Data Streaming Client Development in SIMULINK for LTB Real-time Application

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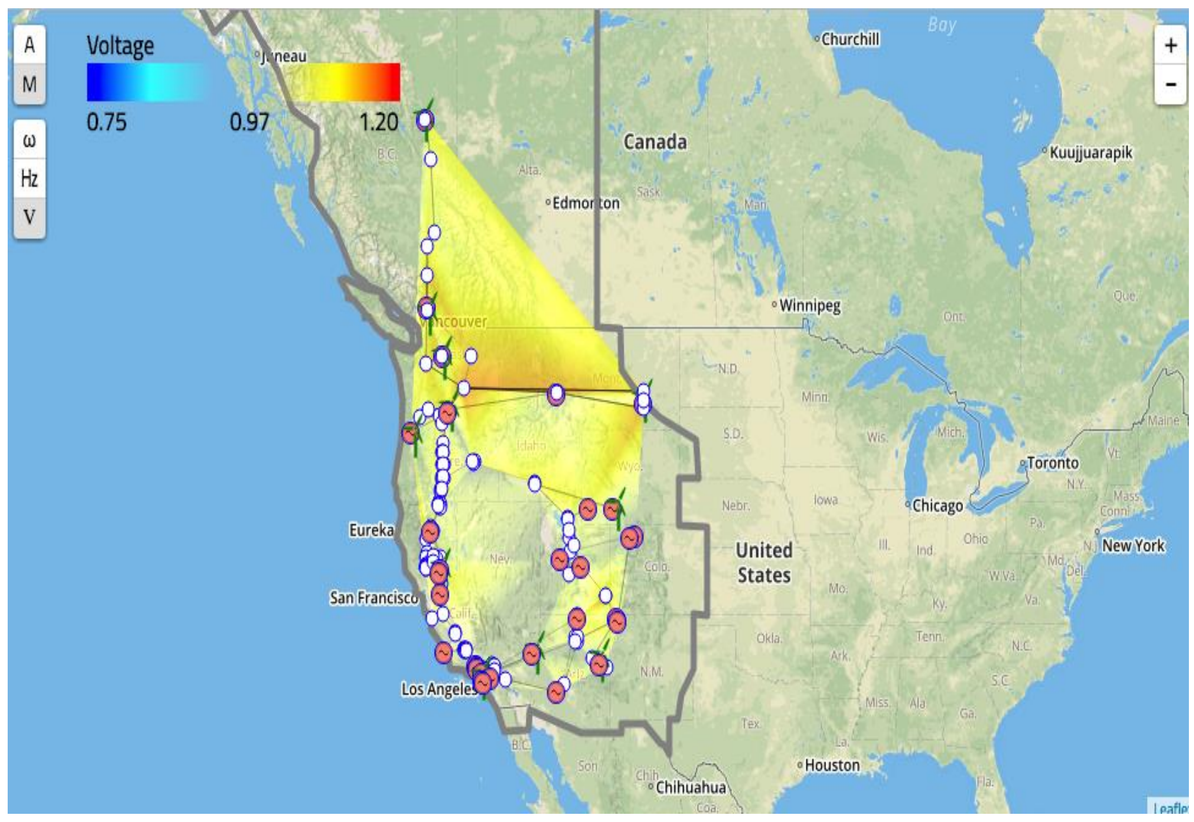
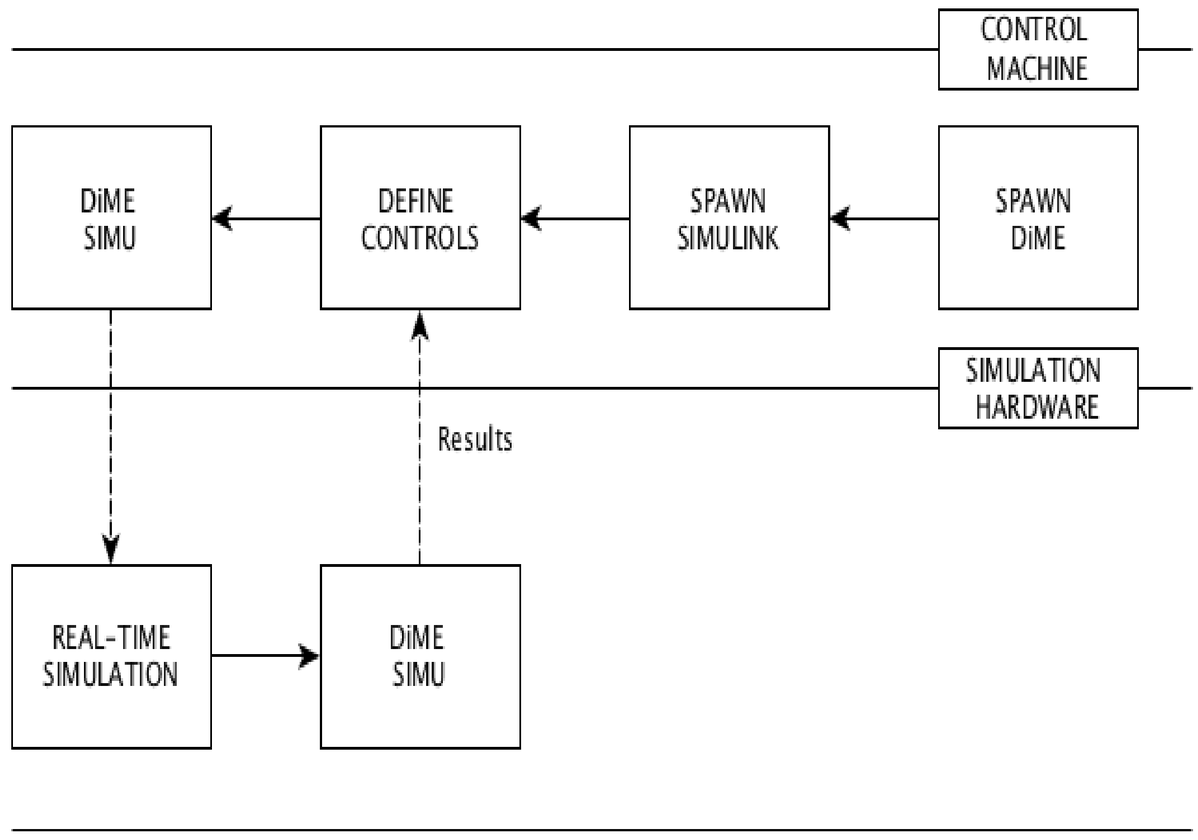
LTB Data Flow

