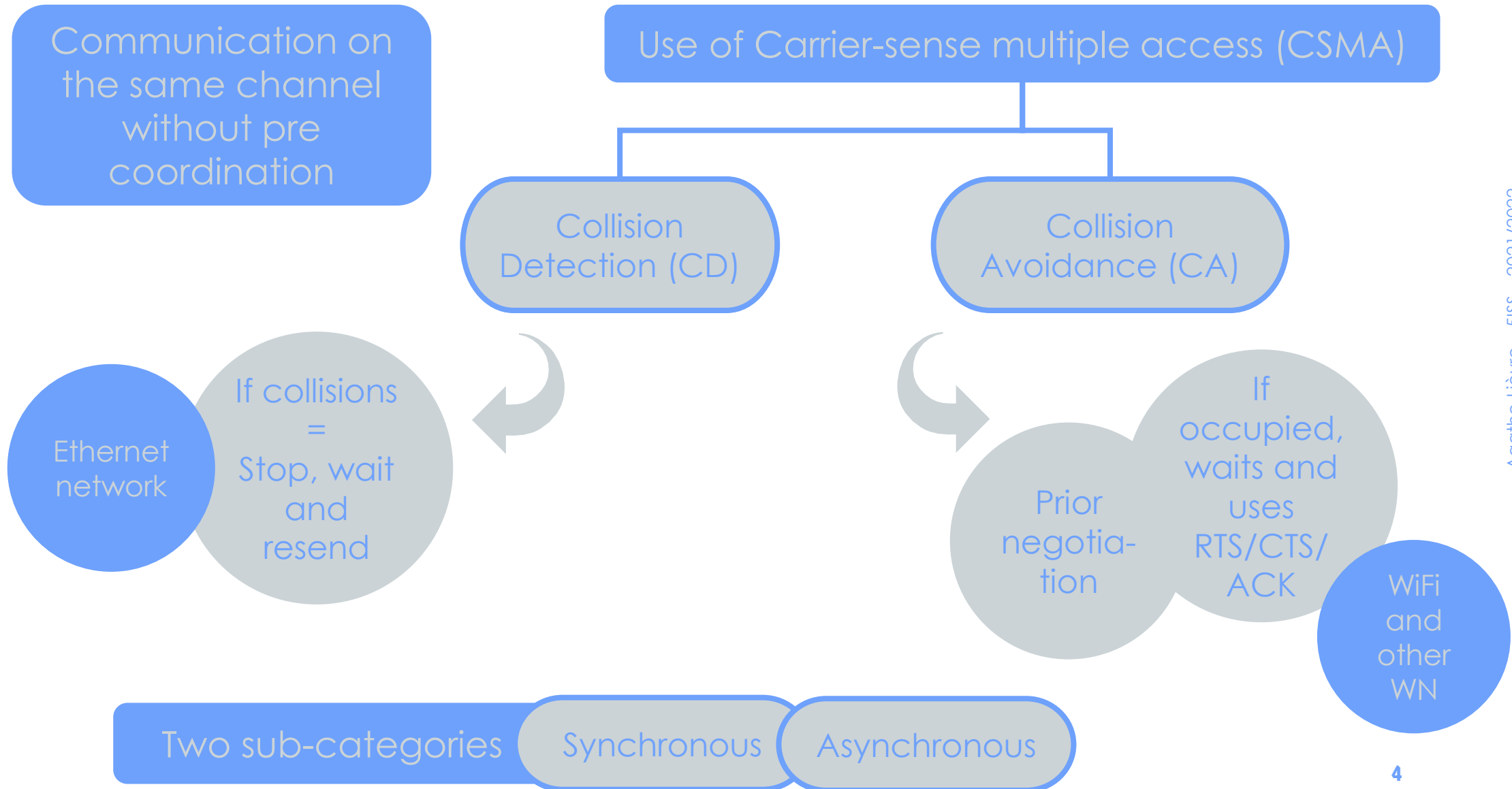
# I. INTRODUCTION



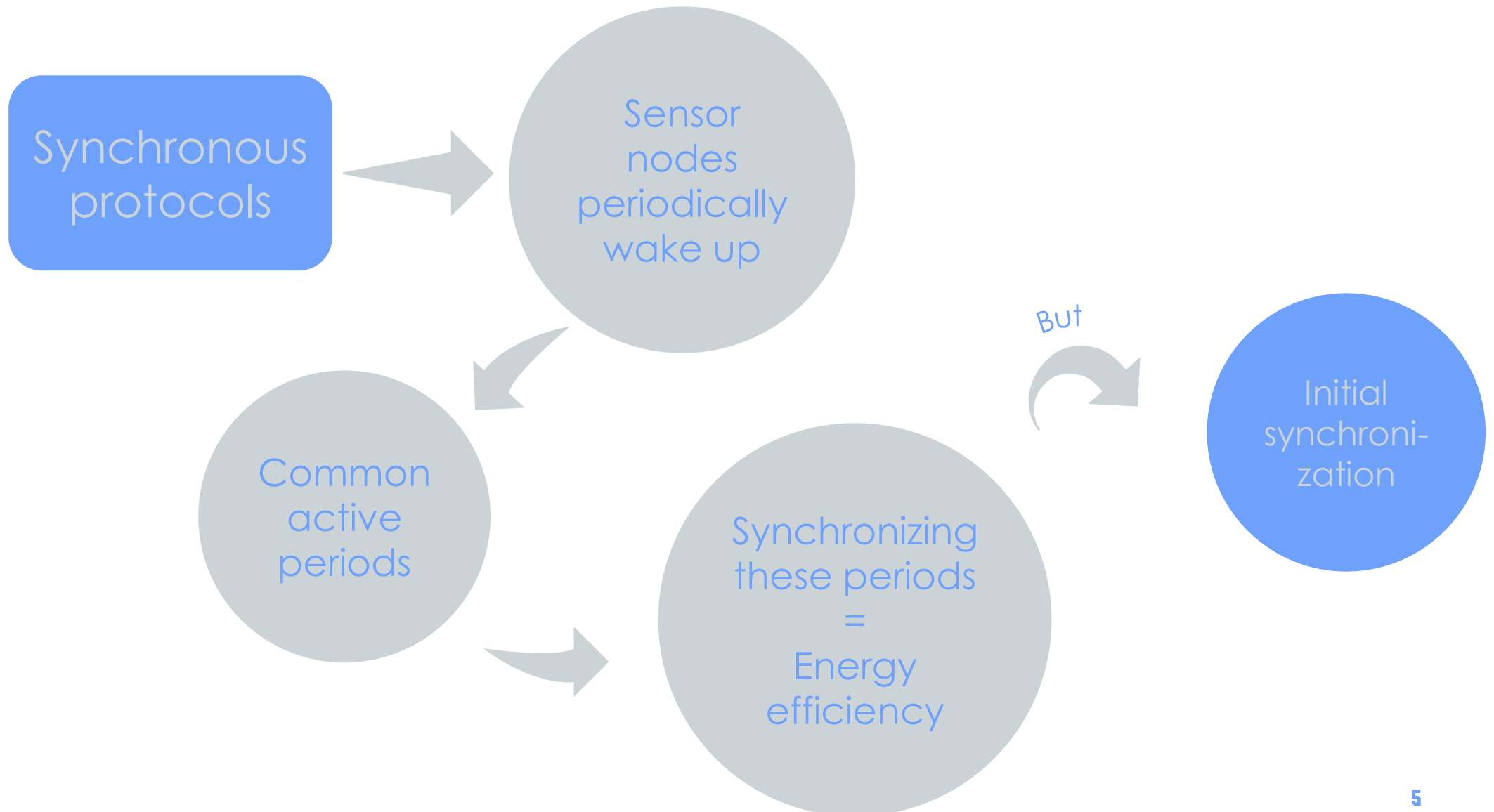
## II. CRITICAL ISSUES



# III. CONTENTION BASED PROTOCOLS



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# III. CONTENTION BASED PROTOCOLS

