
打造自己的 LoRaWAN 网关，进阶 3：设参运维

摘要：

运维 LoRaWAN 网关：重定向 server、设置频段和查看日志。

引言

如果您只关心：打造一个 LoRaWAN 网关，请参考《花一个小时，打造自己的 LoRaWAN 网关》https://blog.csdn.net/jiangjunjie_2005/article/details/79758720

如果您感兴趣：如何为 LoRaWAN 网关设置参数和运维诊断，那本文再适合不过了。尽管它需要一点儿 Linux 知识，然而，这是每个“有耐心”的人都可以掌握的。

1 重定向 server

编辑文件：[vi packet_forwarder/lora_pkt_fwd/local_conf.json](#)

（切记：修改行尾保留“英文逗号(半角)”！）

实例：重定向服务器为 [xxxx.yyyy.com](#)

```
{
  "gateway_conf": {
    "gateway_ID": "B827EBFFFE3D6B90",
    "server_address": " xxxx.yyyy.com",
    "serv_port_up": 1700,
    "serv_port_down": 1700,
    .....
  }
}
```

实例 1 重定向服务器到 lorawan.timedddd.com（锐米云服务器）

```
rime@lorawangw:~/packet_forwarder/lora_pkt_fwd $ cat ./local_conf.json
{
  "gateway_conf": {
    "gateway_ID": "B827EBFFFEA5A63C",
    "server_address": "lorawan.timedddd.com",
    "serv_port_up": 1700,
    "serv_port_down": 1700,
    "serv_enabled": true,
    "ref_latitude": 28.3,
    "ref_longitude": 112.9,
    "ref_altitude": 146,
    "contact_email": "support@rimelink.com",
    "description": "Rime LoraWAN Gateway for CN470"
  }
}
```

实例 2 重定向服务器到 gw01.rimecloud.com（锐米开放服务器）

```
rime@lorawangw:~/packet_forwarder/lora_pkt_fwd $ cat ./local_conf.json
{
  "gateway_conf": {
    "gateway_ID": "B827EBFFFEA5A63C",
    "server_address": "gw01.rimecloud.com",
    "serv_port_up": 1700,
    "serv_port_down": 1700,
    "serv_enabled": true,
    "ref_latitude": 28.3,
    "ref_longitude": 112.9,
    "ref_altitude": 146,
    "contact_email": "support@rimelink.com",
    "description": "Rime LoraWAN Gateway for CN470"
  }
}
```

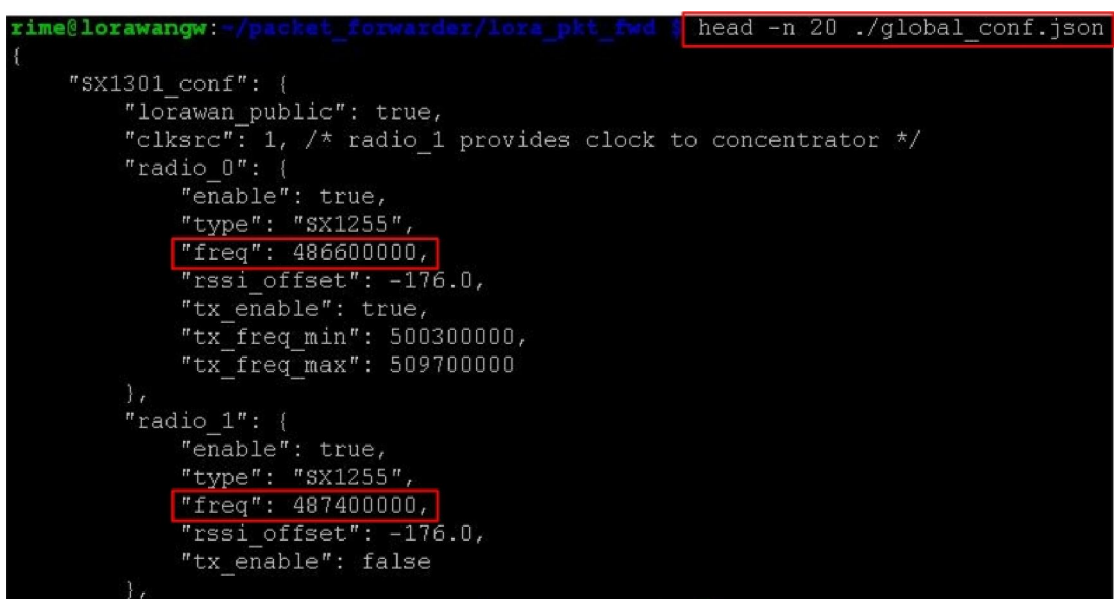
2 设置频段

编辑文件：[vi packet_forwarder/lora_pkt_fwd/global_conf.json](#)

