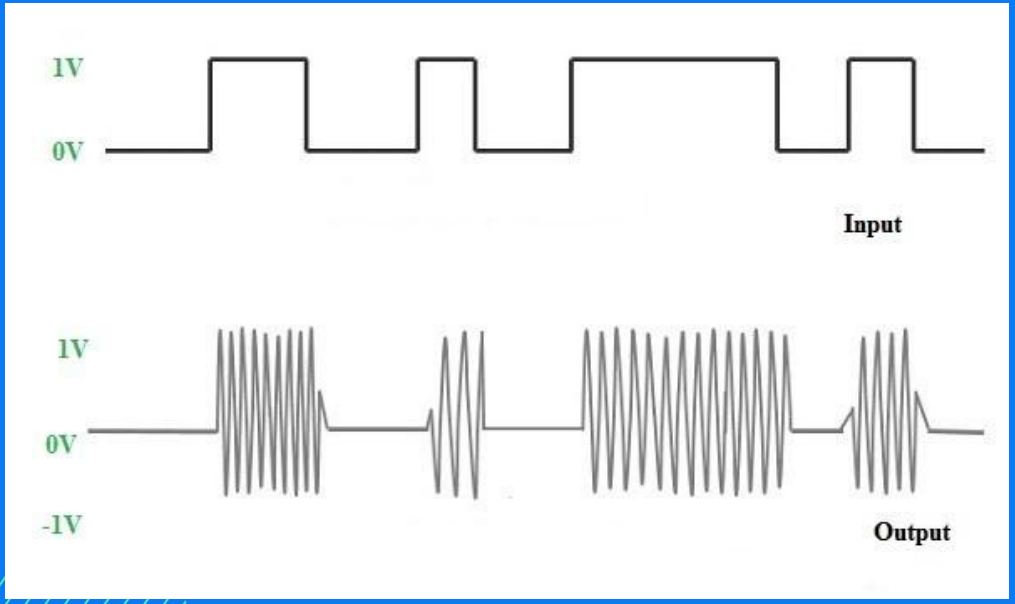
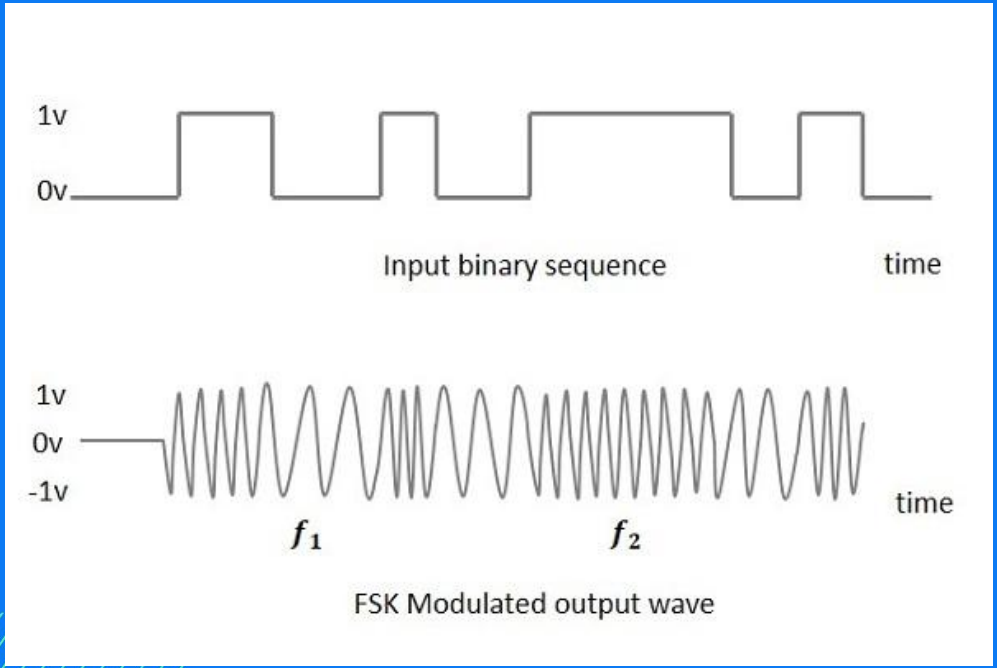
La modulazione OOK