S-MAC protocol

CSMA/CA

Periodic sleep-listen schedule

Locally managed synchronizations

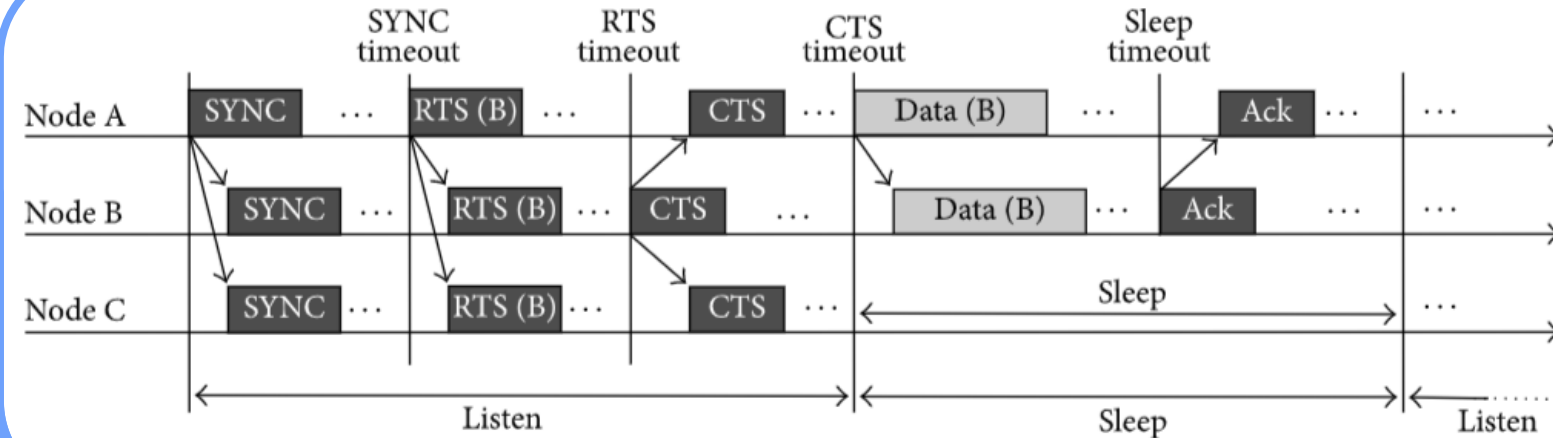


Figure 1: Basic S-MAC scheme

- Reduce energy consumption
- Adapts to topology change
- No need for central entity