实例 1：设置 CN470-510 80-87 频段

```
{
  "SX1301_conf": {
    "lorawan_public": true,
    "clksrc": 1, /* radio_1 provides clock to concentrator */
    "radio_0": {
      "enable": true,
      "type": "SX1255",
      "freq": 486600000,
      .....
    },
    "radio_1": {
      "enable": true,
      "type": "SX1255",
      "freq": 487400000,
      .....
    },
  },
}
```

图 2-1 查看 CN470-510 80-87 频段：head -n 20 ./global_conf.json

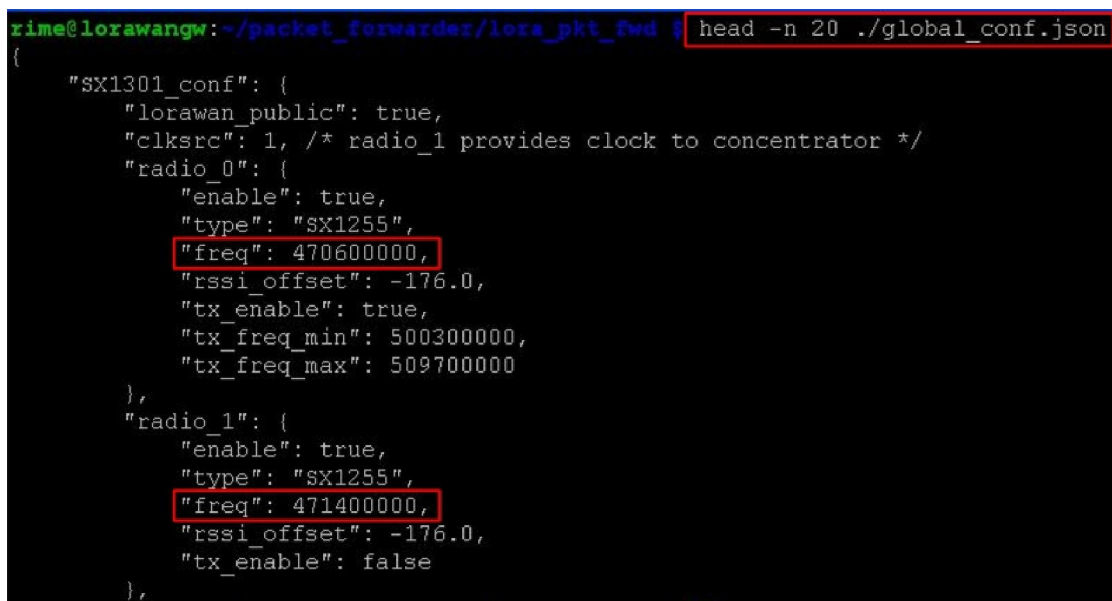


```
rime@lorawangw:~/packet_forwarder/lora_pkt_fwd$ head -n 20 ./global_conf.json
{
  "SX1301_conf": {
    "lorawan_public": true,
    "clksrc": 1, /* radio_1 provides clock to concentrator */
    "radio_0": {
      "enable": true,
      "type": "SX1255",
      "freq": 486600000,
      "rssi_offset": -176.0,
      "tx_enable": true,
      "tx_freq_min": 500300000,
      "tx_freq_max": 509700000
    },
    "radio_1": {
      "enable": true,
      "type": "SX1255",
      "freq": 487400000,
      "rssi_offset": -176.0,
      "tx_enable": false
    },
  },
}
```

实例 2：设置 CN470-510 0-7 频段

```
{
  "SX1301_conf": {
    "lorawan_public": true,
    "clksrc": 1, /* radio_1 provides clock to concentrator */
    "radio_0": {
      "enable": true,
      "type": "SX1255",
      "freq": 470600000,
      .....
    },
    "radio_1": {
      "enable": true,
      "type": "SX1255",
      "freq": 471400000,
      .....
    },
  },
}
```

图 2-2 查看 CN470-510 0-7 频段：head -n 20 ./global_conf.json



```
rime@lorawangw:~/packet_forwarder/lorax_pkt_fwd $ head -n 20 ./global_conf.json
{
  "SX1301_conf": {
    "lorawan_public": true,
    "clksrc": 1, /* radio_1 provides clock to concentrator */
    "radio_0": {
      "enable": true,
      "type": "SX1255",
      "freq": 470600000,
      "rssi_offset": -176.0,
      "tx_enable": true,
      "tx_freq_min": 500300000,
      "tx_freq_max": 509700000
    },
    "radio_1": {
      "enable": true,
      "type": "SX1255",
      "freq": 471400000,
      "rssi_offset": -176.0,
      "tx_enable": false
    },
  },
}
```

