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IETF-114

IPWAVE Hackathon Project

July 23-24, 2022

Champion: Jaehoon (Paul) Jeong

Members: Bien Aime Mugabarigira and Junhee Kwon

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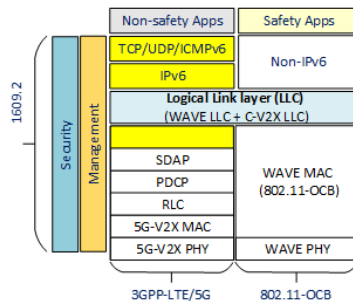
IP Wireless Access in Vehicular Environments (IPWAVE) Basic Protocols Project

Champion: Jaehoon (Paul) Jeong (SKKU)

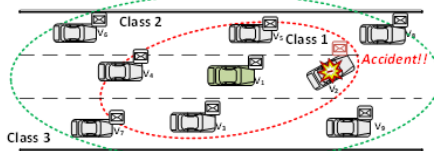
IETF-114 IPWAVE Hackathon Project:
Context-Aware Navigator Protocol (CNP)



WAVE Protocol Stack



IPv6 ND Option



- ✉ IPv6 ND with Cooperation Context Message (CCM)
- ✉ IPv6 ND with Emergency Context Message (ECM)

Objectives

- To Demonstrate IPWAVE Basic Protocols
- New IPv6 ND option for road safety
- Simulation of Context-Aware Navigation Protocol over C-V2X
- To Discover technology gaps for IPWAVE

Where to get source code:

- GitHub: <https://github.com/ipwave-hackathon-ietf>

How to set up an environment:

- OS: Ubuntu 16.04
- SUMO 1.0.0
- OMNeT++ 5.3
- GNU GCC7.3
- Veins 5.0
- INET 3.6.6

Implementation Contents:

- To Support IETF Vehicular Mobility Information (VMI) Option in IPv6-based vehicular networks over C-V2X.
 - ✓ VMI: <https://datatracker.ietf.org/doc/draft-jeong-ipwave-context-aware-navigator/>
- To support the cooperation Context Message (CCM) and Emergency Context Message (ECM) for CNP application in 3GPP-LTE
- Text the adaptability of IEEE 802.11-OCB vehicular protocol stack to the C-V2X access layer.

Professors:

- Jaehoon (Paul) Jeong (SKKU)
- Younghan Kim (SSU)