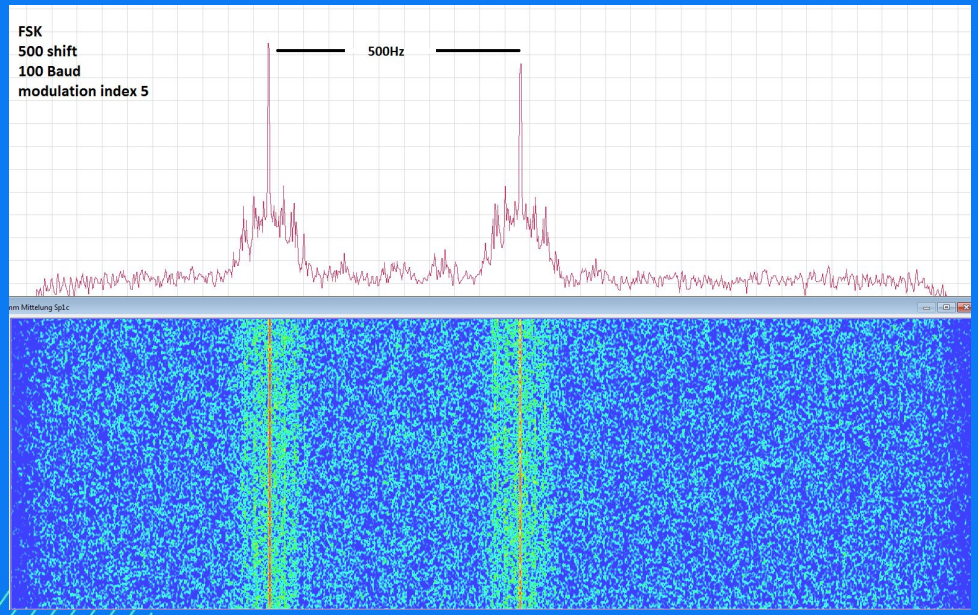
Assenza o presenza del segnale RF. Come una lampadina che lampeggia.

La modulazione FSK

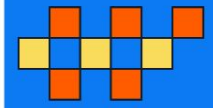


Modifica della frequenza di trasmissione. Come una luce che cambia colore.

