

TP Lorawan

Exercice 1 et 2

Nous utilisons le deveui DEADDEAD00090004.

Nous tentons dès le début d'envoyer des données, les exercices 1 et 2 sont donc plus ou moins faits en même temps.

Après avoir effectué les quelques modifications nécessaires au fonctionnement du script python, il s'avère que la commande `mac set dr` nous renvoie une erreur, suite à quoi la connexion est refusée.

```
tnt3192a@u3-203-11d:~/documents/work/M2/IoT/TP1$ python3 rn_2483.py

Resetting device :
RN2483 1.0.1 Dec 15 2015 09:38:09

Setting the appkey : 0123456789ABCDEF0123456789ABCDEF
ok

Setting the appeui : DEAD25DEAD25DEAD
ok

Setting the deveui : DEADDEAD00090004
ok

Setting the data-rate : 0
invalid_param

Saving mac settings
ok

Preparing to join the network
no_free_ch

Sending message: 68656c6c6f2d3034 to broker
not_joined

Waiting for 3s before sending again
```

Cette erreur finit par être résolue simplement en changeant la carte.

Puis un `no_free_channel` quand on tente de rejoindre le réseau.

```
tnt3192a@u3-203-11d:~/documents/work/M2/IoT/TP1$ python3 rn_2483.py

Resetting device :
RN2483 1.0.1 Dec 15 2015 09:38:09

Setting the appkey : 0123456789ABCDEF0123456789ABCDEF
ok

Setting the appeui : DEAD25DEAD25DEAD
ok

Setting the deveui : DEADDEAD00090004
ok

Saving mac settings
ok

Preparing to join the network
no_free_ch

Sending message: 68656c6c6f2d3034 to broker
not_joined

Waiting for 3s before sending again
```

Nous constatons que l'utilisation simultanées d'une carte pour chaque binome pose problème au niveau du réseau. Même lorsque nous arrivons finalement à nous connecter, le broker nous renvoie **busy** quand nous tentons d'envoyer des données

```
Resetting device :
RN2483 1.0.5 Oct 31 2018 15:06:52

Setting the appkey : 0123456789ABCDEF0123456789ABCDEF
ok

Setting the appeui : DEAD25DEAD25DEAD
ok

Setting the deveui : DEADDEAD00090004
ok

Setting the data-rate : 2
ok

Saving mac settings
ok

Preparing to join the network
ok

Sending message: 68656c6c6f2d3034 to broker
not_joined

Waiting for 5s before sending again
accepted

Sending message: 68656c6c6f2d3034 to broker
ok

Waiting for 5s before sending again

Sending message: 68656c6c6f2d3034 to broker
busy

Waiting for 5s before sending again


Sending message: 68656c6c6f2d3034 to broker
busy

Waiting for 5s before sending again

Sending message: 68656c6c6f2d3034 to broker
busy

Waiting for 5s before sending again
```

La majeure partie du reste du TP a donc été réalisée hors des heures allouées.



```
6 oct. 13:58
abdoulhamid@Legion: ~/SECIL/IOT/TP1

Waiting for 5s before sending again
mac_tx_ok

Sending message: 68656c6cf2d35 to broker
ok

Waiting for 5s before sending again
abdoulhamid@Legion:~/SECIL/IOT/TP1$ sudo python3 script.py

Resetting device :
RN2483 1.0.1 Dec 15 2015 09:38:09

Setting the appkey : 0123456789ABCDEF0123456789ABCDEF
ok

Setting the appeal : DEAD25DEAD25DEAD
ok

Setting the deveul : DEADDEAD00090006
ok

Setting the data-rate : 0
ok

Saving mac settings
ok

Preparing to join the network
ok

Setting the data-rate : 0
ok

Sending message: 68656c6cf2d30 to broker
not_joined

Waiting for 5s before sending again
accepted

Sending message: 68656c6cf2d30 to broker
ok

Waiting for 5s before sending again
mac_tx_ok

Sending message: 68656c6cf2d30 to broker
ok

Waiting for 5s before sending again
mac_tx_ok

Sending message: 68656c6cf2d30 to broker
ok
```