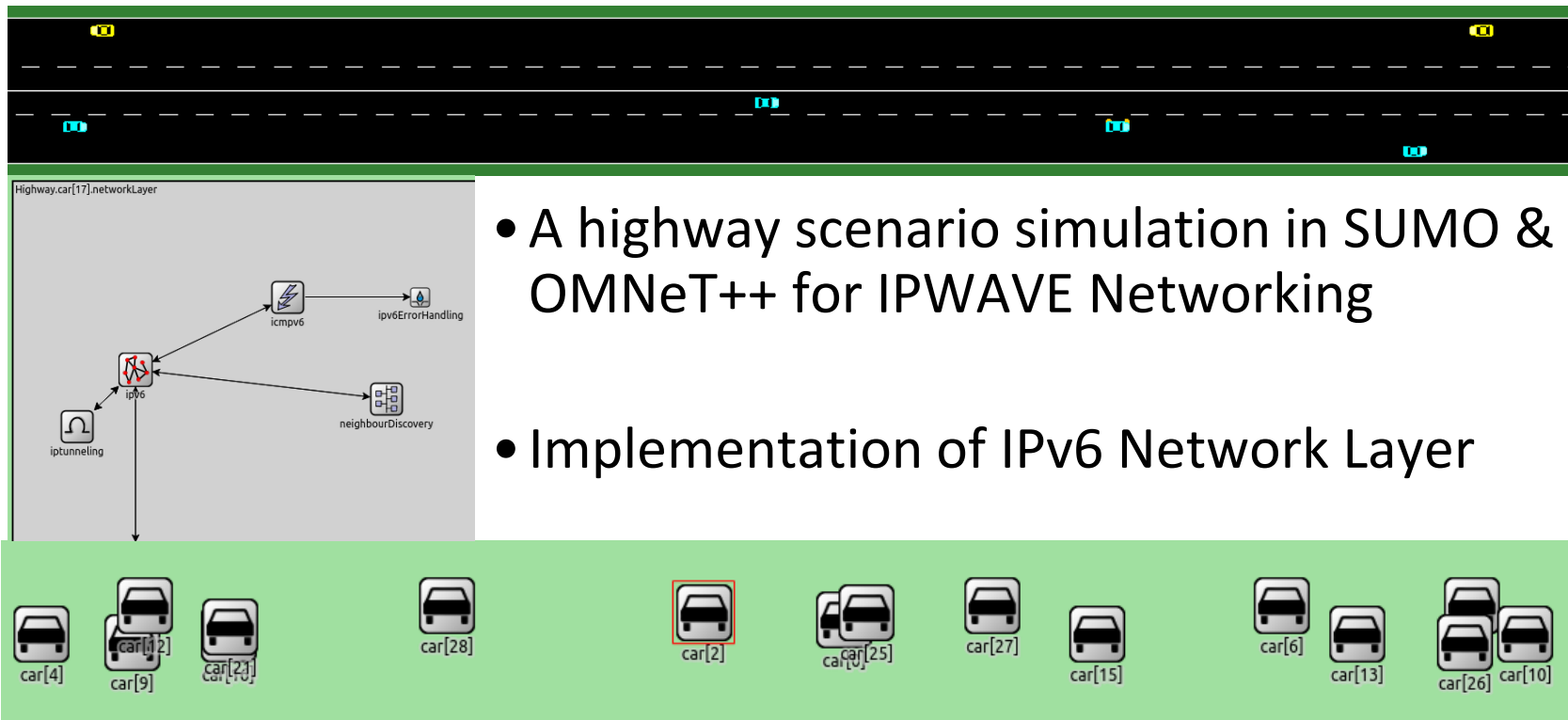
Students:

- Bien Aime Mugabarigira (SKKU)
- Junhee Kwon (SKKU)
- Yiwen (Chris) Shen (SKKU)
- Hyeonah Jeong (SKKU)

Hackathon Plan

- Simulation
 - To test the applicability of IPWAVE protocols in C-V2X
 - To simulate Context-Aware Navigation Protocol (CNP) with C-V2X
 - [draft-jeong-ipwave-context-aware-navigator-05](#)
- Cooperation Context Message (CCM) and Emergency Context Message (ECM) for CNP application in 3GPP-LTE Mode 4
- Test of the coexistence of IEEE 802.11-OCB protocol layer and 3GPP V2X protocol layer

What got done (1/2)

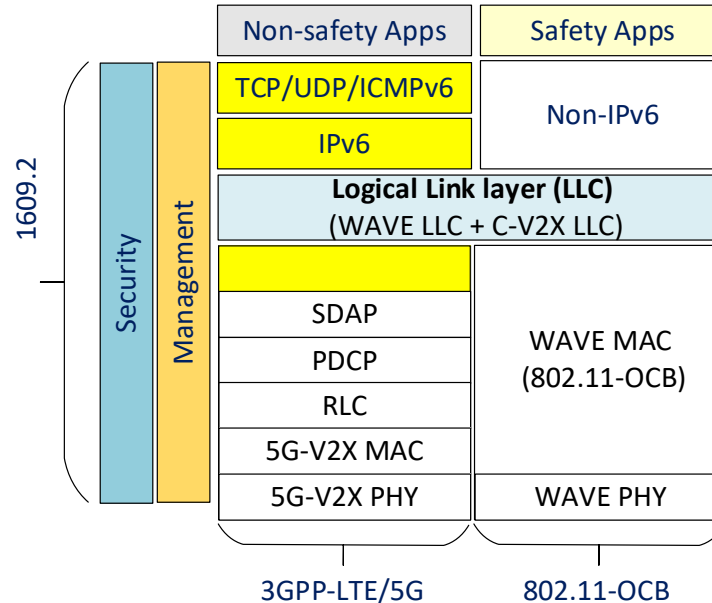


What got done (2/2)

- Simulation Implementation of IPWAVE Context-Aware Navigation Protocol (CNP) with C-V2X
 - Adaptation of Cooperation Context Message (CCM) by V2V within the Mode4 application.
 - Exchange of Emergency Context Message (ECM) with higher priority over CCM within IPv6 enabled vehicular network.