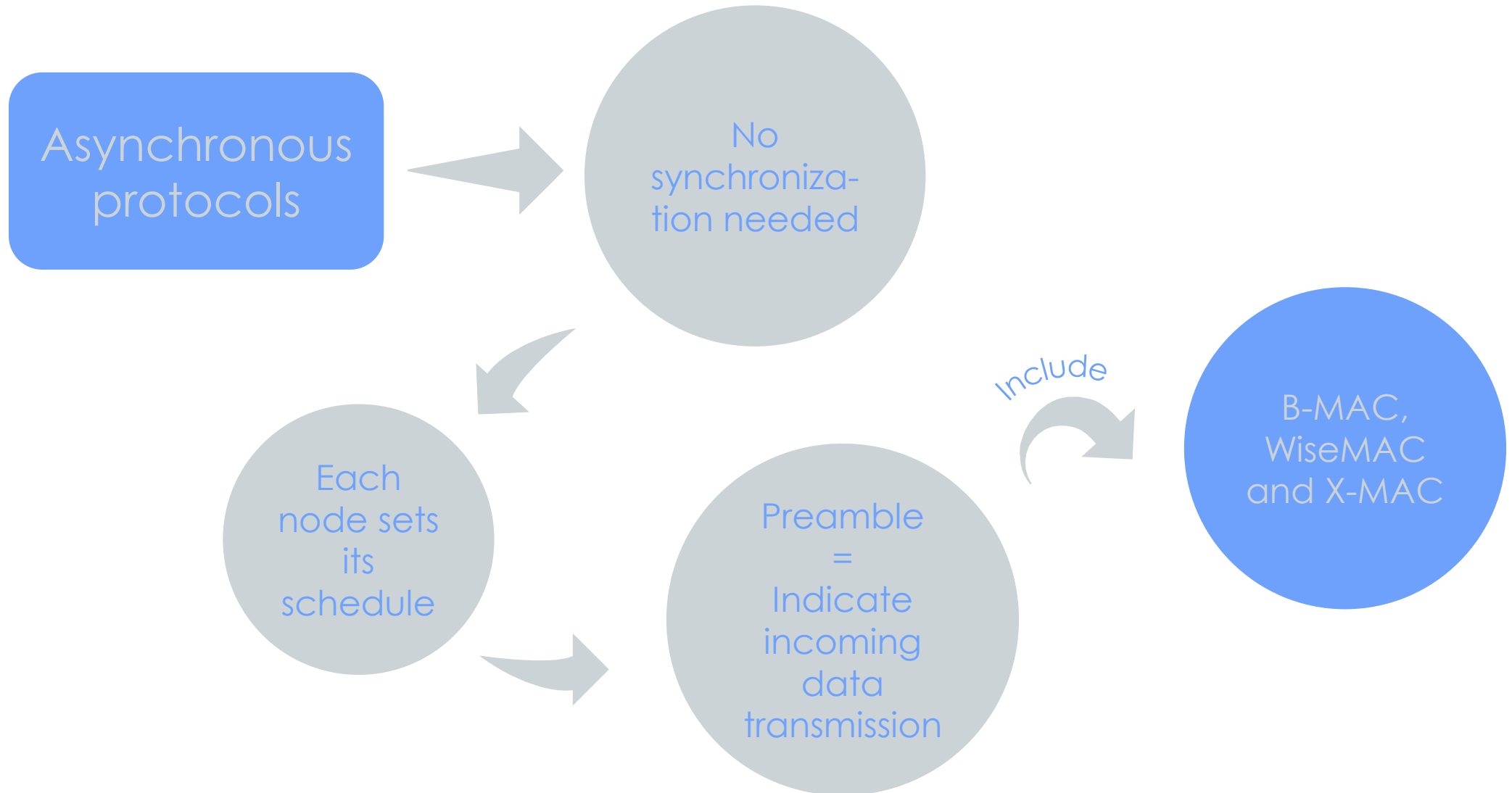
Advantages

But

Listening period to detect other nodes with different schedule  
=  
Packet overheard