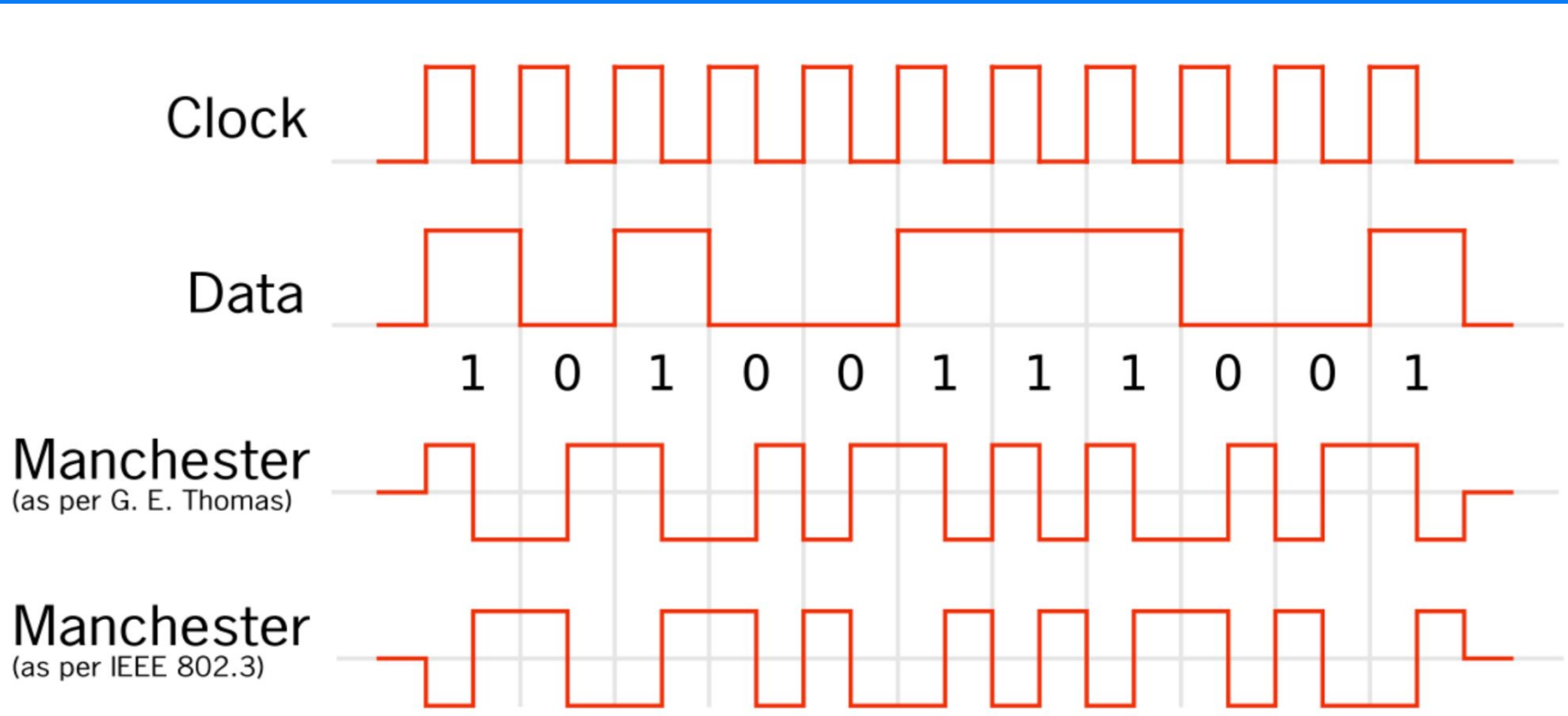
Lo spettro FSK



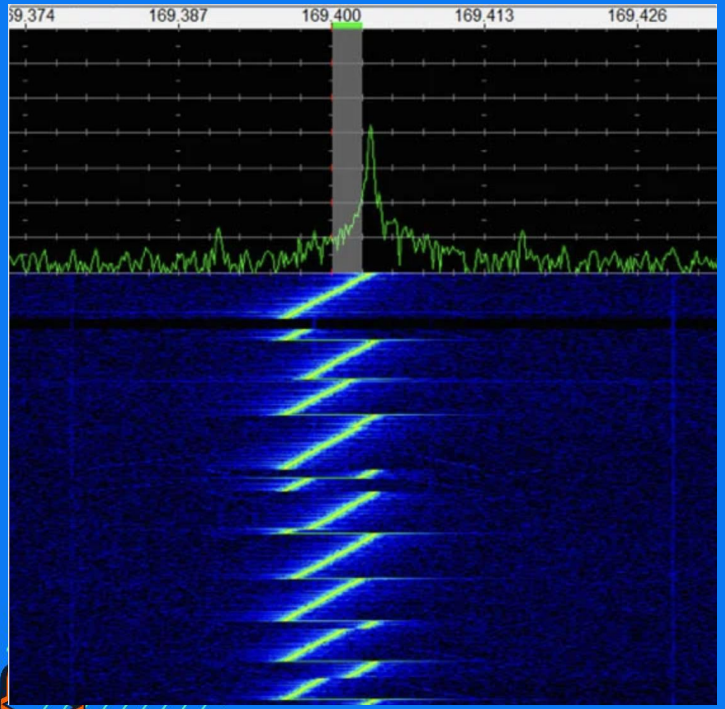
Lo spettro di una trasmissione FSK.

