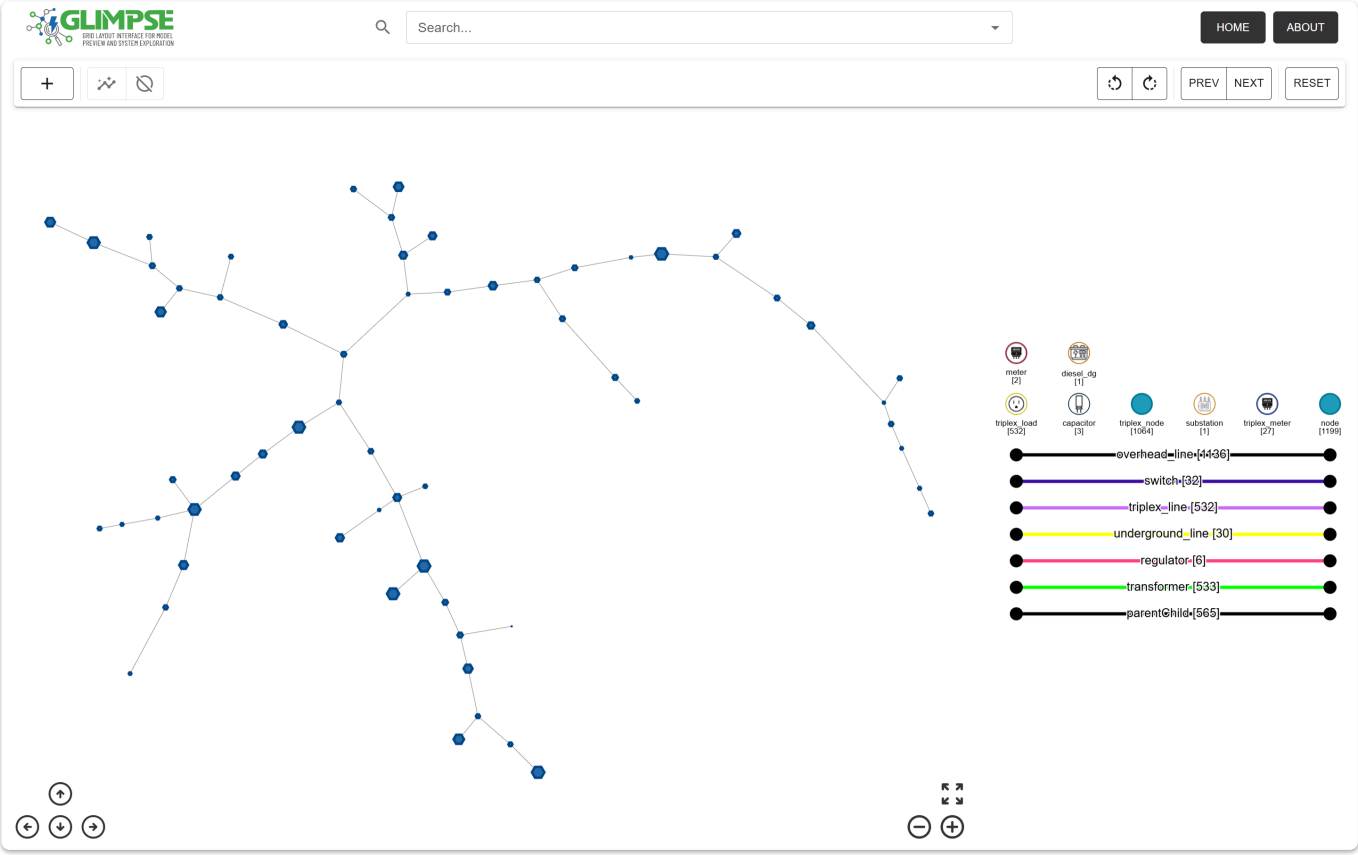
User Manual

Getting Started

GLIMPSE is a graph-based desktop application to visualize and update GridLAB-D power grid models. The tool can be used to search and highlight power grid model objects. Additionally, it also update the model attributes and export the modified model future simulations.