# III. CONTENTION BASED PROTOCOLS



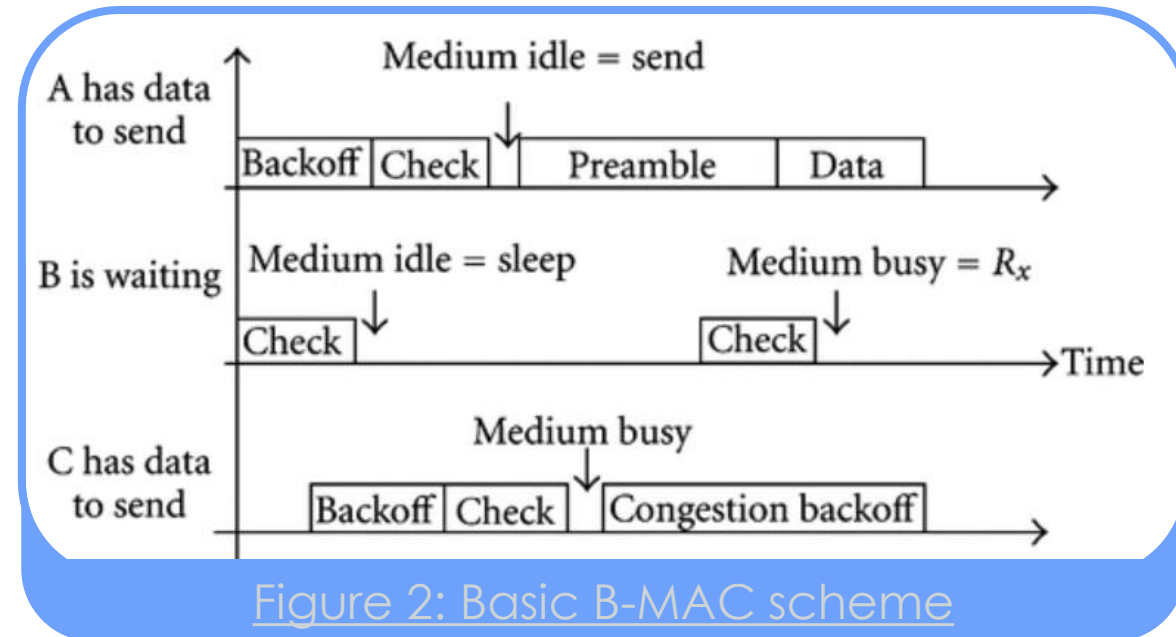


# III. CONTENTION BASED PROTOCOLS

B-MAC protocol

Use of low-power listening

The preamble is broadcasted



No use of RTS/CTS

Advantages