What we learned

- Feasibility of Heterogenous Vehicular Networks with WAVE and 5G V2X
 - Coexistence of IEEE 802.11-OCB based IPWAVE and C-V2X-based IPWAVE
- Cooperation Context Message (CCM) and Emergency Context Message (ECM) for CNP can be transmitted over 3GPP-LTE mode 4.



Open Source

URL: <https://github.com/ipwave-hackathon-ietf/ipwave-hackathon-ietf-114>

The screenshot shows the GitHub repository page for `ipwave-hackathon-ietf/ipwave-hackathon-ietf-114`. The repository is public and has 1 watch, 1 fork, and 0 stars. The repository is currently on the `master` branch, which has 1 branch and 0 tags. The repository is owned by `mubienaima` and has 2 commits. The repository is located at `5518c61` and was updated yesterday. There are 3 commits in total.

The repository contains the following files and folders:

File/Folder	Commit	Time
<code>inet</code>	first commit	7 days ago
<code>simulte</code>	2 commit	yesterday
<code>veins-veins-5.1</code>	first commit	7 days ago
<code>.gitignore</code>	first commit	7 days ago

The repository is currently on the `master` branch. The repository is located at `5518c61` and was updated yesterday. There are 3 commits in total.

About

No description, website, or topics provided.

☆ 0 stars
👁 1 watching
🍴 1 fork

Releases

No releases published

Wrap Up

Professors:

- Jaehoon (Paul) Jeong (SKKU)
- Younghan Kim (SSU)
- Yiwen (Chris) Shen (Kyungsung University)

Team members:

- Bien Aime Mugabarigira (SKKU)
- Junhee Kwon (SKKU)
- Hyeonah Jung (SKKU)

Appendices

(1) Simulation Environment Preparation Guide

(2) Implementation Environment

Simulation Environment

- OS: Ubuntu 16.04
- Simulators:
 - SUMO 1.0.0
 - OMNeT++ 5.4.1
- GNU GCC 7.3
- Open Sources:
 - <https://github.com/ipwave-hackathon-ietf/ipwave-hackathon-ietf-114>
 - Veins 5.0
 - INET 3.6.6

