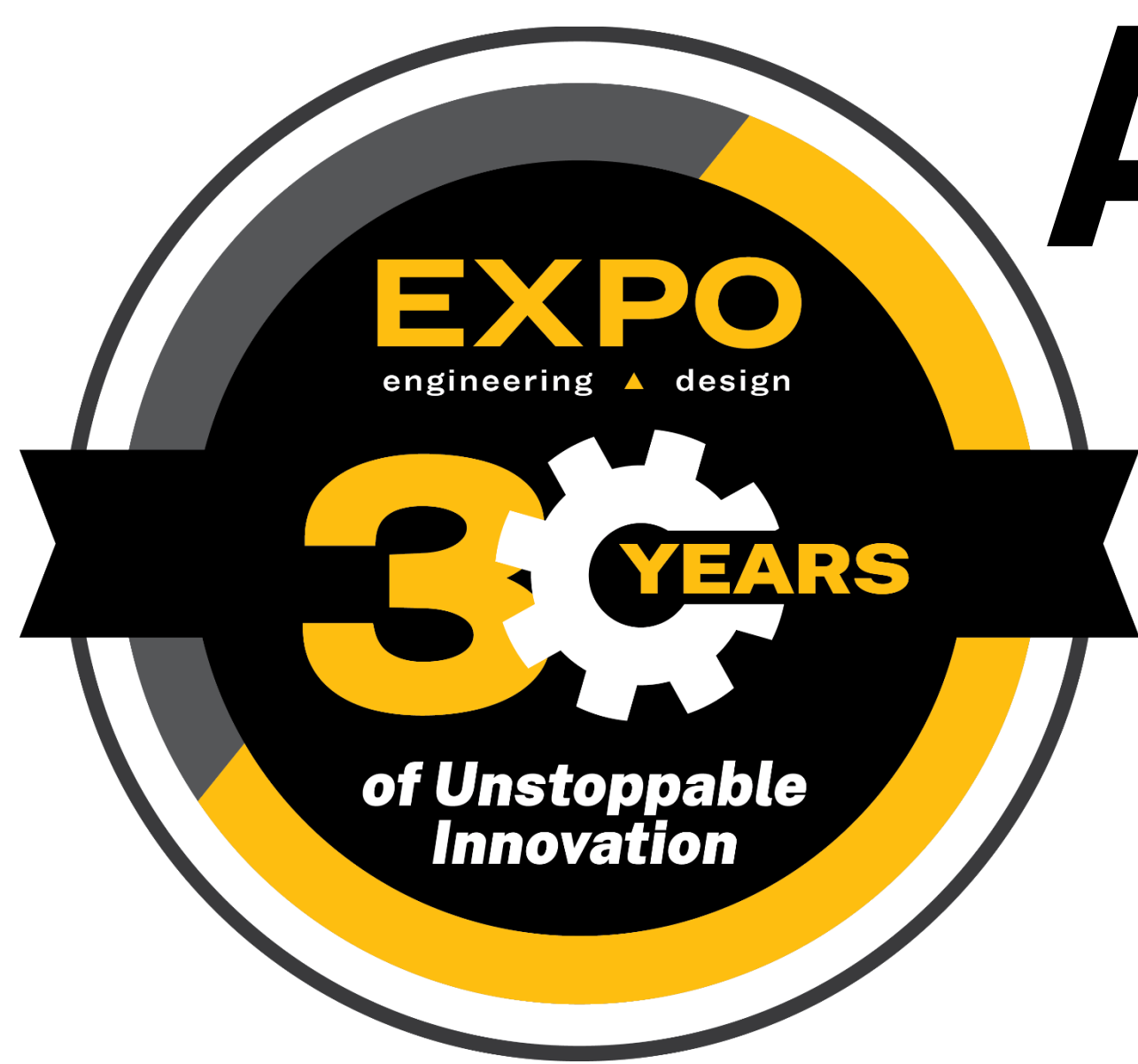




AUTOMATED VISIO CONSTRUCTION

MORGAN BROCKMAN, ROSS PRESTWICH, SOPHIA SIVULA, CREED THIE



OBJECTIVE

Programmatically create physical and logical network drawings in Microsoft® Visio using details contained in text-based configuration files.