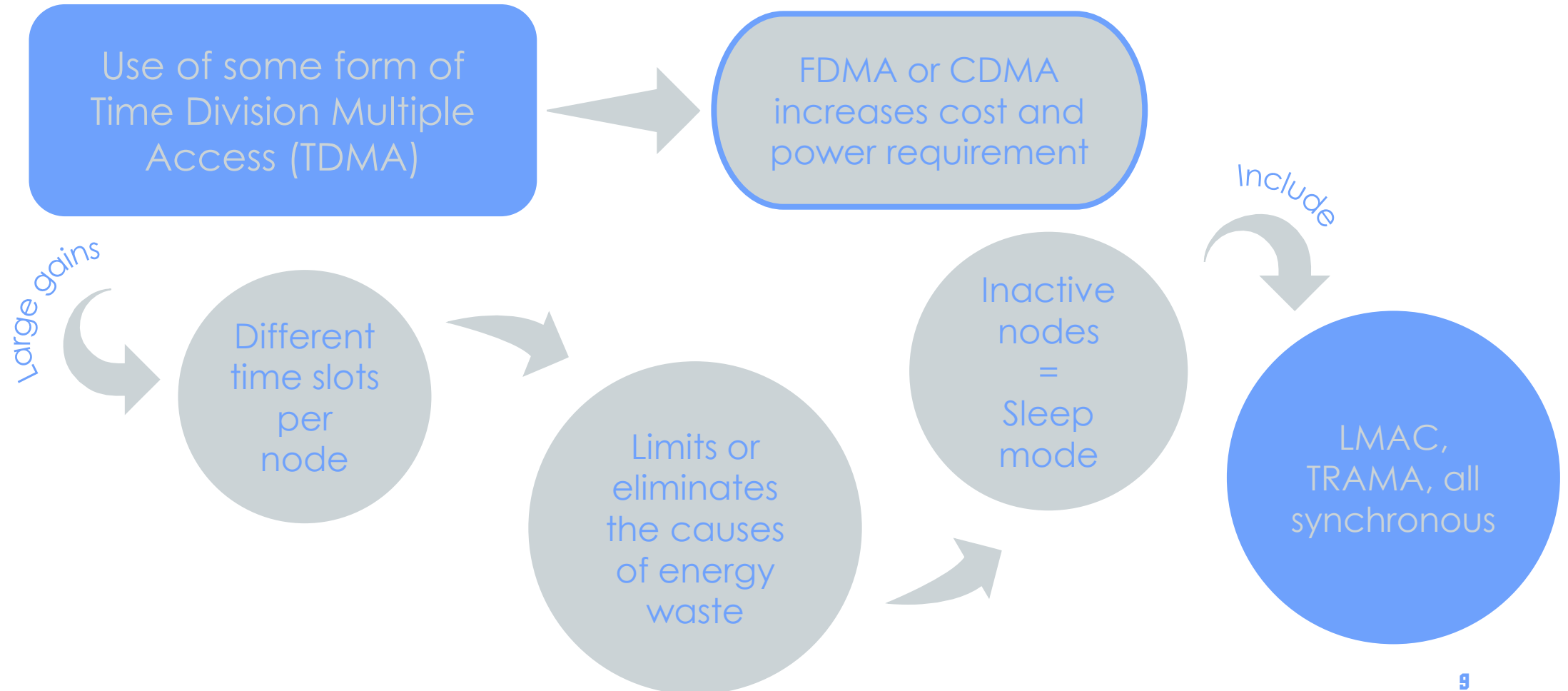
But

Drawbacks

- Overhearing
- Excess latency at each hop
- Effect on overall performance

# IV. SCHEDULED BASED PROTOCOLS

Coordinates sensor nodes with a common schedule



# IV. SCHEDULED BASED PROTOCOLS

L-MAC protocol