- GLIMPSE comes with a data folder found at `GLIMSPE/data/`. In this folder you will find multiple Feeder model files as well as some example JSON files that have a custom graph.
  - Each feeder model folder contains 1 - 4 `.glm` files
  - Drag and drop them on the upload area in the GLIMPSE UI
  - Or click on the upload area to simply find and select the files you want to visualize



UI Tour

- Once uploading a model for visualization a search bar will appear at the top of the app to find nodes and edges by ID and grouped by type with auto complete.
- At the top right there is the `HOME` and `ABOUT` buttons
  - `HOME` - Click to go back and upload a new file

    - `ABOUT` - Click to read more about the tool and it's features
- Bellow The `HOME` and `ABOUT` buttons there is the `RESET`, `PREV`, `NEXT`, `Rotate CW`, and `Rotate CCW` buttons for interacting with the overall visualization
    - `RESET` button returns the visualization back to its original styles when uploaded and centers the visualizations.
    - `Rotate CW` (Clock Wise) and a `Rotate CCW` (Counter Clock Wise) buttons rotate the entire visualization by 15 degrees.
    - `PREV` and `NEXT` - These buttons cycle through any highlighted nodes. To highlight nodes double click on a node type in the legend just bellow these buttons.
- To the top right just under the GLIMPSE logo there are two toggle buttons and a add overlay button.
    - The `Auto Layout` toggle button enables the visualization's physics engine to then bring the visualization to a stable state.
    - The `Hide Legend` toggle button does just that. It hides the legend for greater visualization area.
    - The `Add and Overlay` button allows the upload of an additional JSON file that contains related nodes and edges to the current visualization.

Context Menu Actions

- `Node Right-Click` - Right-Clicking on a node will show a couple of options
    - `Edit Attributes` - By clicking this menu option a form will popup that allows the update of any attributes that belong to the selected node.
    - `Delete Node` - This will delete the node from the visualization and can be reflected on the export of the uploaded `.glm` files.
    - `Cluster` - This is best for when you have multiple models or when you upload the larger models and you decided to open a cluster.
    - `Open Cluster` - On larger models a community detection algorithm is ran in the background to categorize the nodes into communities to then cluster. This option will open the selected clustered node to view any nodes and edges inside that cluster.
- `Edge Right-Click` - Right-Clicking on an edge will give the user some of the following options.
    - `Edit Attributes` - By clicking this menu option a form will popup that allows the update of any attributes that belong to the selected edge.
    - `Hide Edge` - Hide only this edge
    - `Hide Edges of This Type` - If the edge has a type all of the edges of that same type will be hidden
    - `Delete Edge` - Remove the edge from the visualization

    - `Animate Edge` - Show a small orange arrow animation going from source to target node.
    - `Remove Animation` - This option shows up when you right click on an animated edge to remove the animation
- `Right-Click` - Right-Clicking on an empty area of the visualization will show other options
    - `New Node` - This option will open a new node form to add new nodes
    - `New Edge` - Same as the new node form you will be able to create a new edge between two existing nodes.
    - `Save image as ...` - This option will have you select where you would like to save a png image of the current visualization.

Legend Context Menu Actions

- Right clicking on a node or edge will give the user two options.
    - `Hide All` - This will hide all edges or nodes of that type.
    - `Edit Theme` - This option will bring up the them builder form that allows the user to modify the color, shape, and size for a selected node type or the width and color for a selected edge type.

