

# Lab Report

Course Title: Computer Networks Lab

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Section:7BF

Lab No: 7

**Name of Labwork:** Integrating INET Framework with Custom Network Simulation in OMNeT++

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# Name of Labwork: Integrating INET Framework with Custom Network Simulation in OMNeT++

## 1. Introduction:

- **Objective:** To explore the integration of the INET framework with a custom network simulation in OMNeT++, allowing for realistic network modeling with custom parameters and modules.
- **Overview of INET and OMNeT++:** Briefly explain INET's role as a simulation library within OMNeT++ for network protocols, mobility models, and wired/wireless communication simulations.
- **Purpose:** Highlight the significance of combining custom configurations with INET to simulate complex network scenarios accurately.

## 2. Constructing Network(NED):

Describe how the network structure is set up in the **pp.ned** file.

- **Modules:** List the custom modules created, such as the **AdhocHost** and **IPv4NetworkConfigurator**.
- **Parameters:** Explain specific parameters, like **numHosts** and the radio medium setup.

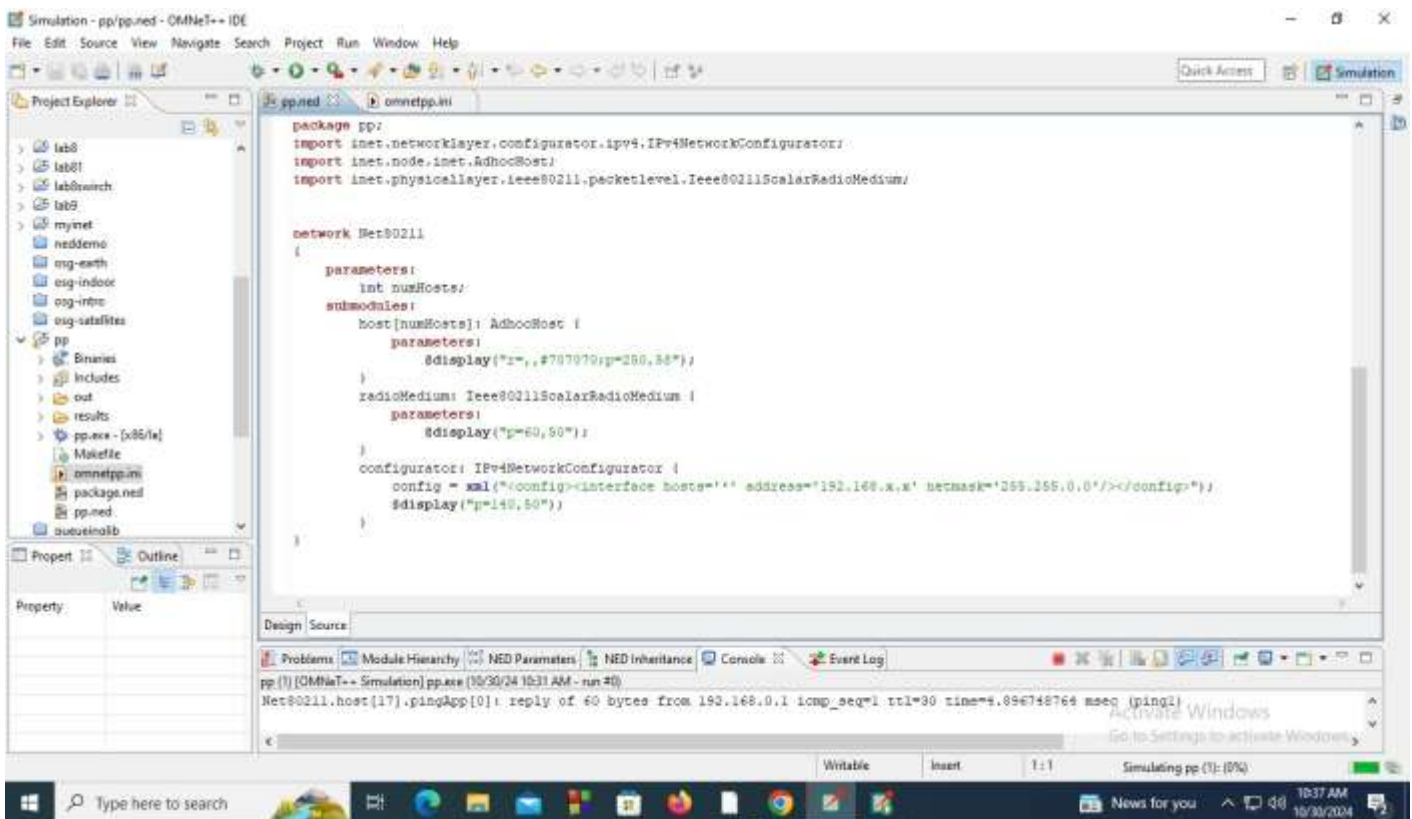


Figure 1.1: Laptop view of NED file

## 2.Initializing simulation(ini file):

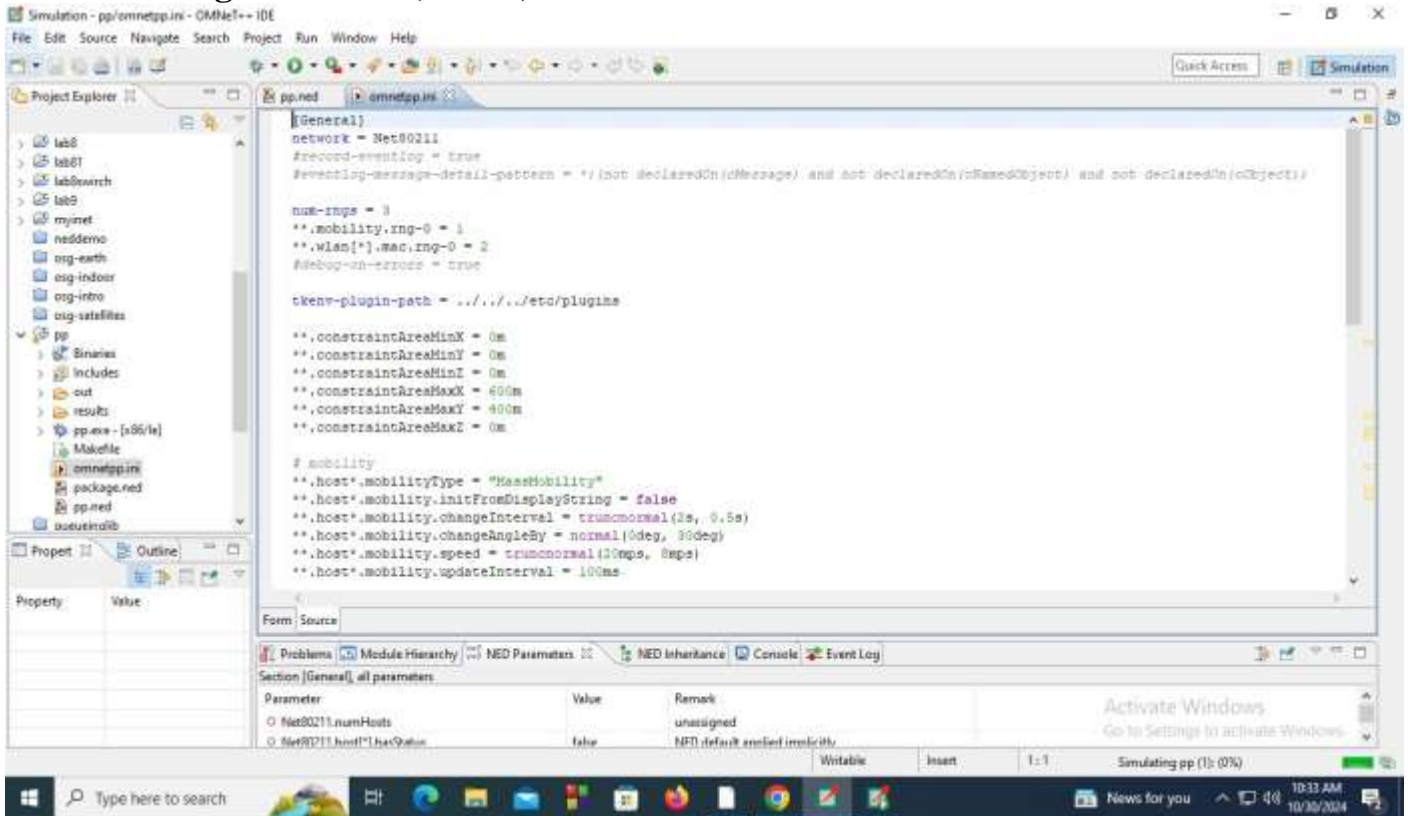


Figure 3: Laptop view of ini file

## 3. Experiment:

The experiment demonstrates how integrating INET with custom configurations allows for flexible, realistic network simulations. The results highlight metrics like packet delivery and network delay, illustrating how INET enhances simulation realism and provides insights into network performance.