Exercice 3

Nous observons les trames envoyées sur le réseau avec la commande :

```
sudo mosquitto_sub -h neocampus.univ-tlse3.fr -t TestTopic/lora/# -u test -P test.
```

```

Abilities  Terminal  6oct. 13:57
abduohamid@legion:~/SECIL/OT/TP1
abduohamid@legion:~$ cd SECIL/
abduohamid@legion:~/SECIL$ cd /ot/
abduohamid@legion:~/SECIL/ot$ cd TP1
abduohamid@legion:~/SECIL/OT/TP1$ ls
script.py
abduohamid@legion:~/SECIL/OT/TP1$ mosquito sub -h neocampus.univ-tlse3.fr -t TestTopic/Lora
Connection error: Connection Refused: not authorised.
abduohamid@legion:~/SECIL/OT/TP1$ sudo mosquito sub -h neocampus.univ-tlse3.fr -t TestTopic/Lora
[sudo] Mot de passe de abduohamid:
Connection error: Connection Refused: not authorised.
abduohamid@legion:~/SECIL/OT/TP1$ sudo mosquito sub -h neocampus.univ-tlse3.fr -t TestTopic/Lora/# -u test -P Test
()
[all gw":{"desc":"MCTCDIP-266A /LoRa gateway @ Ecolab","gpsalt":176,"gpspos":{"lat":43.55805,"lon":11.46959},"lsnr":{"id":5.0,"mac":"00080000A0004F86","rsst":180,"tme":"2023-10-06T11:34:34.655045Z","tnms":1380627292654},"app":"neocampus-test","appargs":{"app arg"},"appid":"neocampus","battery":255,"best gw":{"desc":"MCTCDIP-266A /LoRa gateway @ Ecolab","gpsalt":176,"gpspos":{"lat":43.55805,"lon":11.46959},"lsnr":{"id":5.0,"mac":"00080000A0004F86","rsst":100,"tme":"2023-10-06T11:34:34.655045Z","tnms":1380627292654},"codr":{"4/5","data":"6805C6C6CFD30336","datetime":"2023-10-06T11:34:34Z","dtr":{"SF12BH125"},"lab-device-06","devaddr":"8B5D5A5F","deveui":"DEAD0EAD00090006","fcnt":0,"freq":868.1,"lsnr":{"id":5.0,"mac":"00080000A0004F86","netid":"000042","port":220,"rsst":180,"tme":"2023-10-06T11:34:34.656202Z","tnms":1380627299602},"desc":"MCTCDIP-210A /LoRa gateway @ BU sant","gpsalt":204,"gpspos":{"lat":43.561385403869,"lon":11.4564394580667},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":103,"tme":"2023-10-06T11:34:41.703744Z"},"desc":"MCTCDIP-210A /LoRa gateway @ BU sciences","gpsalt":157,"gpspos":{"lat":43.5635075916262,"lon":11.465505361557068},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":110,"tme":"2023-10-06T11:34:41.683499Z"},"app":"neocampus-test","appargs":{"app arg"},"appid":"neocampus","battery":255,"best gw":{"desc":"MCTCDIP-266A /LoRa gateway @ Ecolab","gpsalt":176,"gpspos":{"lat":43.55805,"lon":11.46959},"lsnr":{"id":5.0,"mac":"00080000A0004F86","rsst":101,"tme":"2023-10-06T11:34:41.662002Z","tnms":1380627299602},"codr":{"4/5","data":"6805C6C6CFD30336","datetime":"2023-10-06T11:34:41Z","dtr":{"SF12BH125"},"lab-device-06","devaddr":"8B5D5A5F","deveui":"DEAD0EAD00090006","fcnt":1,"freq":868.1,"lsnr":{"id":5.0,"mac":"00080000A0004F86","netid":"000042","port":220,"rsst":180,"tme":"2023-10-06T11:34:41.679202Z","tnms":1380627306760},"desc":"MCTCDIP-266A /LoRa gateway @ BU sant","gpsalt":204,"gpspos":{"lat":43.561385403869,"lon":11.4564394580667},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":103,"tme":"2023-10-06T11:34:41.679733Z"},"desc":"MCTCDIP-210A /LoRa gateway @ BU sciences","gpsalt":157,"gpspos":{"lat":43.5635075916262,"lon":11.465505361557068},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":110,"tme":"2023-10-06T11:34:41.683536Z"},"app":"neocampus-test","appargs":{"app arg"},"appid":"neocampus","battery":255,"best gw":{"desc":"MCTCDIP-266A /LoRa gateway @ Ecolab","gpsalt":176,"gpspos":{"lat":43.55805,"lon":11.46959},"lsnr":{"id":5.0,"mac":"00080000A0004F86","rsst":96,"tme":"2023-10-06T11:34:46.670920Z","tnms":1380627306760},"codr":{"4/5","data":"6805C6C6CFD30336","datetime":"2023-10-06T11:34:46Z","dtr":{"SF12BH125"},"lab-device-06","devaddr":"8B5D5A5F","deveui":"DEAD0EAD00090006","fcnt":2,"freq":868.5,"lsnr":{"id":4.0,"mac":"00080000A0004F86","netid":"000042","port":220,"rsst":96,"tme":"2023-10-06T11:34:46.679733Z"},"desc":"MCTCDIP-266A /LoRa gateway @ Ecolab","gpsalt":176,"gpspos":{"lat":43.55805,"lon":11.46959},"lsnr":{"id":5.0,"mac":"00080000A0004F86","rsst":96,"tme":"2023-10-06T11:34:55.679733Z","tnms":1380627313679},"desc":"MCTCDIP-210A /LoRa gateway @ BU sant","gpsalt":204,"gpspos":{"lat":43.561385403869,"lon":11.4564394580667},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":101,"tme":"2023-10-06T11:34:55.720826Z"},"desc":"MCTCDIP-210A /LoRa gateway @ BU sciences","gpsalt":157,"gpspos":{"lat":43.5635075916262,"lon":11.465505361557068},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":117,"tme":"2023-10-06T11:34:55.679733Z"},"app":"neocampus-test","appargs":{"app arg"},"appid":"neocampus","battery":255,"best gw":{"desc":"MCTCDIP-266A /LoRa gateway @ Ecolab","gpsalt":176,"gpspos":{"lat":43.55805,"lon":11.46959},"lsnr":{"id":5.0,"mac":"00080000A0004F86","rsst":96,"tme":"2023-10-06T11:34:55.679733Z","tnms":1380627313679},"codr":{"4/5","data":"6805C6C6CFD30336","datetime":"2023-10-06T11:34:55Z","dtr":{"SF12BH125"},"lab-device-06","devaddr":"8B5D5A5F","deveui":"DEAD0EAD00090006","fcnt":3,"freq":868.5,"lsnr":{"id":5.0,"mac":"00080000A0004F86","netid":"000042","port":220,"rsst":96,"tme":"2023-10-06T11:35:02.728245Z"},"desc":"MCTCDIP-266A /LoRa gateway @ Ecolab","gpsalt":176,"gpspos":{"lat":43.55805,"lon":11.46959},"lsnr":{"id":4.0,"mac":"00080000A0004F86","rsst":101,"tme":"2023-10-06T11:35:02.728245Z"},"desc":"MCTCDIP-210A /LoRa gateway @ BU sant","gpsalt":204,"gpspos":{"lat":43.561385403869,"lon":11.4564394580667},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":103,"tme":"2023-10-06T11:35:02.728245Z"},"desc":"MCTCDIP-210A /LoRa gateway @ BU sciences","gpsalt":157,"gpspos":{"lat":43.5635075916262,"lon":11.465505361557068},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":117,"tme":"2023-10-06T11:35:02.728245Z"},"app":"neocampus-test","appargs":{"app arg"},"appid":"neocampus","battery":255,"best gw":{"desc":"MCTCDIP-266A /LoRa gateway @ Ecolab","gpsalt":176,"gpspos":{"lat":43.55805,"lon":11.46959},"lsnr":{"id":5.0,"mac":"00080000A0004F86","rsst":101,"tme":"2023-10-06T11:35:02.728245Z"},"desc":"MCTCDIP-210A /LoRa gateway @ BU sant","gpsalt":204,"gpspos":{"lat":43.561385403869,"lon":11.4564394580667},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":103,"tme":"2023-10-06T11:35:02.728245Z"},"desc":"MCTCDIP-210A /LoRa gateway @ BU sciences","gpsalt":157,"gpspos":{"lat":43.5635075916262,"lon":11.465505361557068},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":117,"tme":"2023-10-06T11:35:02.728245Z"},"app":"neocampus-test","appargs":{"app arg"},"appid":"neocampus","battery":255,"best gw":{"desc":"MCTCDIP-266A /LoRa gateway @ Ecolab","gpsalt":176,"gpspos":{"lat":43.55805,"lon":11.46959},"lsnr":{"id":5.0,"mac":"00080000A0004F86","rsst":97,"tme":"2023-10-06T11:35:02.728245Z"},"desc":"MCTCDIP-210A /LoRa gateway @ BU sant","gpsalt":204,"gpspos":{"lat":43.561385403869,"lon":11.4564394580667},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":103,"tme":"2023-10-06T11:35:02.728245Z"},"desc":"MCTCDIP-210A /LoRa gateway @ BU sciences","gpsalt":157,"gpspos":{"lat":43.5635075916262,"lon":11.465505361557068},"lsnr":{"id":4.0,"mac":"0008000000000CF2A","rsst":117,"tme":"2023-10-06T11:35:02.728245Z"},"app":"neocampus-test","appargs":{"app arg"},"appid":"neocampus","battery":255,"best gw":{"desc":"MCTCDIP-266A /LoRa gateway @ Ecolab","gpsalt":176,"gpspos":{"lat":43.55805,"lon":11.46959},"lsnr":{"id":5.0,"mac":"00080
```