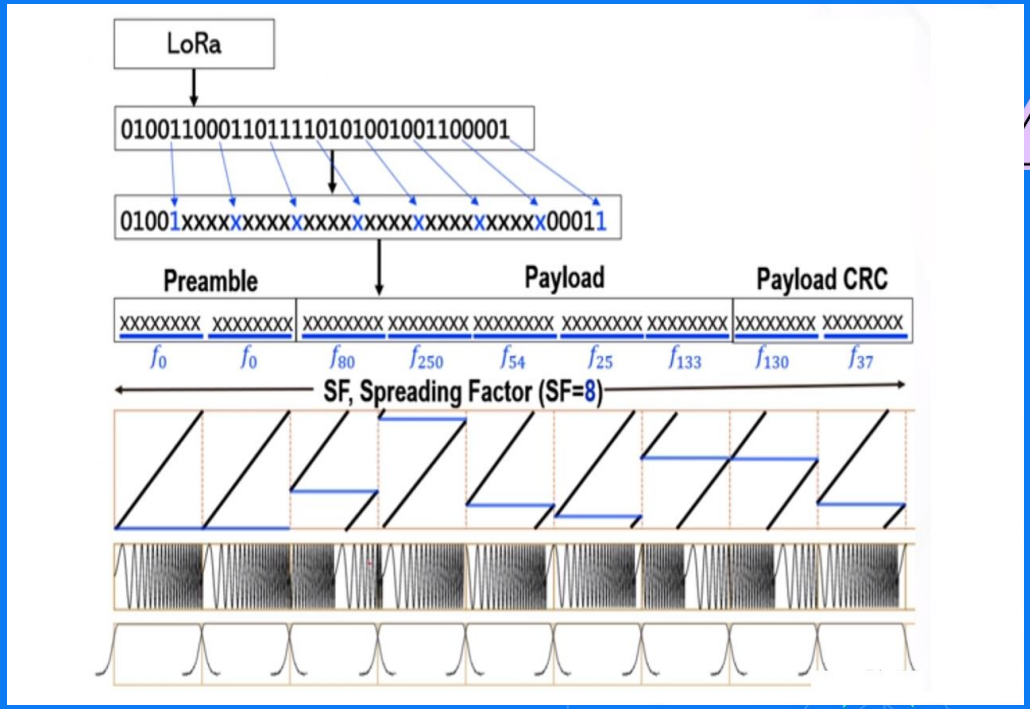


Codifiche dei bit

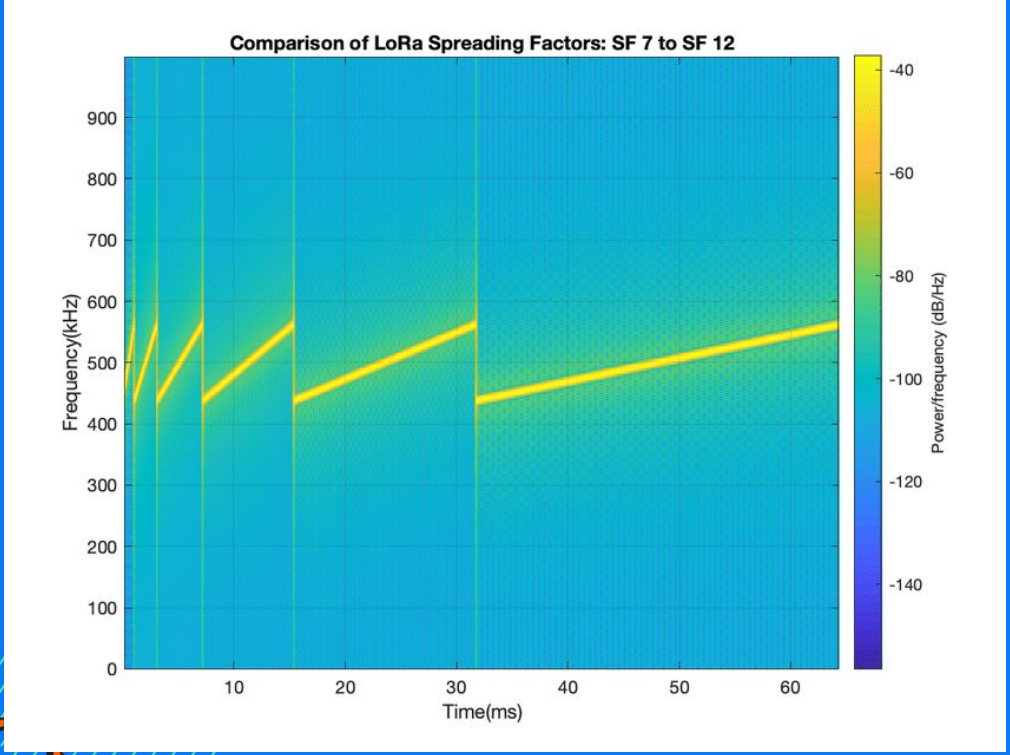


La modulazione LoRa





Spreading factor

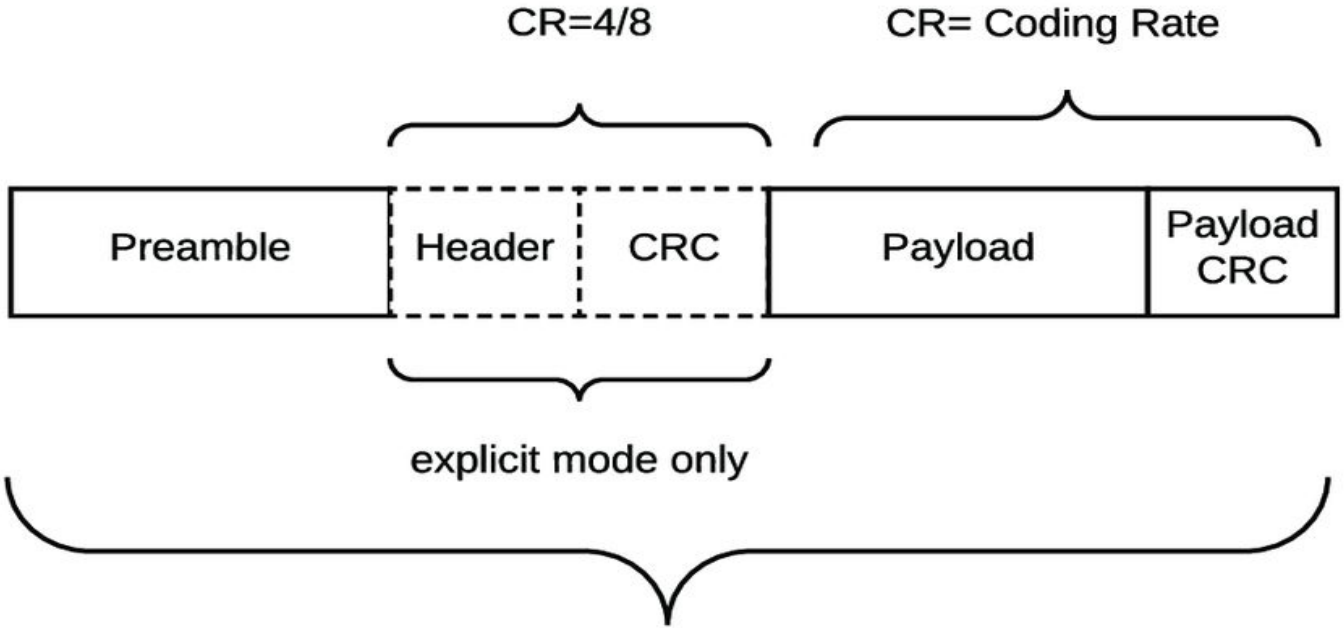


$$DR = 12 \cdot \frac{125\ kHz}{2^{12}} \cdot \frac{4}{8}$$

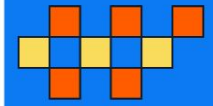
$$DR = 183.1055\ bps.$$

LoRa chips

Semtech	Frequenze
SX127x (1276, 1278, ...)	433/868 Mhz (EU)
SX126x (1262, 1268, ...)	915 Mhz (US)