3 查看日志

LoRaWAN 网关的日志是一个宝库，它为诊断故障和管理 LoRaWAN 网络提供了便捷。日志文件一般存放在：/tmp 下；grep（正则表达式匹配）是搜索信息的利器。

3.1 启动网关

搜索日志：`grep -B 40 "concentrator started" /tmp/start_gateway.sh.log`

实例如下图：

- ① 中心频点（SX1255 x 2）分别为：486600000 和 487400000
- ② 网关 EUI = B827EBFFFE3D6B90
- ③ 定向服务器到：lorawan.timeddd.com
- ④ 上行和下行端口均为 1700
- ⑤ 启动成功：INFO: [main] concentrator started, packet can now be received

图 3-1 网关启动日志

```
time@lorawangw:~/parcel_forwarder/lorawan_pkt_fwd$ grep -B 40 "concentrator started" /tmp/start_gateway.sh.log
INFO: Configuring TX LUT with 16 indexes
INFO: radio 0 enabled (type SX1255), center frequency 486600000, RSSI offset -176.000000, tx enabled 1, tx_notch_freq 0
INFO: radio 1 enabled (type SX1255), center frequency 487400000, RSSI offset -176.000000, tx enabled 0, tx_notch_freq 0
INFO: Lora multi-SF channel 0> radio 1, IF -300000 Hz, 125 kHz bw, SF 7 to 12
INFO: Lora multi-SF channel 1> radio 1, IF -100000 Hz, 125 kHz bw, SF 7 to 12
INFO: Lora multi-SF channel 2> radio 1, IF 100000 Hz, 125 kHz bw, SF 7 to 12
INFO: Lora multi-SF channel 3> radio 1, IF 300000 Hz, 125 kHz bw, SF 7 to 12
INFO: Lora multi-SF channel 4> radio 0, IF -300000 Hz, 125 kHz bw, SF 7 to 12
INFO: Lora multi-SF channel 5> radio 0, IF -100000 Hz, 125 kHz bw, SF 7 to 12
INFO: Lora multi-SF channel 6> radio 0, IF 100000 Hz, 125 kHz bw, SF 7 to 12
INFO: Lora multi-SF channel 7> radio 0, IF 300000 Hz, 125 kHz bw, SF 7 to 12
INFO: Lora standard channel 8 disabled
INFO: FSK channel 8 disabled
INFO: global_conf.json does contain a JSON object named gateway_conf, parsing gateway parameters
INFO: gateway MAC address is configured to AA555A0000000000
INFO: server hostname or IP address is configured to "localhost"
INFO: upstream port is configured to "1680"
INFO: downstream port is configured to "1680"
INFO: downstream keep-alive interval is configured to 10 seconds
INFO: statistics display interval is configured to 30 seconds
INFO: upstream PUSH_DATA time-out is configured to 100 ms
INFO: packets received with a valid CRC will be forwarded
INFO: packets received with a CRC error will NOT be forwarded
INFO: packets received with no CRC will NOT be forwarded
INFO: GPS serial port path is configured to "/dev/ttyAMA0"
INFO: found local configuration file local_conf.json, parsing it
INFO: redefined parameters will overwrite global parameters
INFO: local_conf.json does not contain a JSON object named SX1301_conf
INFO: local_conf.json does contain a JSON object named gateway_conf, parsing gateway parameters
INFO: gateway MAC address is configured to B827EBFFFE3D6B90
INFO: server hostname or IP address is configured to "lorawan.timeddd.com"
INFO: upstream port is configured to "1700"
INFO: downstream port is configured to "1700"
INFO: packets received with a valid CRC will be forwarded
INFO: packets received with a CRC error will NOT be forwarded
INFO: packets received with no CRC will NOT be forwarded
INFO: Reference latitude is configured to 28.300000 deg
INFO: Reference longitude is configured to 112.900000 deg
INFO: Reference altitude is configured to 146 meters
INFO: [main] TTY port /dev/ttyAMA0 open for GPS synchronization
INFO: [main] concentrator started, packet can now be received
```

3.2 node 入网

3.2.1 Join-Request

搜索日志: `grep -A 2 -B 1 "\"size\":23,\"data\":\"A\" /tmp/start_gateway.sh.log`

解释: Join-Request 报文长度 = 23, 第一个字节数据=A(Base64 编码)

```
xime@lorawangw:~/packet_forwarder/lorawan_pkt_fwd$ grep -A 2 -B 1 "\"size\":23,\"data\":\"A\" /tmp/start_gateway.sh.log
JSON up: {"txpk":{"tmst":15624236,"chan":5,"rfch":0,"freq":486.500000,"stat":1,"modu":"LoRa","datr":"SF7BW125","codr":"4/5","lsnr":
rsnr":-88,"size":23,"data":"AHdmVUQzIhEALQA7A0c2MjN7J5Mq9Xg="}}
INFO: [up] PUSH_ACK received in 23 ms
INFO: [down] PULL_RESP received - token[25:177] :)
```

