Edge to Cloud Digital Twin in smart Irrigation Scenario

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IMT2018508

Steps to install :-

You need to install 2 softwares for this project.

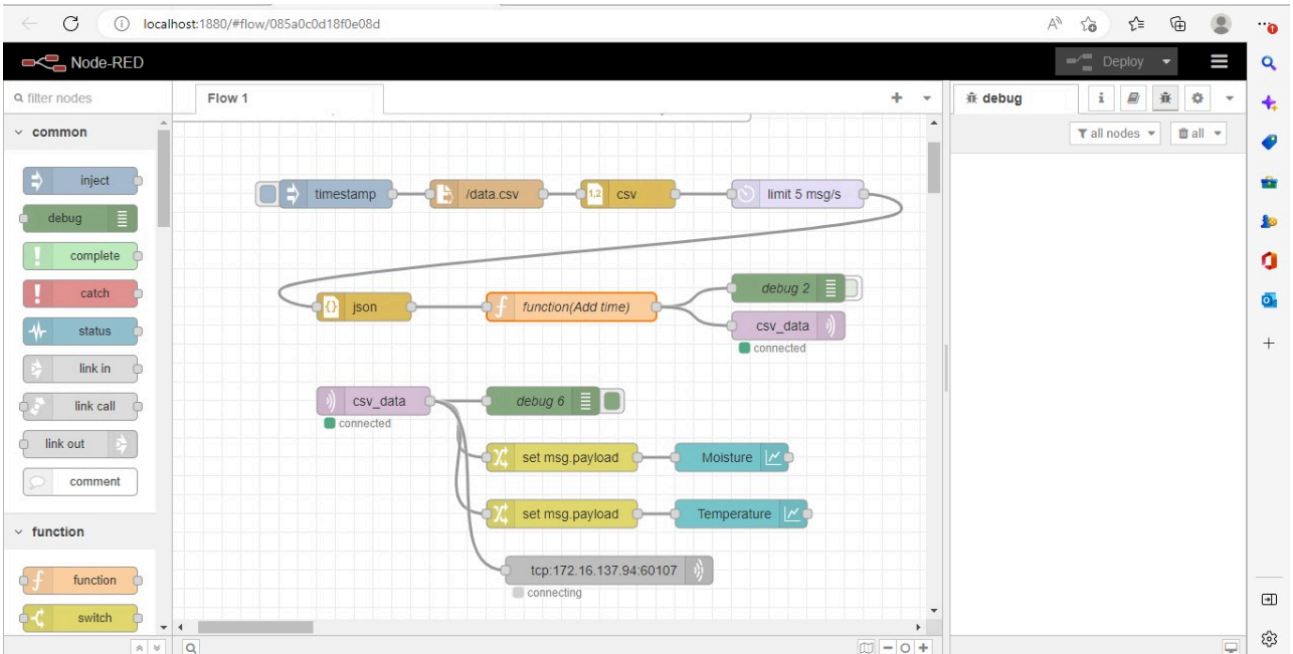
1) **Nodered**: Any version works. The steps to download are provided in this link https://nodered.org/docs/getting-started/local. I have installed the docker image.
2) **Netsim:** Preferably use a stable version. Any sub-version of 1.12 works.

After installation, To work on the project you need 3 files.

1) flows.json: This file includes the model build in Node Red. In Node Red export this file.
2) smart_irrigation.netsim_exp: This is the network which is designed in Netsim.
3) Data.csv: This project doesn't work by capturing actual data from sensors instead it reads data from data .csv file.

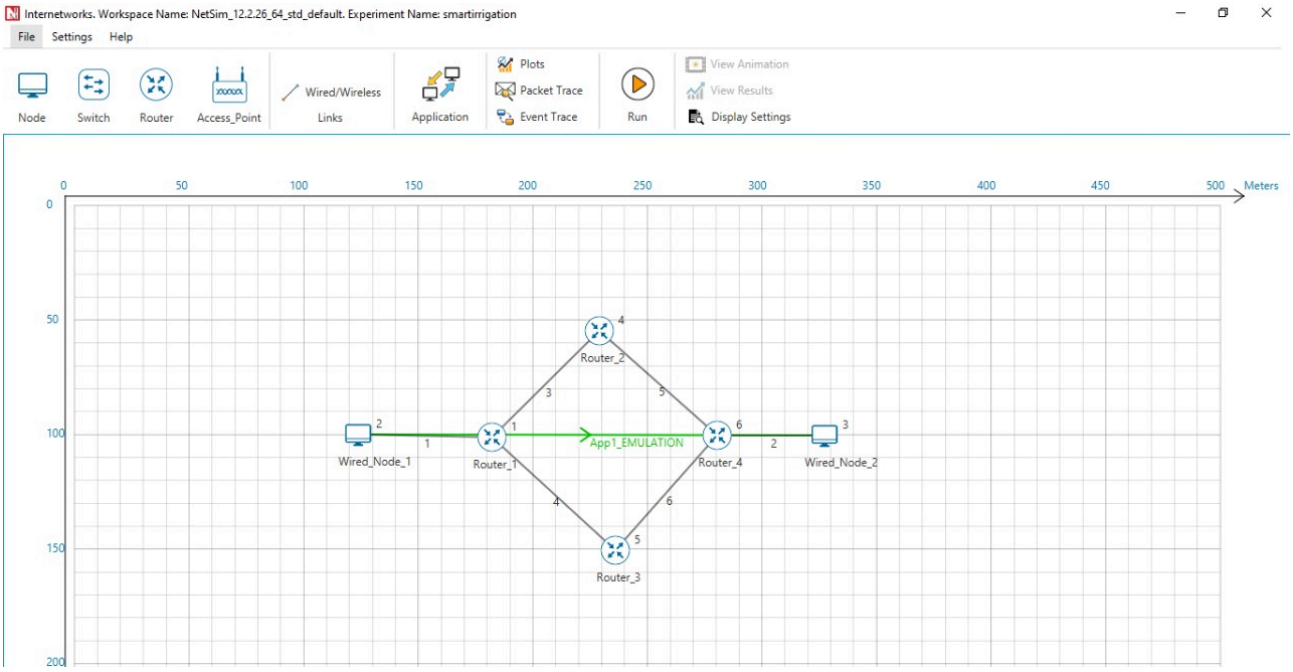
Configuring Node Red and Netsim:

1) **Node Red**:

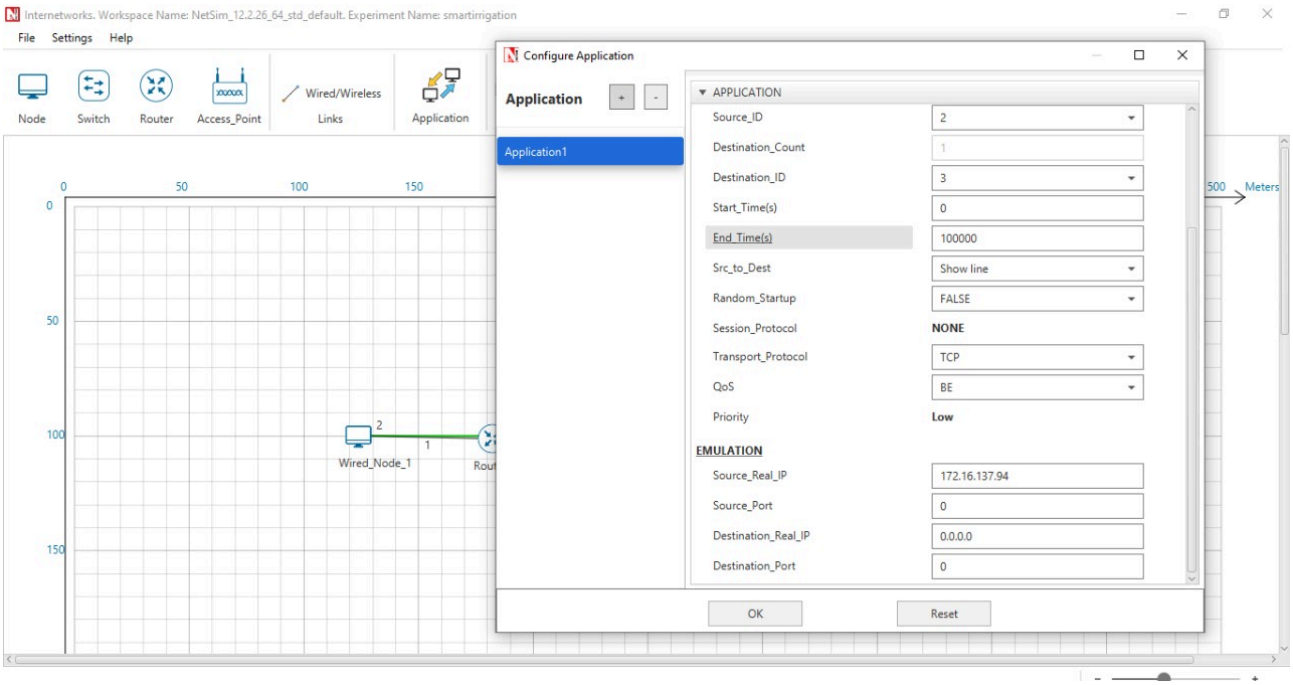


- After exporting flows.json, Node Red screen should look like the screenshot shown above.
- **timestamp node,** will run the project. Basically it will start reading the csv file
- **limit 10msg/s node** will limit the rate at which messages are being transmitted.
- **Function(Add Time) node,** It is a custom function node whose job is to add time and date at which the data is recorded.
- One **csv_data node** is the MQTT broker where all the data is published and other **csv_data node** is MQTT subscriber which is reading all the messages published on the broker.
- **Debug nodes** are to print what messages are being delivered at this node.
- **Moisture, Temperature nodes** are plotting moisture and temperature values respectively.
- **TCP node** is routing the collected data to IP address and port mentioned. Later on this IP address would be required to configure netsim.
- In this flow, Two changes are required :-
  1. In **/data.csv node** specify the path where data.csv is stored in your system.
  2. In Tcp node specify the IP address of your machine.

2) **Netsim** :



- Netsim needs to run in administrator mode.
- After exporting the file, Netsim home screen should look like the above screenshot.
- Network designed in Netsim should be configured in such a way such that output of Node Red should be input for Netsim. Therefore to do this go to applications and select simulation mode and in input IP address and port select the IP address and port where Node Red is routing its data (Same IP address as that of **TCP node** in Node Red) .



- Output IP address doesn’t matter and therefore can be set to 0.0.0.0 and port 0.
- Now we can run the simulation in Netsim as well as in Node Red.