BACKGROUND

Software currently exists to convert Visio diagrams to spreadsheets, but Schweitzer Engineering Laboratories (SEL) would like to have the process reversed.

VALUE PROPOSITION

- Software Defined Networks (SDNs) are complex, defined by spreadsheets
- Visio diagrams display these networks
- We want to convert spreadsheet data to Visio diagrams
- We want to make a mapping algorithm to create and order Visio shapes to represent the data

KEY REQUIREMENTS

- Depict an SEL SDN Network using Visio's C# API
- Develop an algorithm for readable network-item placement
- Fully convert SEL SDN spreadsheet data to Visio drawings
- Use existing SEL Visio stencils in Visio drawings

CONCEPT DEVELOPMENT

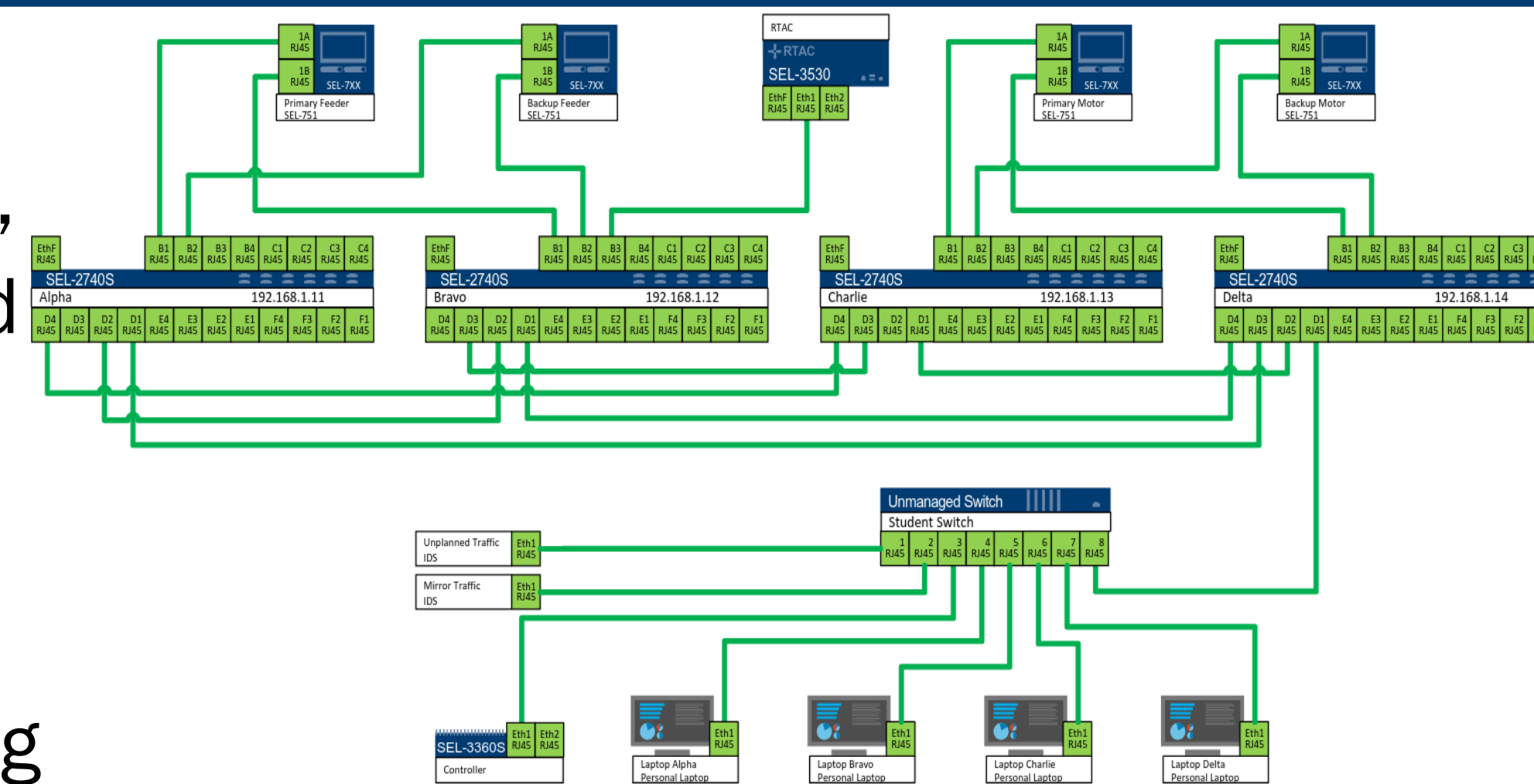
- Parse through comma-separated values (CSVs), such as the topology and host files