3.2.1 Join-Response

搜索日志: `grep -A 2 -B 1 "\"size\":17,\"data\":\"I\" /tmp/start_gateway.sh.log`

解释: Join-Response 报文长度 = 17, 第一个字节数据=I(Base64 编码)

```
xime@lorawangw:~/packet_forwarder/lorawan_pkt_fwd$ grep -A 2 -B 1 "\"size\":17,\"data\":\"I\" /tmp/start_gateway.sh.log
JSON down: {"txpk":{"imme":false,"tmst":20624236,"freq":506.9,"rfch":0,"pwr":14,"modu":"LoRa","datr":"SF7BW125","codr":"4/5","ipol":
,"size":17,"data":"IKFYM49i32c08NMuMZ1yUjw=","brd":0,"ant":0}}
INFO: tx_start_delay=1495 (1495.500000) - (1497, bw_delay=1.500000, notch_delay=0.000000)
INFO: [down] PULL_ACK received in 22 ms
```

3.3 node 上报

搜索日志: `grep -B 2 -A 3 "JSON up" /tmp/start_gateway.sh.log | more`

解释: INFO: [up] PUSH_ACK received in 19 ms (Server->Gateway 通信延时)

```
xime@lorawangw:~/packet_forwarder/lorawan_pkt_fwd$ grep -B 2 -A 3 "JSON up" /tmp/start_gateway.sh.log | more
INFO: Received pkt from mote: 99676D36 (fcnt=8245)

JSON up: {"txpk":{"tmst":3378147,"chan":0,"rfch":1,"freq":487.100000,"stat":1,"modu":"LoRa","datr":"SF7BW125","codr":"4/5","lsnr":
ssnr":-81,"size":27,"data":"gDztZ5mCNSADB8jdsqDpTT6TC4AoeDfcs/zW"}}
INFO: [up] PUSH_ACK received in 19 ms
```

3.4 server 下行

搜索日志: `grep -A 1 -B 2 "JSON down" /tmp/start_gateway.sh.log | more`

```
xime@lorawangw:~/packet_forwarder/lorawan_pkt_fwd$ grep -A 1 -B 2 "JSON down" /tmp/start_gateway.sh.log | more
INFO: [down] PULL_RESP received - token[169:251] :)

JSON down: {"txpk":{"imme":false,"tmst":5504564,"freq":506.9,"rfch":0,"pwr":14,"modu":"LoRa","datr":"SF7BW125","codr":"4/5","ipol":
"size":17,"data":"YM0PAZmlxB8DU/8AU4ltNDw=","brd":0,"ant":0}}
```

3.5 统计日志

搜索日志: `grep -B 1 -A 24 "UPSTREAM" /tmp/start_gateway.sh.log | more`

```
rime@lorawangw:~/packet_forwarder/lora_pkt_fwd$ grep -B 1 -A 24 "UPSTREAM" /tmp/start_gateway.sh.log | more
##### 2017-11-28 10:41:21 GMT #####
### [UPSTREAM] ###
# RF packets received by concentrator: 58
# CRC_OK: 89.66%, CRC_FAIL: 10.34%, NO_CRC: 0.00%
# RF packets forwarded: 52 (1370 bytes)
# PUSH DATA datagrams sent: 52 (10846 bytes)
# PUSH DATA acknowledged: 100.00%
### [DOWNSTREAM] ###
# PULL DATA sent: 3 (100.00% acknowledged)
# PULL RESP(onse) datagrams received: 18 (3450 bytes)
# RF packets sent to concentrator: 16 (307 bytes)
# TX errors: 0
# TX rejected (collision packet): 11.11% (req:18, rej:2)
# TX rejected (collision beacon): 0.00% (req:18, rej:0)
# TX rejected (too late): 0.00% (req:18, rej:0)
# TX rejected (too early): 0.00% (req:18, rej:0)
# BEACON queued: 0
# BEACON sent so far: 0
# BEACON rejected: 0
### [JIT] ###
# SX1301 time (PPS): 2413499
src/jitqueue.c:448:jit_print_queue(): INFO: [jit] queue is empty
### [GPS] ###
# Invalid time reference (age: 1511865681 sec)
# no valid GPS coordinates available yet
##### END #####
--
```

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