TDMA  
based

Timeframes divided  
into time slots

Number of time  
slots is configurable

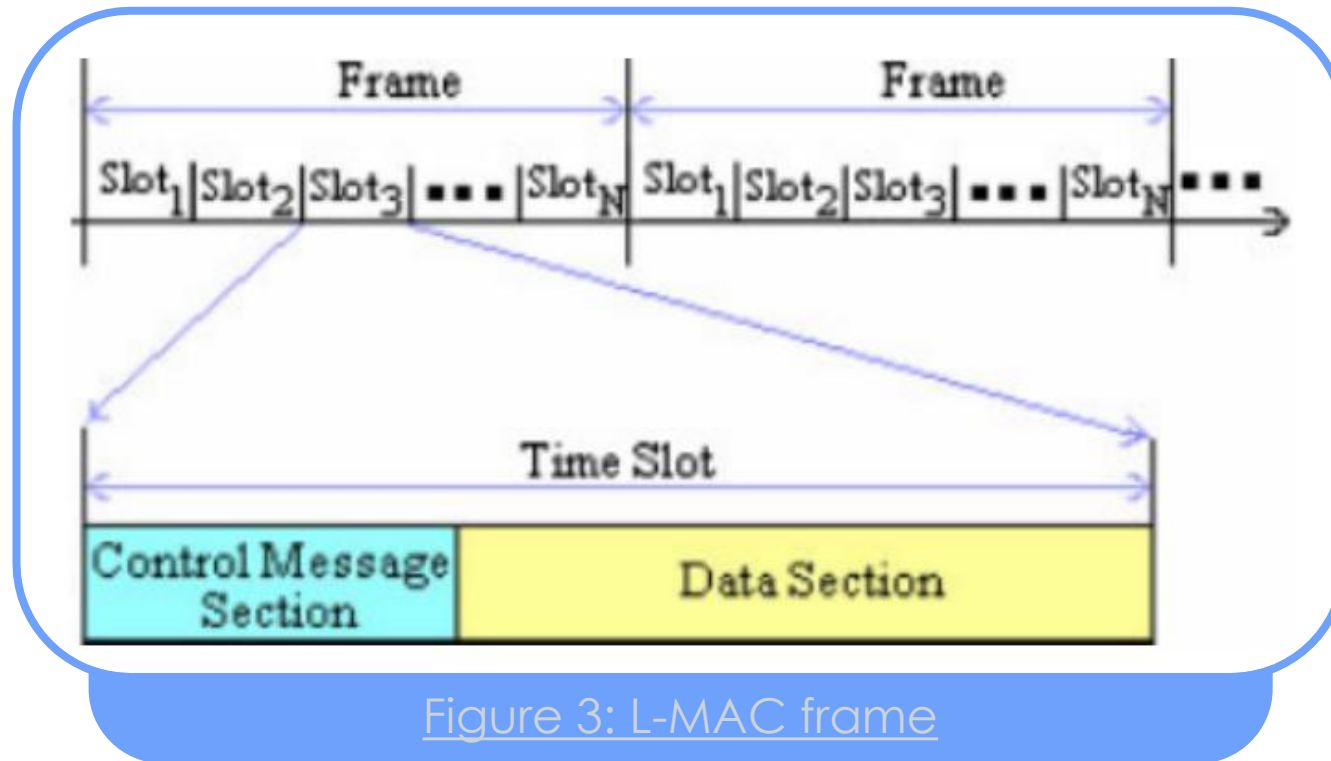
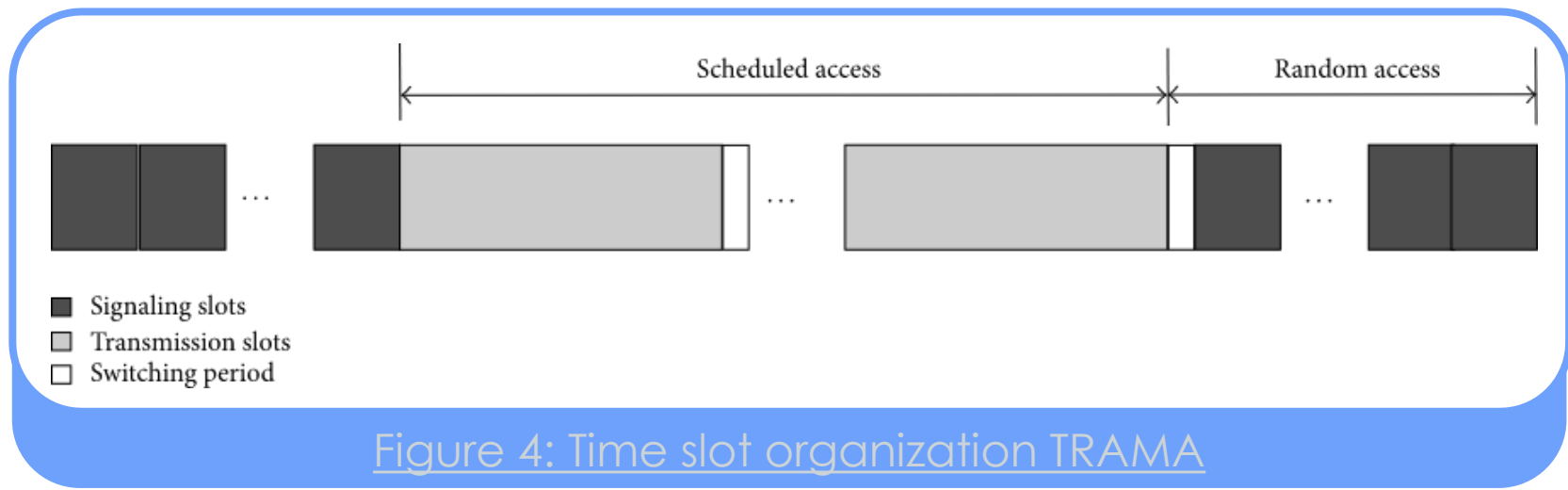
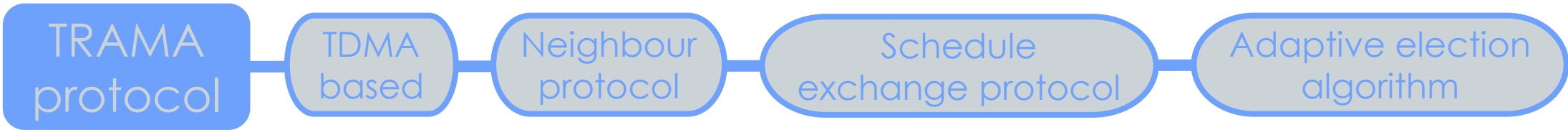