- Create a hierarchical mapping algorithm

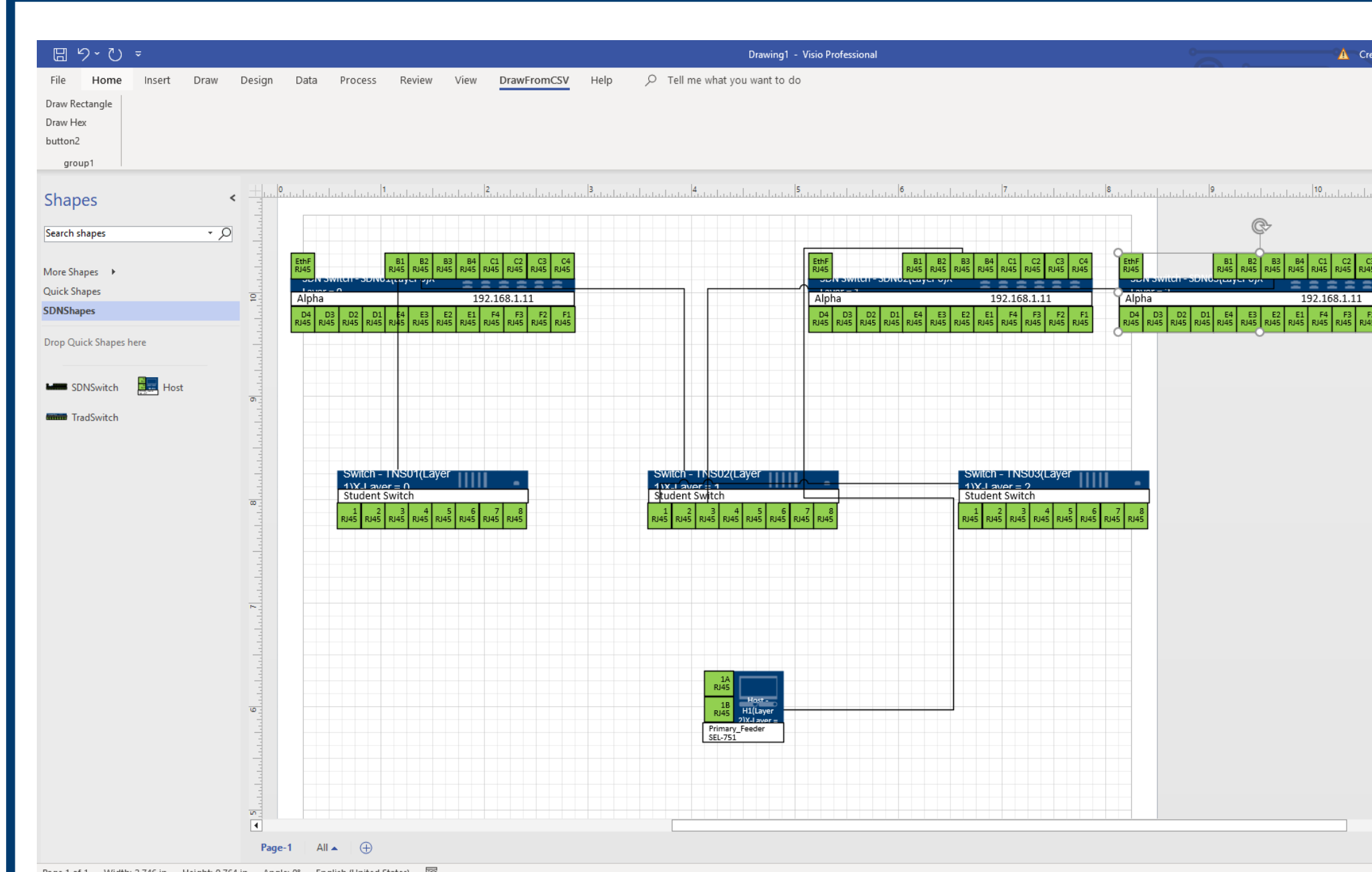
- Minimize edge crossing