SF = Spreading Factor

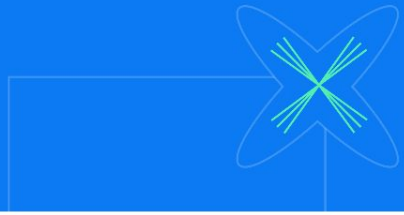


Ranges

Vista ottica: 80 km

Area urbana con molti edifici: 500m / 1km

Campo aperto con barriere vulcaniche: ~ 5 km



LILYGO devices

LILYGO®

LoRa32 V2.1_1.6

16 reviews

ESP32 433/868/915MHZ 0.96 Inch OLED SD Card WIFI Module

$14.39 USD

LoRa32 V2.1_1.6

Paxcounter 433MHZ CH9102F[Q13

Quantity

− 1 +

Add to cart

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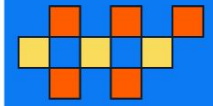
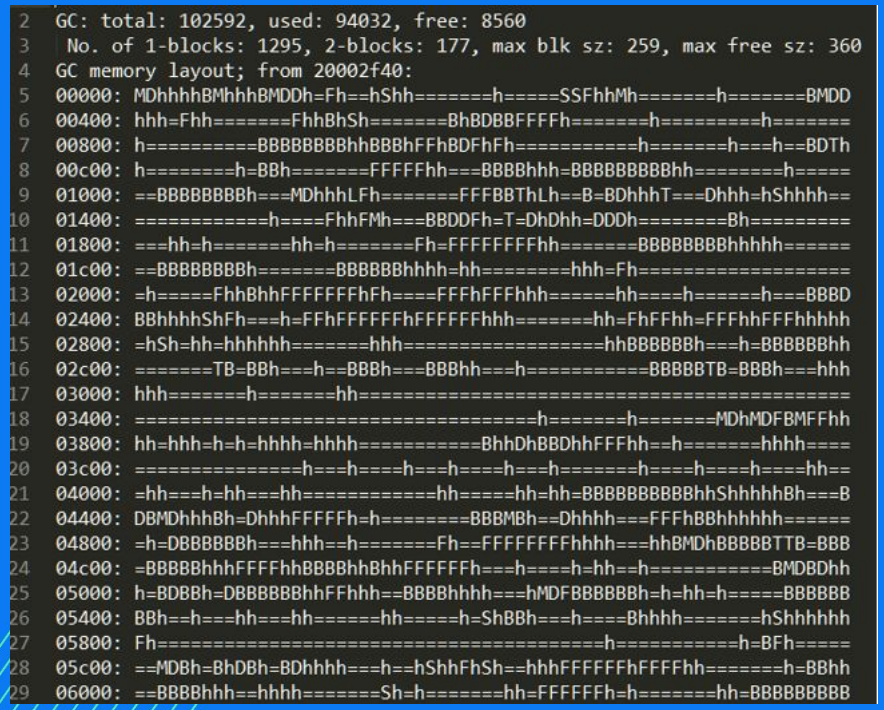


MicroPython

- Supporta Python 3 (anche asyncio!)
- Implementato in C99
- 256k di binario, minimo 16k RAM
- Licenza MIT
- Supporta praticamente tutte le MCU
- Sviluppo molto più UNIX-like di Arduino IDE
- Native code emitter, Viper code emitter
- REPL e console via seriale

MicroPython



The limit is the space not the speed...

FREAKWAN

NOT
INVENTED
HERE
SYNDROME

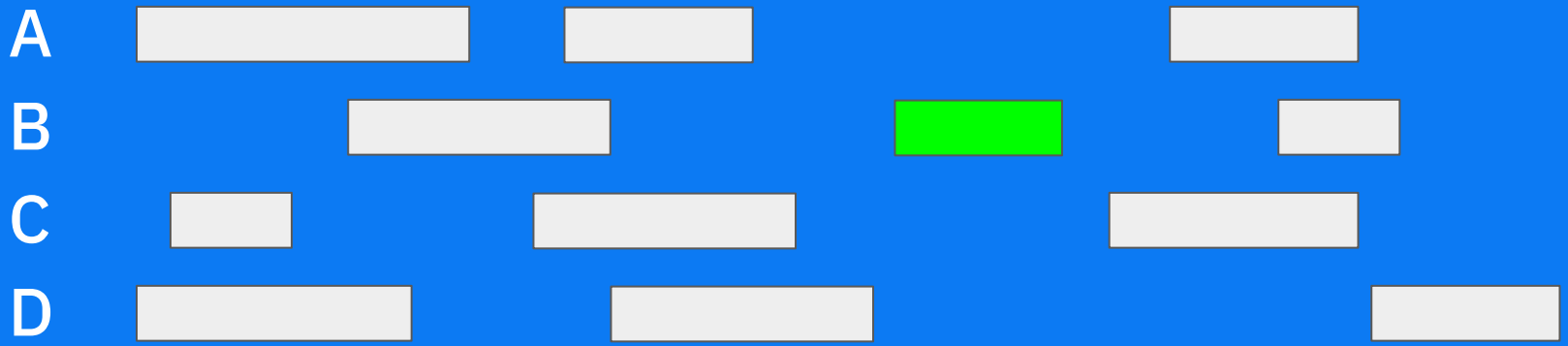
- Talk via phone (BTE)
- Routing
- IRC, ACKs, images!
- Network sensing
- Support for sensors
- ...