Figure 3: L-MAC frame

## Advantages

- Saves power
- No collisions or retransmission

# IV. SCHEDULED BASED PROTOCOLS

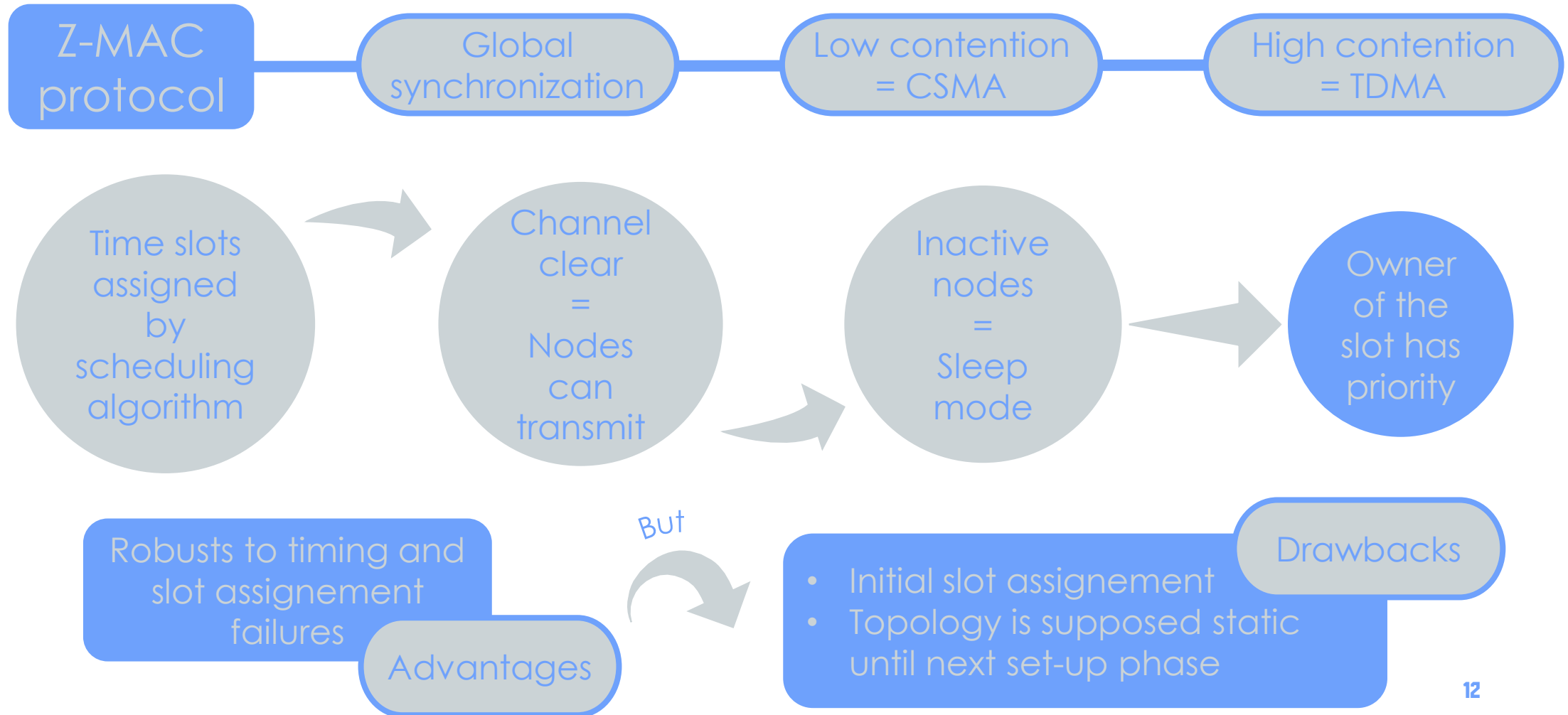


- Reduce energy consumption
  - No collisions
  - Usage of low power sleep mode
- Advantages



# V. HYBRIDS

Combine the concepts of synchronous protocols and preamble



# VI. CONCLUSION

Protocol name	Channel access type	Clock sync	Energy consumption	Mobility	Energy conservation factors
S-MAC	CSMA	Yes	Reception: 0,65 $\mu$ J/bit Transmission: 1,24 $\mu$ J/bit Idle: 0,65 $\mu$ J/bit Sleep: 7,4.10 <sup>-4</sup> J/bit	No (MS-MAC)	Overhearing, idle listening, latency
B-MAC	CSMA	No		Yes	Overhearing, collision
L-MAC	TDMA	Yes	Reception: 0,47 $\mu$ J/bit Transmission: 0,7 $\mu$ J/bit Sleep : 5.10 <sup>-4</sup> J/bit	No	Overhearing, idle listening
TRAMA	TDMA	Yes		No	
Z-MAC	CSMA/ TDMA	Yes		No	Overhead

The URL for all sources (pictures, graphs, ...) are embedded in the figure title.