Configurations

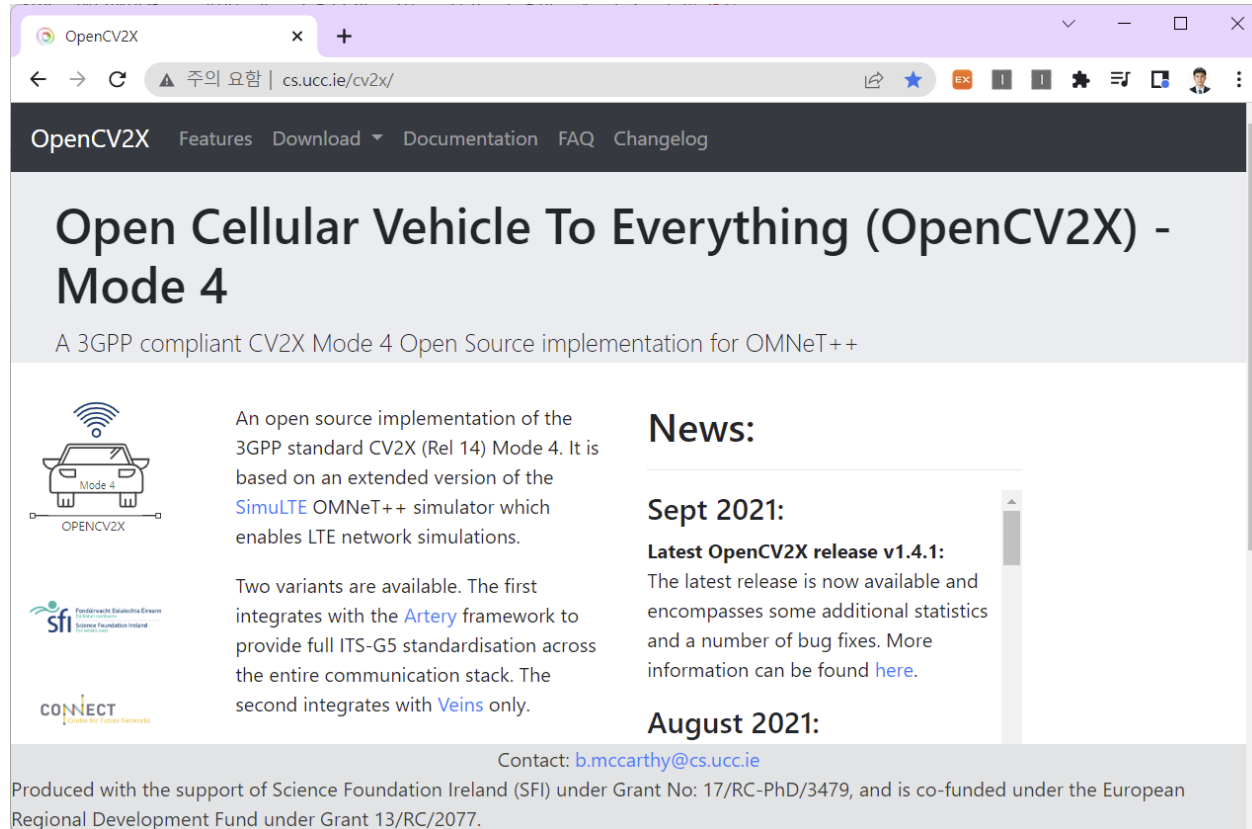
- Install OMNeT++ following the procedure in the installation manual:
<https://doc.omnetpp.org/omnetpp/InstallGuide.pdf>
- Install proper SUMO version
- Import projects in OMNeT++ workspace
 - Import INET by
 - File → Import → General → Existing projects into workspace
 - Similarly, as INET, import SimuLTE
 - Import veins:
 - »Specifically, search for nested project and install both veins and veins_inet3 projects.

Project References

- Activate project features to ensure SimuLTE runs correctly.
- Right-click on lte project and choose Properties
- Then, Project References and tick inet, veins and veins_inet3
- Run the scenario in veins:
- *python2 sumo-launchd.py*
- Run the simulation by:
 - *lte → simulations → mode4 → omnetpp and in set inifile configuration, choose Hachathon112*

- Reference:

- http://www.cs.ucc.ie/cv2x/media/OpenCV2X_Documentation.pdf

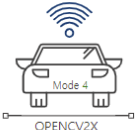


The screenshot shows a web browser window with the URL <http://www.cs.ucc.ie/cv2x/>. The page features a navigation bar with links to OpenCV2X, Features, Download, Documentation, FAQ, and Changelog. The main heading is "Open Cellular Vehicle To Everything (OpenCV2X) - Mode 4", followed by the subtitle "A 3GPP compliant CV2X Mode 4 Open Source implementation for OMNeT++". The content is divided into two columns. The left column includes an icon of a car with a wireless signal, a description of the open-source implementation, and logos for the Science Foundation Ireland (SFI) and CONNECT programs. The right column is titled "News:" and contains two entries: "Sept 2021: Latest OpenCV2X release v1.4.1:" and "August 2021:". The footer includes contact information and funding details.

OpenCV2X Features Download Documentation FAQ Changelog

Open Cellular Vehicle To Everything (OpenCV2X) - Mode 4

A 3GPP compliant CV2X Mode 4 Open Source implementation for OMNeT++



Mode 4
OPENCV2X

An open source implementation of the 3GPP standard CV2X (Rel 14) Mode 4. It is based on an extended version of the [SimuLTE](#) OMNeT++ simulator which enables LTE network simulations.

Two variants are available. The first integrates with the [Artery](#) framework to provide full ITS-G5 standardisation across the entire communication stack. The second integrates with [Veins](#) only.

News:

Sept 2021:
Latest OpenCV2X release v1.4.1:
The latest release is now available and encompasses some additional statistics and a number of bug fixes. More information can be found [here](#).

August 2021:

Contact: b.mccarthy@cs.ucc.ie

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