📄 LoRa Device Configuration & AT Command Automation — Documentation

🔧 System Overview

This setup automates the generation and management of LoRa RYLR896 module configurations by:

- Assigning unique `network_id` and `address` values
- Storing configs in a structured `JSON` file
- Printing ready-to-use `AT` command strings
- Saving script progress to resume generation later

📁 Files Structure

File Name	Description
`lora_nodes.json`	Stores all generated device entries (TX/RX)
`state.json`	Stores the index pointer of the last served device pair
`generate_devices.py`	Script to generate all TX/RX device pairs and save to JSON
`get_next_pair.py`	Script to output the next TX/RX pair with AT commands

📦 JSON Format (`lora_nodes.json`)

Each entry represents a LoRa module configuration:

```
{
  "device_id": 1,
  "role": "transmitter",
  "network_id": 1,
  "address": 1,
  "password": "LoRaSecure1234",
  "band": "868000000"
}
```

⚙️ Script 1: Generate All Devices (`generate_devices.py`)

Purpose: Create all device entries for all `network_id`s from `1` to `16`, with addresses `1` to `65534`. Each TX/RX pair is assigned sequential addresses within a network.

Command to run:

```
python3 generate_devices.py
```

It saves the data to `lora_nodes.json` safely without duplicating entries if they already exist.

⚙ Script 2: Get Next Pair (`get_next_pair.py`)

Purpose: On each run:

- Outputs the next available TX/RX device pair
- Prints AT commands for each
- Updates `state.json` to track progress

Command to run:

```
./get_next_pair.py
```

What it prints:

- Device JSON info
- Corresponding `AT` command strings:

```
AT+BAND=868000000
AT+NETWORKID=1
AT+ADDRESS=1
AT+CPIN="LoRaSecure1234"
```

💾 State Management

File	Key	Purpose
`state.json`	`current_index`	Index of next unused TX/RX pair

If `state.json` doesn't exist, it starts from the beginning.

To **reset the state** and start from the beginning:

```
rm state.json
```

🔐 Default Configuration Values

Field	Value
Band	`868000000`

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Field	Value
CPIN	`"LoRaSecure1234"`
NetworkID Range	`1–16`
Address Range	`1–65534` (per NetworkID)

🧪 Example Output

```
📡 Next Device Pair:
----------------------------------------

🔹 Transmitter Info:
{
  "device_id": 1,
  "role": "transmitter",
  "network_id": 1,
  "address": 1,
  "password": "LoRaSecure1234",
  "band": "868000000"
}

🛠 Transmitter AT Commands:
AT+BAND=868000000
AT+NETWORKID=1
AT+ADDRESS=1
AT+CPIN="LoRaSecure1234"
```

✅ Advantages

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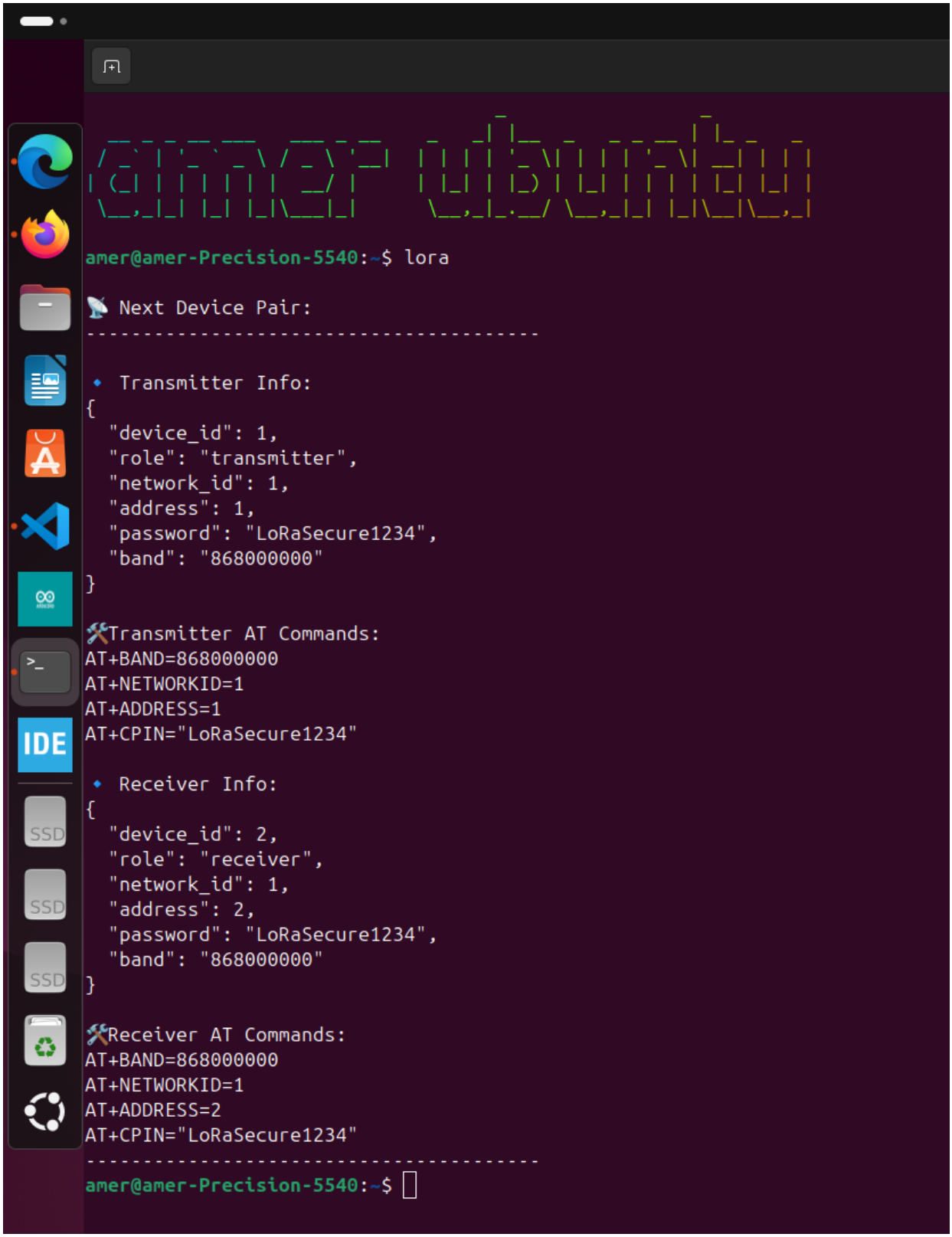
- No address or network reuse
- Easy recovery using state tracking
- No duplication or overwriting
- Portable and readable JSON
- Command-ready AT strings

⚙⚙ linux like util **lora**

- in any place run **lora** CMD in terminal it will generate node data
- generate the TX /RX node data

- avoiding Repetition **uni node data**



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