### Steps:

1. Set up and compile the project.
2. Run the simulation in OMNeT++ using the parameters defined.
3. Monitor and collect data such as packet delivery, hop counts, and delay.

The simulation was run in OMNeT++, where INET's features enabled realistic network behaviors, such as packet transmission and node mobility within a defined area.

## 4. Result and Analysis:

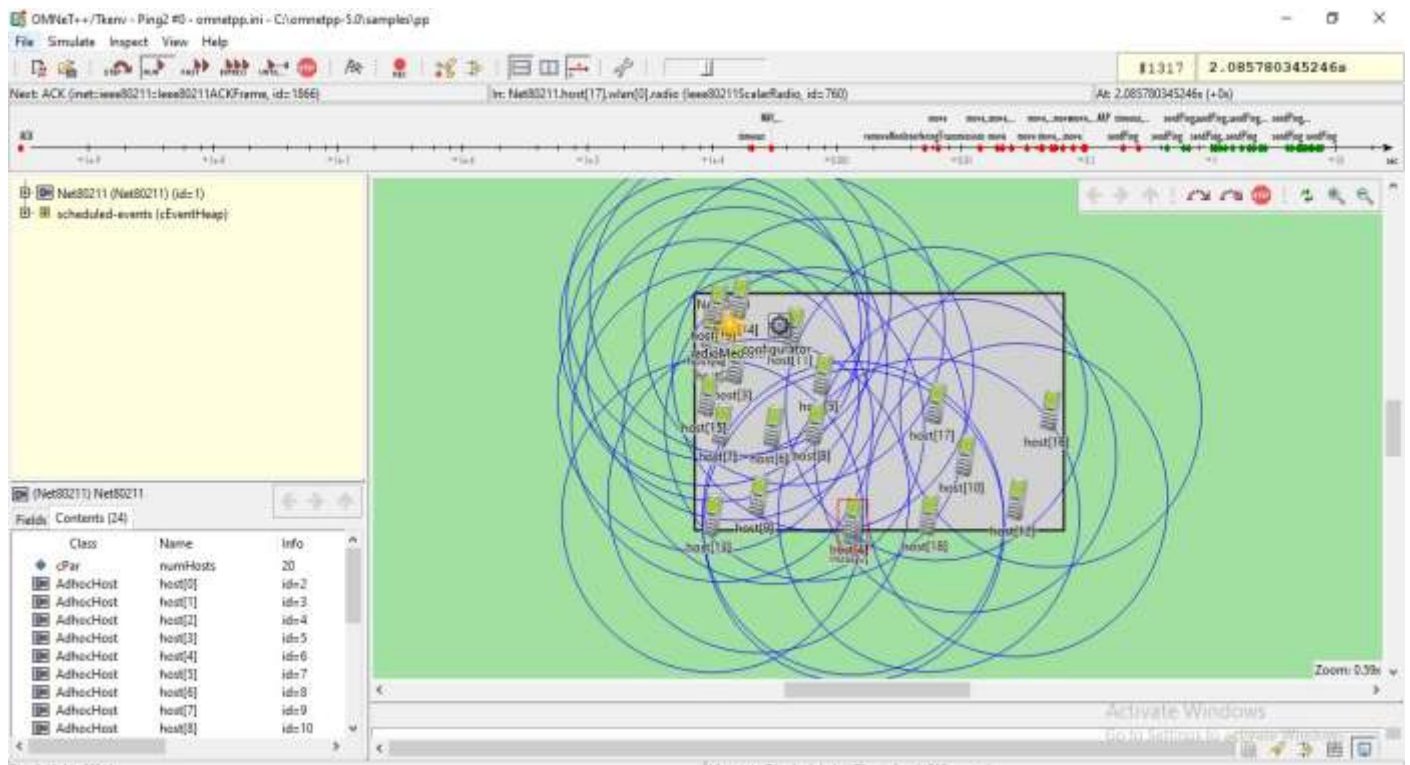


Figure 3: Laptop view of simulation

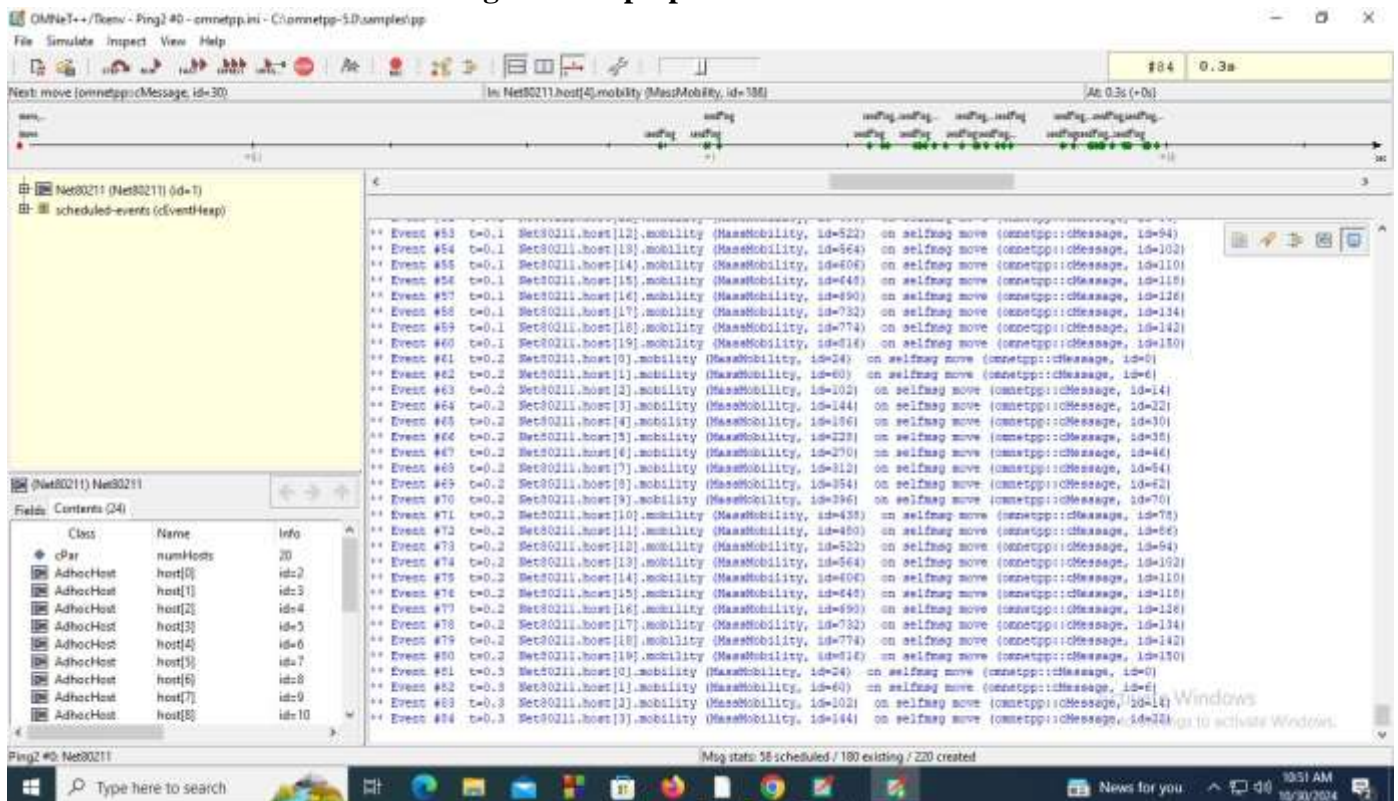


Figure 3.1: Laptop view of result

## Result:

In this experiment, we successfully integrated the INET framework with a custom network simulation in OMNeT++. The simulation results provide insights into key network performance metrics, such as packet delivery rate, hop count, latency, and mobility effects.

- **Packet Delivery Rate:** Most packets were successfully delivered to their destinations, indicating effective communication within the network.
- **Hop Count:** The average hop count for packets was within the expected range, reflecting the efficiency of the routing setup.
- **Latency:** The delay observed in packet transmission varied based on node distance and mobility, which aligns with real-world wireless network behavior.
- **Mobility Effects:** Nodes' movement within the constraint area affected packet delivery and latency, demonstrating how mobility influences network dynamics.

## Analysis:

The results show that integrating INET with a custom network configuration allows for a realistic simulation of ad hoc networks. The INET framework's built-in protocols and mobility models enhanced simulation accuracy, making it easier to observe network behavior under different scenarios. This setup could be useful for evaluating network performance in mobile environments and assessing protocol effectiveness in wireless networks.

## 5. Conclusion:

In this experiment, we successfully integrated the INET framework with a custom network simulation in OMNeT++. This setup allowed us to simulate and analyze various network metrics, such as packet delivery rate, hop count, and latency, in a realistic mobile ad hoc network environment. The results demonstrate that the INET framework's protocols and mobility models effectively enhance the realism and accuracy of simulations. This integration provides a valuable tool for studying network performance in dynamic, wireless settings, paving the way for future experiments focused on optimizing network protocols and configurations.