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PROJECT: LORA-2-LORA

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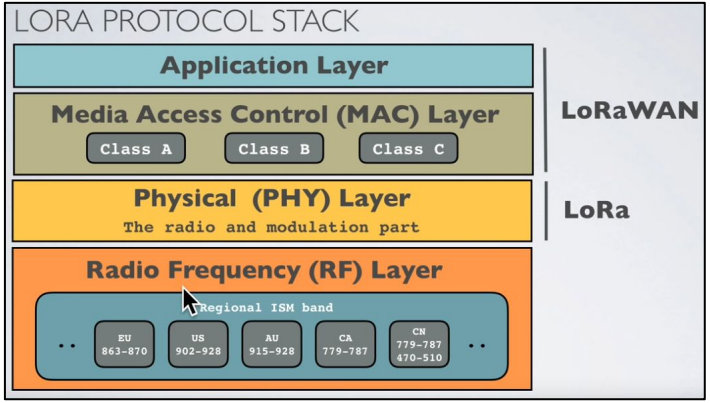
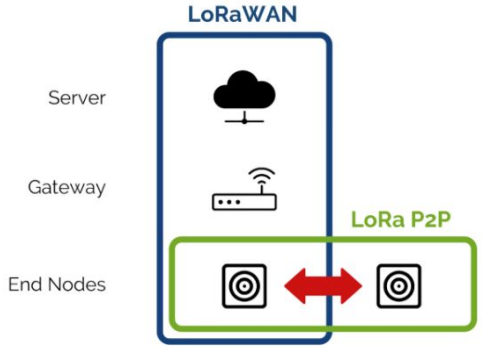
THEORETICAL INTRODUCTION

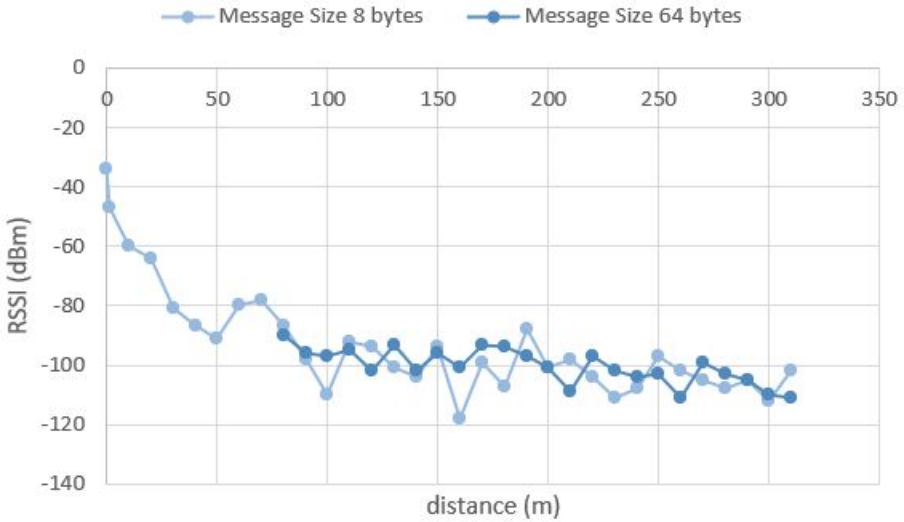
- LoRa: Radio frequency carrier signal based in the physical layer, converts data to signals;
- LoRa modulation is also known as CSS (Chirp Spread Spectrum) modulation;
- Spreading Factor (SF) between 7 and 12;
- Range between 2-5 km (urban) 5-15 km (rural);
- Data rates up to 50 kbps;
- LoRa uses radio frequency bands like EU433 (433.05-434.79 MHz) and EU863-870 (863–870/873 MHz) in Europe;
- Peer-to-Peer (P2P) LoRa Communication;
- Increase the range and flexibility of LoRaWAN.