Exercise 4

Nous envoyons successivement 30 trames avec un dr de 0 à 5 sur le réseau (et un message contenant le DR afin de les identifier plus facilement une fois reçues sur mosquito).

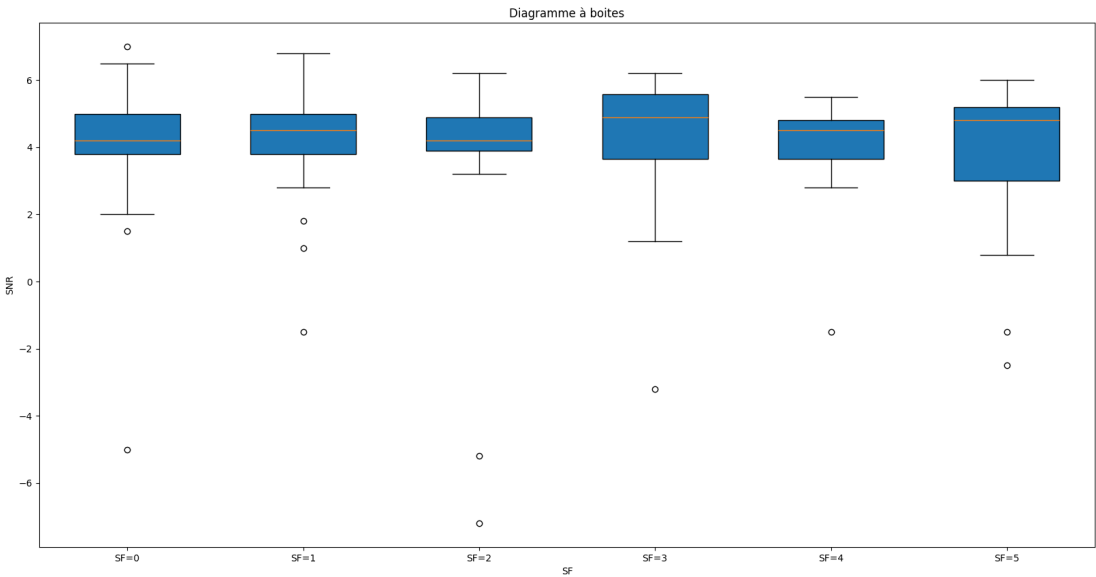
Les trames reçues au niveau de mosquitto sont conservées dans un json avec la commande **sudo**

```
mosquitto_sub -h neocampus.univ-tlse3.fr -t TestTopic/lora/# -u test -P test > donnees.json.
```

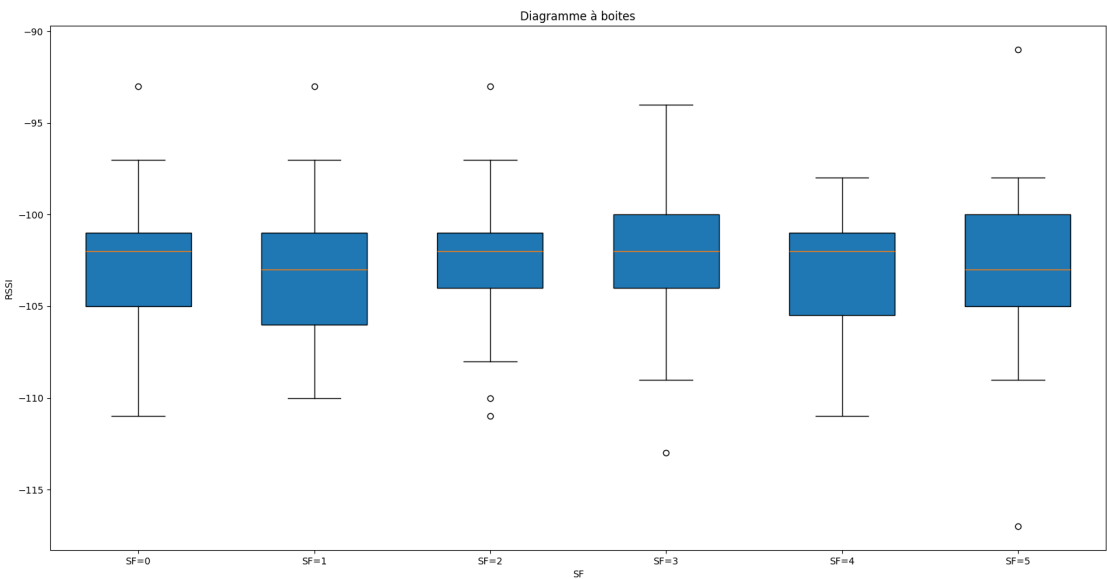
Résultats

La meilleure gateway dans tous les cas (pour tous les DR) est Ecolab. C'est sur cette gateway que nous nous basons pour l'analyse du RSSI/LSNR

SNR par SR



RSSI par SR



Data extraction rate

Data Extraction Rate (réussites pour 30 envois)