- Generate SEL SDN shapes

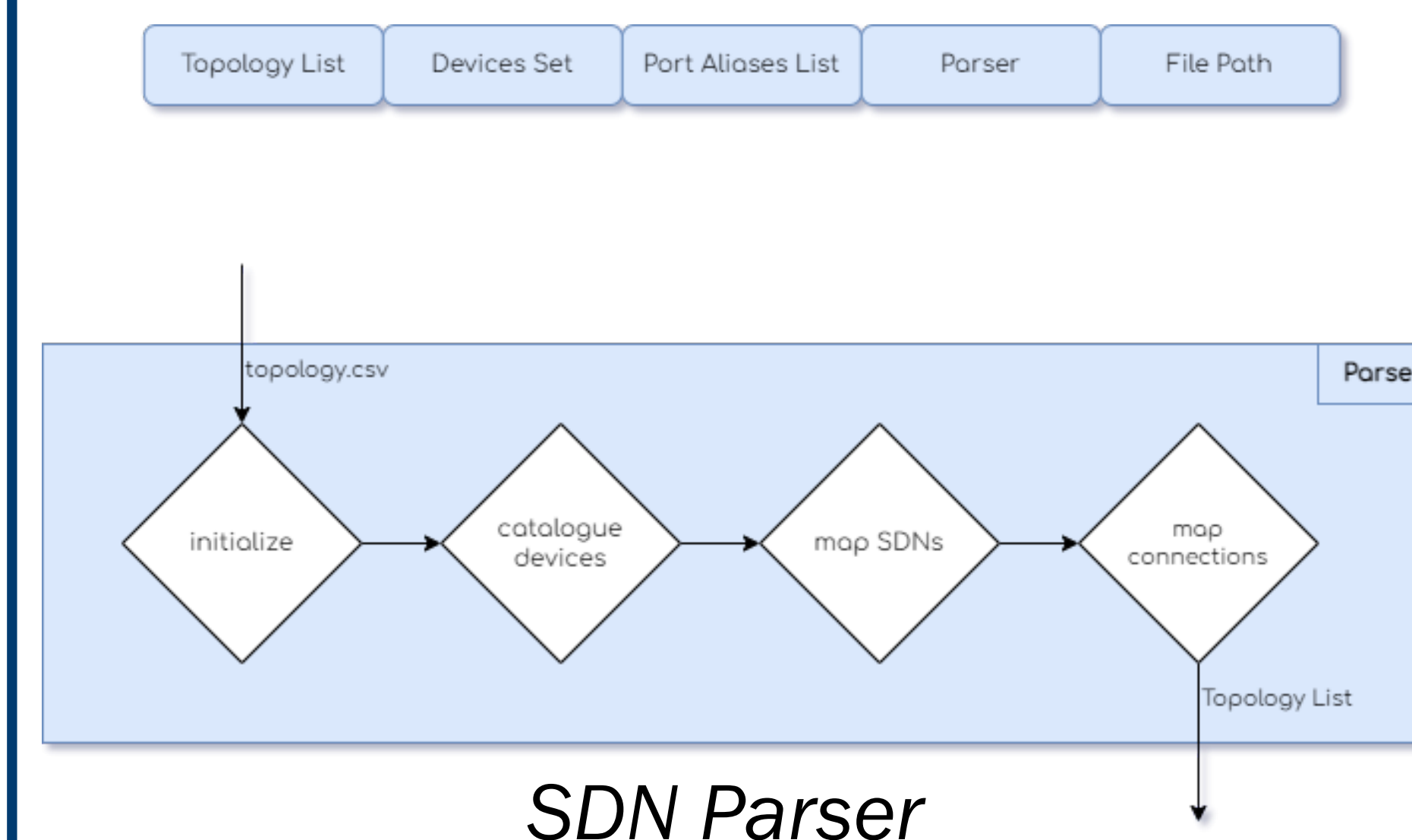
Example of desired SEL SDN Network layout



