Digital Television Datacasting

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Abstract

Digital Television (DTV) Datacasting is a technology where data is sent using a dedicated slice of the DTV spectrum. This is technology is used to deliver important messages to public safety personnel where other forms of communications would not be able to reach. This project embarked on improving the Public Safety Alert Messaging System (PSAMS) by debugging a USB connection problem between the signal receiver and an in-the-field laptop as well as modified the remote vehicle code by enabling real time signal status and GPS data logging in the vehicle. The DTV receiver is a USB based device and when it is removed from the computer inside of a police cruiser, it is no longer able to receive messages until the application is restarted. The logging of GPS data and signal strength will be used to measure the strength of the DTV signal throughout the state so a more accurate representation of this signal can be acquired.

Problem Solving

The problems faced with this project were not as easily distinguished as hoped. Due to the complexity of the source code, the hardware and software technologies used, the project was quite difficult to jump into at first. To begin work it was required to first understand the physical environment. Further debugging required focus on understanding the components of the source code that were involved with the problems pertaining to the USB receiver. To make updates to the software source code it was necessary to rebuild the project piece by piece, which in hand helped layout how the different software technologies were structured and being used with each other. After obtaining this knowledge, debugging specific code was quite easy after the setup. Eventually a hypothesis was created that the problem was in the java code, and we were able to make a new application installer that had fixed the issue at hand.

Technologies Used

This project was based upon the following technologies:

Java launch4j <APACHE ANT>

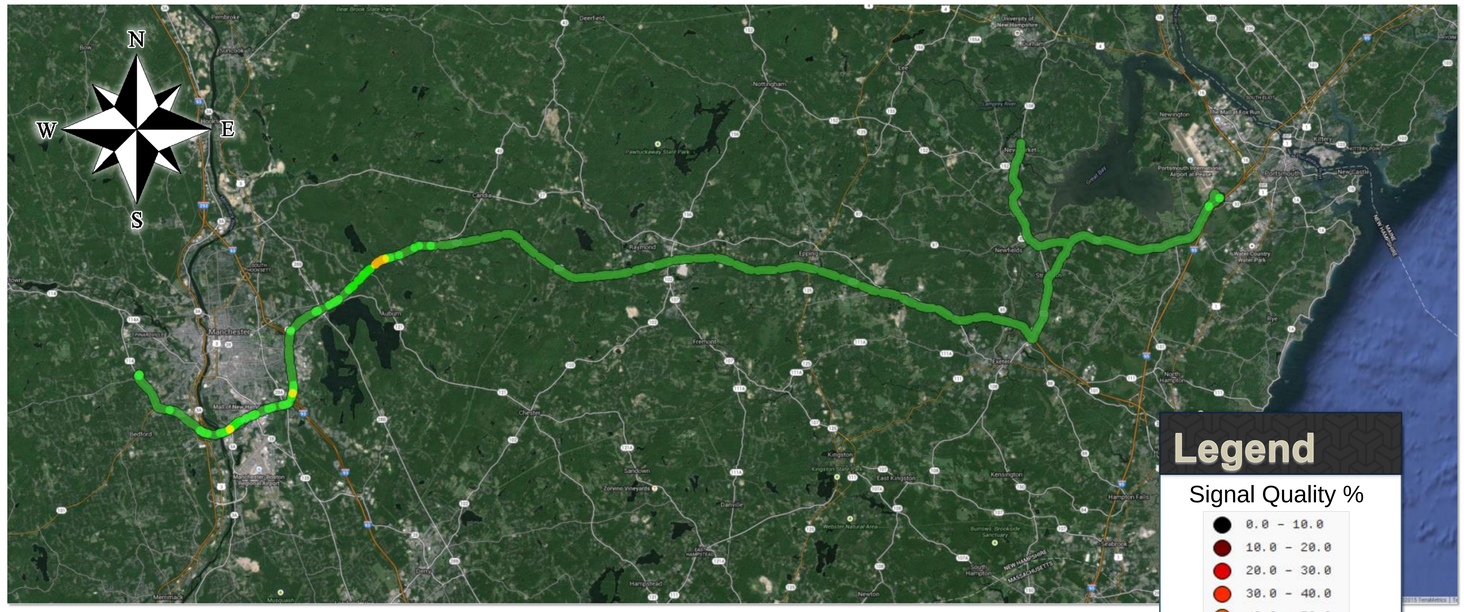
To extend the functionality of the logging we used:

RXTXSerial - for serial communication with the GPS

For Mapping the test results:

python QGIS

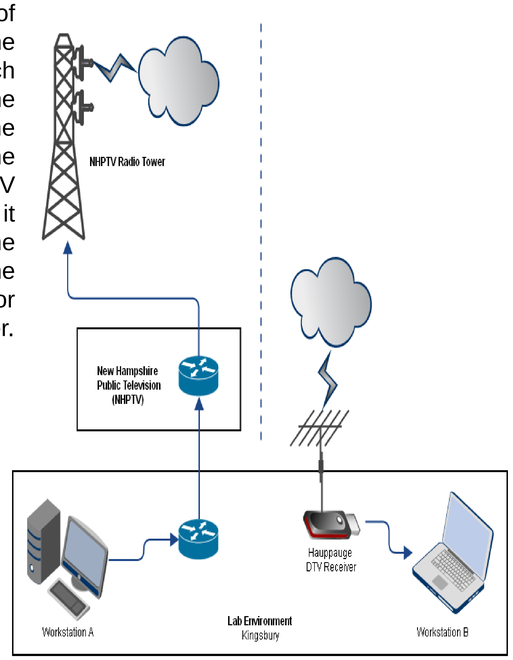
Testing



The map above shows one of the tests done to verify that information can be collected from the receiver and GPS. The data shown is signal quality versus GPS location. All points shown have a locked signal. The system was tuned to channel 11, which receives signal from the antenna on top of Saddleback Mountain in Deerfield, NH.

Development

The test environment consists of a receiver and sender. The sender emulates the dispatch center for the state police and the receiver emulates a cruiser. The message is sent from the dispatch center to a NHPTV server, which then sends it across DTV signals to the receiver in the cruiser. The message is then brought up for display on the cruiser's computer.



NHPTV Coverage