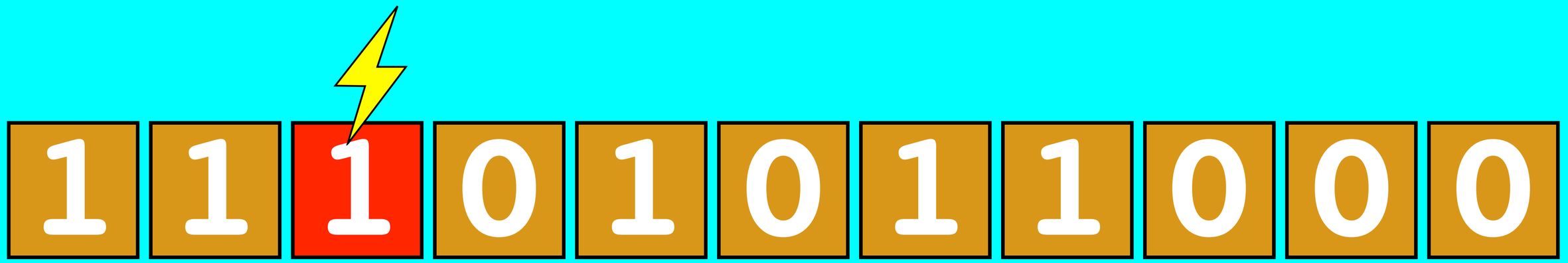
LORA / LORAWAN TUTORIAL 14

Forward Error Correction & Coding Rate



INTRO

- In this tutorial I will explain what Forward Error Correction and coding rates are.

FORWARD ERROR CORRECTION

- Forward Error Correction (FEC) is the process where error correction bits are added to the transmitted data.
- These redundant bits helps to restore the data when the data gets corrupted by interference.
- If more error correction bits are added, the easier the data can be corrected.
- However by adding more error correction bits, more data is transmitted which decreases the battery life.

CODING RATE

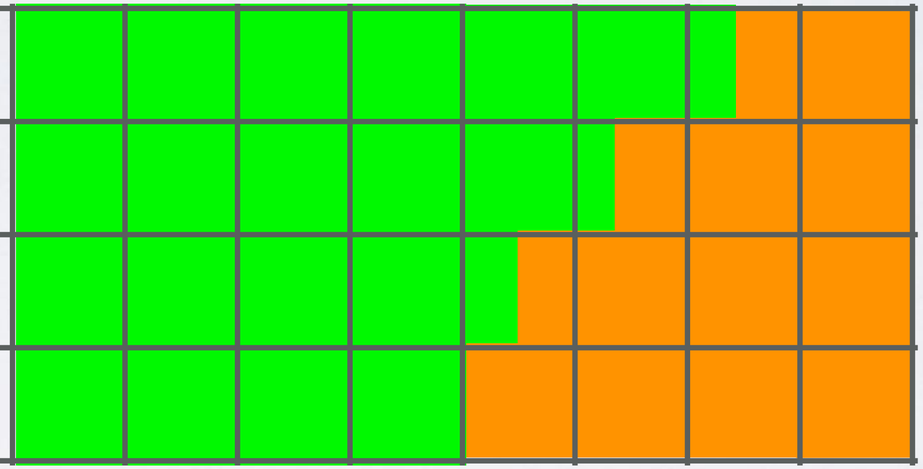
- The coding rate refers to the proportion of the transmitted bits that actually carries information.

- LoRa allowed coding rate values: CR = 4/5, 4/6, 4/7 or 4/8.
  Another notation:
  CR = 4 / (4 + *CR*) where *CR* = 1,2,3,4

Coding Rate (CR)	CR = 4 / (4 + *CR*)
1	4/5
2	4/6
3	4/7
4	4/8

CODING RATE

For example, SF = 8 (the transmitted bits = 8)

CR=1 (4/5) - 8x(4/5) = 6.4	
CR=2 (4/6) - 8x(4/6) = 5.3	
CR=3 (4/7) - 8x(4/7) = 4.5	
CR=4 (4/8) - 8x(4/8) = 4.0	

carries information

for error correction