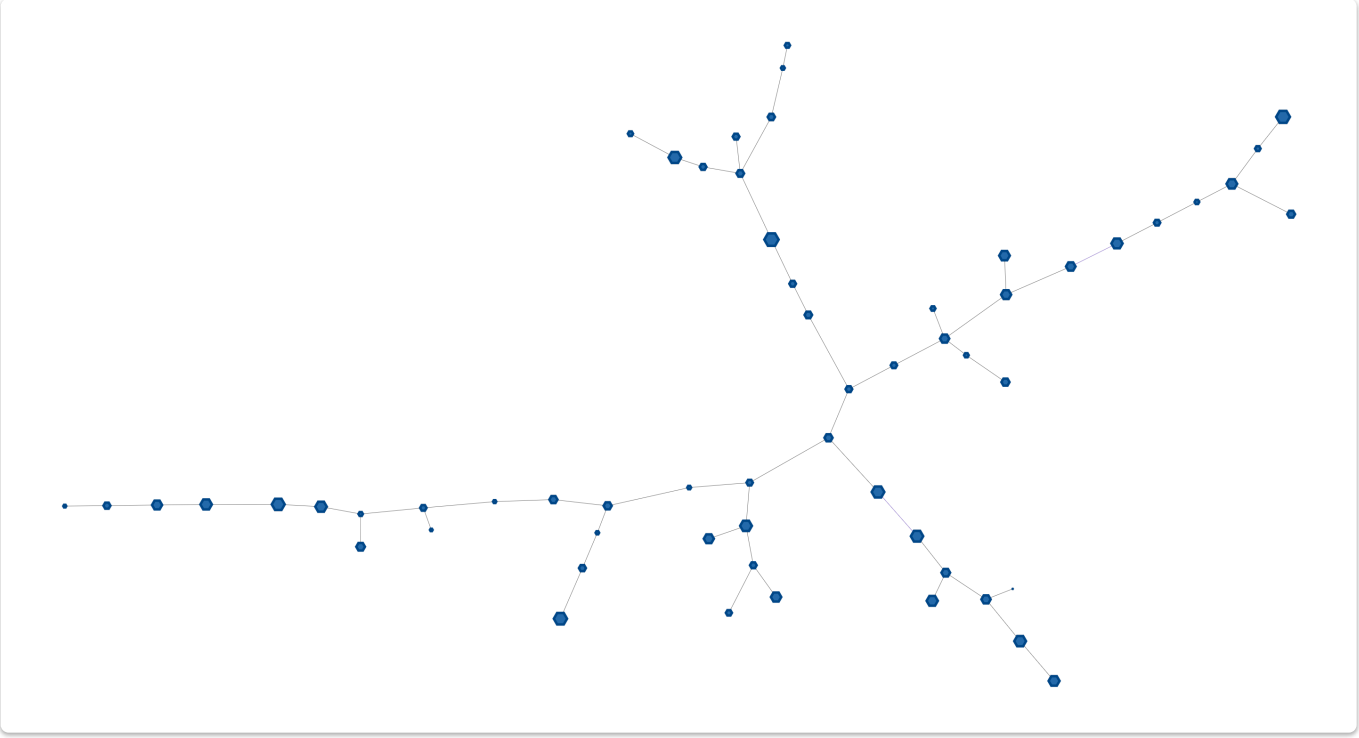
Custom Graphs

To visualize custom graphs GLIMPSE accepts two different JSON structures

1. GLIMPSE Structure - This structure is based on the glm2json output from the parser GLIMPSE uses in the back ground.
2. Networkx Node Link Data - If you have a networkx GRAPH object in python you can use the `node_link_data` function to generate a JSON dump of your graph and upload it to GLIMPSE as a JSON file.

Uploading Large Graphs

When uploading large graphs that contain more than 2k nodes and edges that graph will be fed through a community detection algorithm from the Networkx library. Particularly the Louvain community detection algorithm. The clustered nodes are visualized as hexagons and scaled based on how many nodes are in the cluster. The larger the cluster node that more nodes are in it.



The above screenshot shows how a graph with 2829 nodes and 2834 edges is clustered down.

GLIMPSE WebSocket Server API

GLIMPSE has API so more power users can create a JavaScript or python script to connect to GLIMPSE's local WebSocket server. The API revolves around styling existing nodes and edges while also being able to create and delete nodes and edges. A pdf of the API can be found here. You can also find code examples in the GLIMPSE GitHub repository here.