Overview

- The Large Test Bed simulator is the simulation tool used at CURENT to simulate and visualize large areas of the grid. The LTB software consists of a modular architecture in which multiple pieces of software interact and communicate with one another.
- Some LTB simulations must be conducted on specific hardware capable of running real-time (wall clock time) simulations. These simulations, though run on specialized hardware, still run within SIMULINK on that hardware and also must be given input to a CONTROL node.
- The dynamic models built to simulate the grid in SIMULINK consist of a MASTER node a CONTROL node and a SLAVE node. The CONTROL node is the node which is given input to change the states of the simulation components.
- The DiME server is currently used in the LTB to communicate between instances of Matlab.
- This work explores the possibilities of creating a SIMULINK custom block library (DiMESIMU) utilizing the DiME server to communicate the control data to the real-time simulations.





Required Tasks

Creating the DiMESIMU library requires custom SIMULINK blocks that may be used for successful data streaming in a SIMULINK environment. These blocks are DiME Send, DiME Receive, and DiME Object Initialization.

- The **DiME Object Initialization** block must be used in combination with either the **DiME Send** block or the DiME receive block. This block takes as a parameter the address and port of the echo server and creates a DiME object to handle the data streaming.

- The **DiME Send** block takes as a parameter the amount of input data to be streamed. This block is responsible for the formatting of the numerical simulation data into Matlab structures and also the sending of that data.

- The **DiME Receive** block takes a numerical input of how much data to be received at a time as well as the amount of data to be received as a parameter.