* Slide 2

First I am going to introduce the problem and motivation. For me it all began when the team did Scurge the 3rd. We had multiple trees where each tree represented an NCF. And during Scurge the 3rd the team began defining network dataset consisting of the inter edges ( edge from one tree to another tree) and the intra edges (edge in one tree that does not follow the hierarchical structure of the tree). I grew inspired to find a way to Show the intra and inter dependencies of a network data while preserving the hierarchical component of the trees. For my master’s I had define what the user’s meaning sandia’s goal would be when using this application. We decided for master’s the goal would be to verify and validate the hierarchical and network data set by identifying anomalies and patterns. However I also believe the application can be used for analysis questions such as what are the first level dependencies or which other NCFs are important to a selected NCF? Therefore in the end the problem/goal for my master’s project was to Design a data visualization application that not only visualizes both the hierarchical and network components of the unique dataset but also allows developers to verify and validate the dataset by detecting network and tree related anomalies or patterns.

Demo!

* Overview

First in HIIT we have the overview page which consists of this big visualization here called a directed chord dependency diagram. In which each tree has an arc, we have nine trees total. They are colored based on their tree type in which we can get more description in the help icon here. Showing the percentage of tree types. And within each arc it summarizes the number of edges and where they go to. Let’s look at the largest arc which means it has the most number of edges total which is tree 5. We can hover over a ribbon in this case the largest ribbon to get more information. This ribbon is going from tree 5 to tree 5 meaning the number of intra edges is 50. (Next one over) we can there are 5 edges going from tree 5 to tree 3.

In the toolbar above we can explore further patterns. For example we can see the edges of only tree type 5 lime green. Or we could look at the trees of type 5 the current one and type 1. Additionally we can see the relationships between individual trees. For example tree 1, 6, 7.

Any questions so far?

Now that we have an overview of the relationships of the trees, we now want to explore the relationships in more detail. Lets pick tree 1 by double clicking.

* Icicle Hierarchy

Now we can see the hierarchical structure of tree 1 form what is called an icicle diagram with node link on top. Each rectangle above is a parent with the top most being the current NCF or tree. The colors of each rectangle is the node type which we can see once again in the legend.

The ring of arrows around the icicle diagram has each arrow representing a tree. The lighter arrow indicates we are currently on that tree. Similarly the arrows mimic the position of the tree in the chord diagram which can still be seen here.

* Intra

Now we want to see the intra edges for this tree. As you can see the guiding hierarchical edges disappeared and are replaced with directional intra edges. Now each rectangle tells you how many intra edges outgoing/incoming each node has. As you can see we have 2 incoming edges for node 11 and 3 outgoing. Hovering over each edge gives you more information sich as the edge type.

Now lets look over here to left to get more information about the intra edges. This diagram shows how many edges of a specific edge name go from one node type to another. In this case there are 2 edges of edge name 11 going from purple to pink. We can find out the node names by hovering over to get a table of the start and end nodes. We can find these in the icicle imagine there are a lot more edges making it difficult to find by using the filtering tools above. Lets start with edge name 11 and now we have 4 edges, but we still want this purple to pink ones. Since we only see pink once we can choose that node type which is 1. And now we can see only those nodes. Another way to get this point is through the nodes names. We can choose either start or end node, so lets pick start node 15 and end node 13, and we want edge 11.

* Slide 3