Python VS C (for low level code)

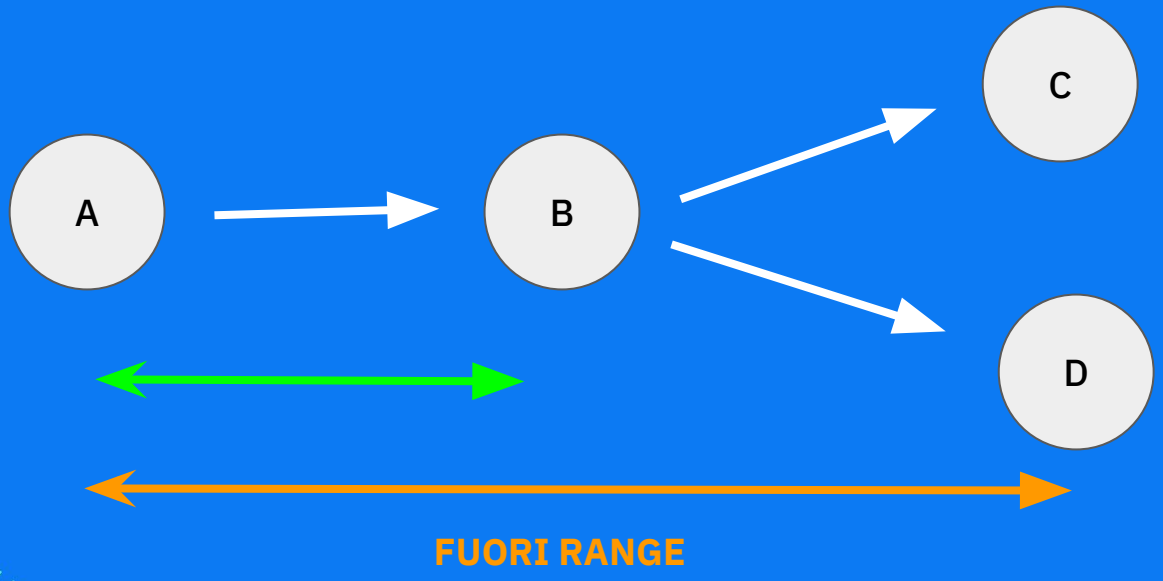

```
struct.pack("<BB6sBB",self.type,
self.flags,self.sender,self.seen
,len(self.nick))+self.nick+self.
text
```

```
m->type = MSG_TYPE_DATA;
m->flags = flags;
m->data.id[0] = random(256);
m->data.id[1] = random(256);
m->data.id[2] = random(256);
m->data.id[3] = random(256);
m->data.ttl = 15;
```

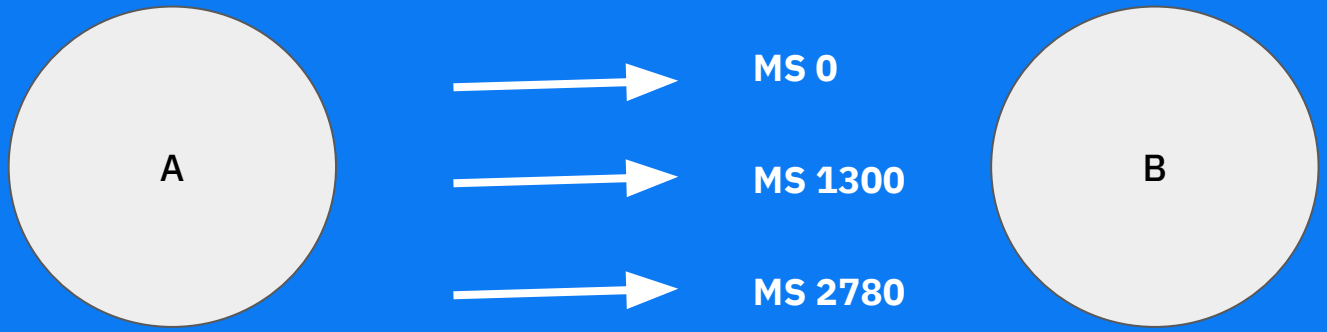
Long time-on-air? Collisions!