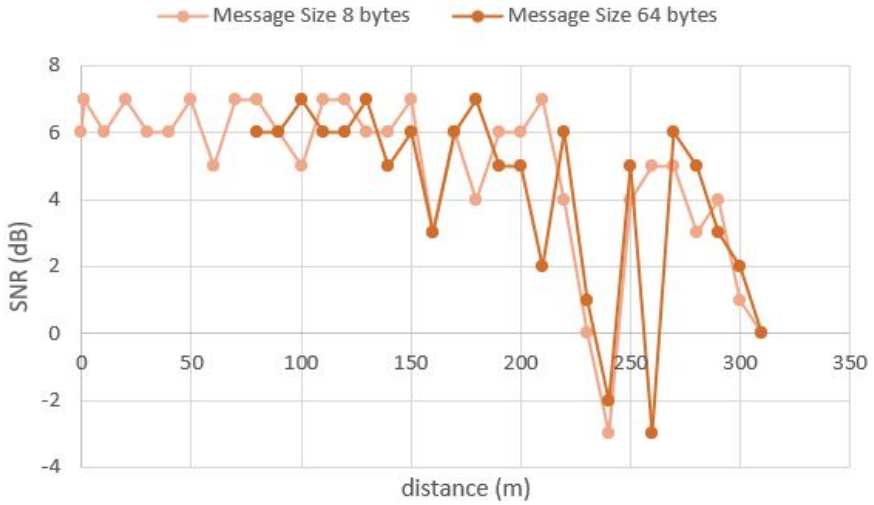




THE IMPACT OF DISTANCE ON RSSI AND SNR

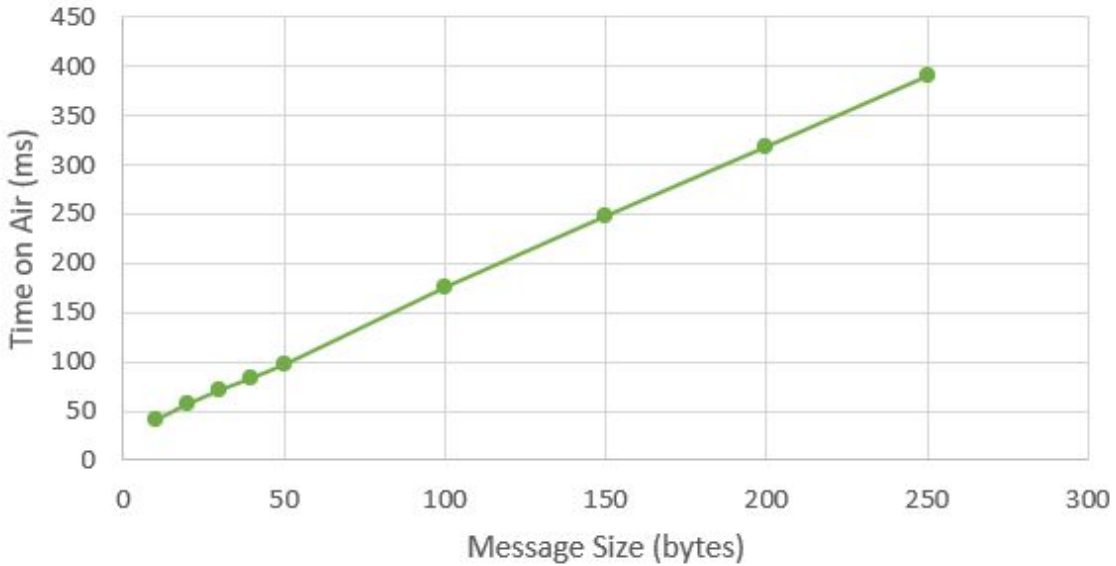
- RSSI between -30 dBm (strong) and -120 dBm (weak);
- SNR between -20 dB (more corrupted) and +10 dB (less corrupted).





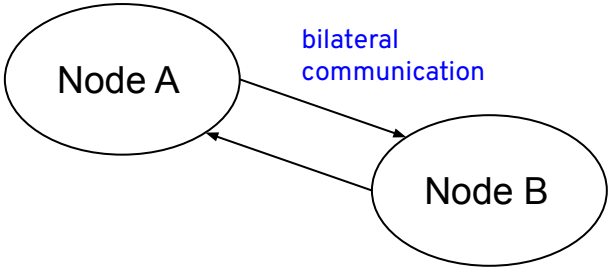
THE IMPACT OF MESSAGE SIZE ON TOA

- ToA (Time On Air)



DEMONSTRATION

- Node A sends a boolean message to turn led on or off, and the temperature (“True/False,Temperature”) to Node B, the parsing of the message is done at the Application Layer
- Node B sends a message indicating if the led is on or off to Node A



Node A

```
Temperature: 8.5 C
[Node A] Changing led to Off
No response from Node B yet ...
```

Node B

```
Led Off
Temperature 8.0

Led Off
Temperature 8.0
```