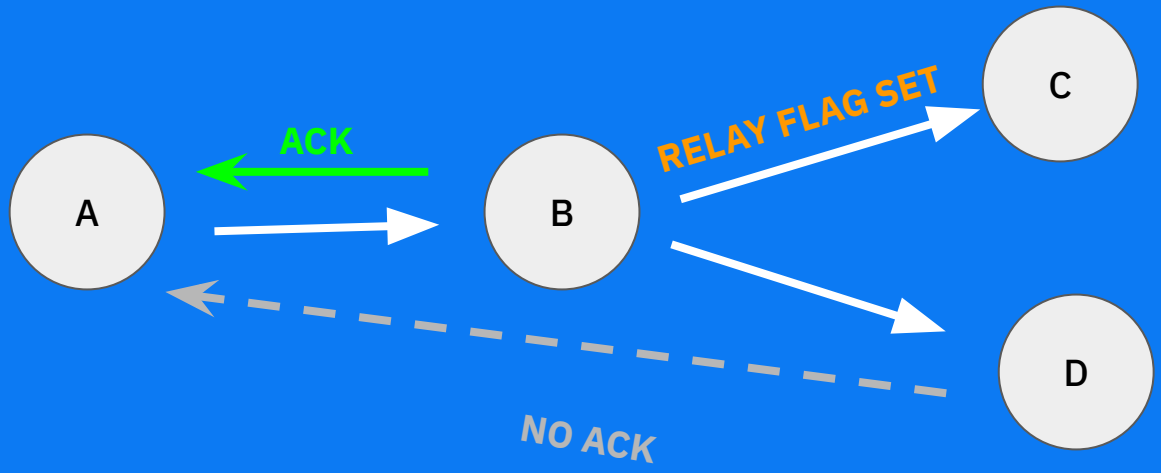
Flood routing



Ritrasmissioni

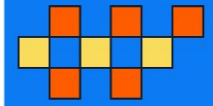


ACKs



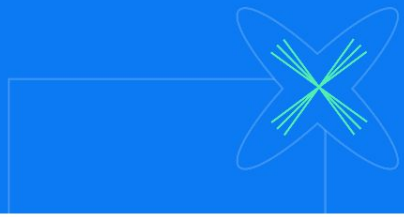
Nodes discovery (HELLO messages)


```
!ls
1. 0c8b95a9eb78 (nirvana868> Hi There!) 101.6
sec ago  with RSSI:-29 It can see 2 nodes.
2. 0c8b95a57bec (antirez> Hi There!) 34.5 sec
ago  with RSSI:-55 It can see 2 nodes.
```

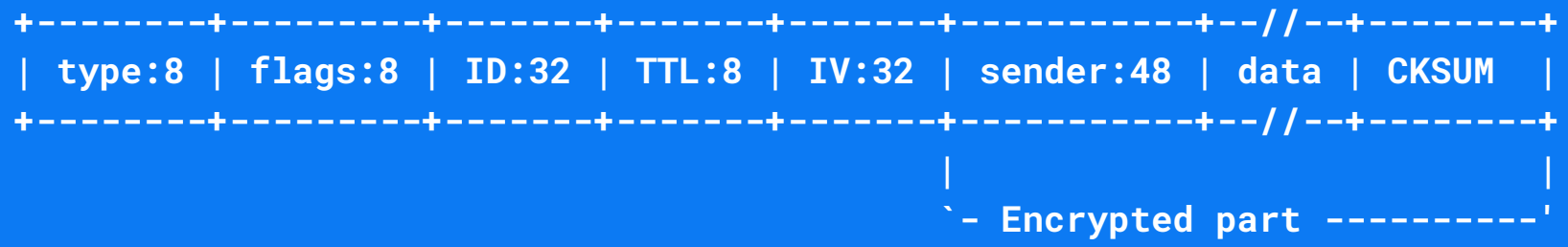


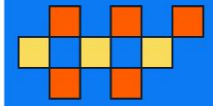
Soppressione delle ritrasmissioni

Quando gli ACK sono stati ricevuti da tutti i vicini conosciuti, possiamo smettere di effettuare le ritrasmissioni.



Cifratura


type:8
flags:8
ID:32
TTL:8
IV:32
sender:48
data
CKSUM
Encrypted part



Ciao raga :)

Già vi ho stressato abbastanza.

Domande?