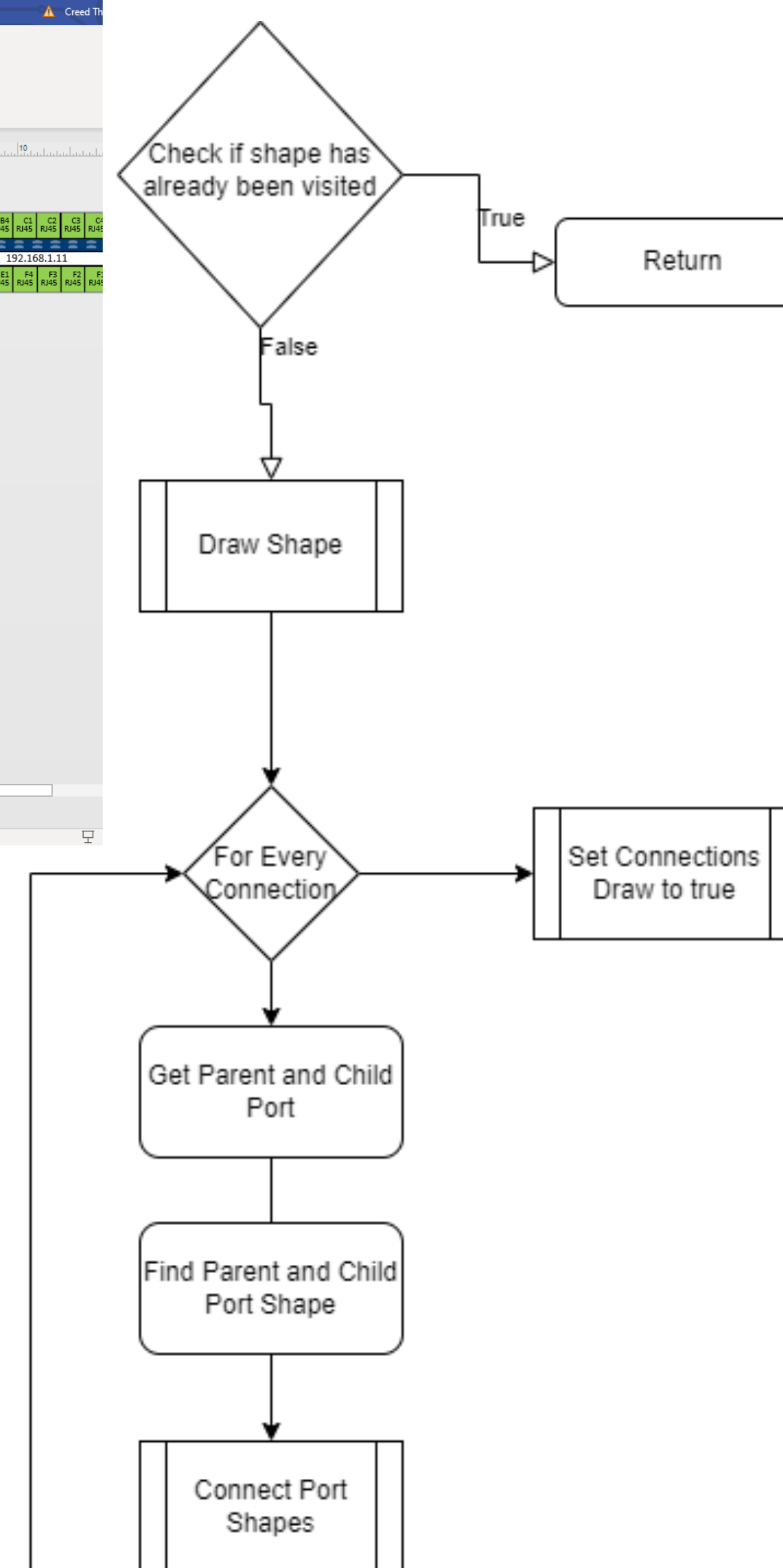
THE FINAL DESIGN



Sample of Visio diagram output

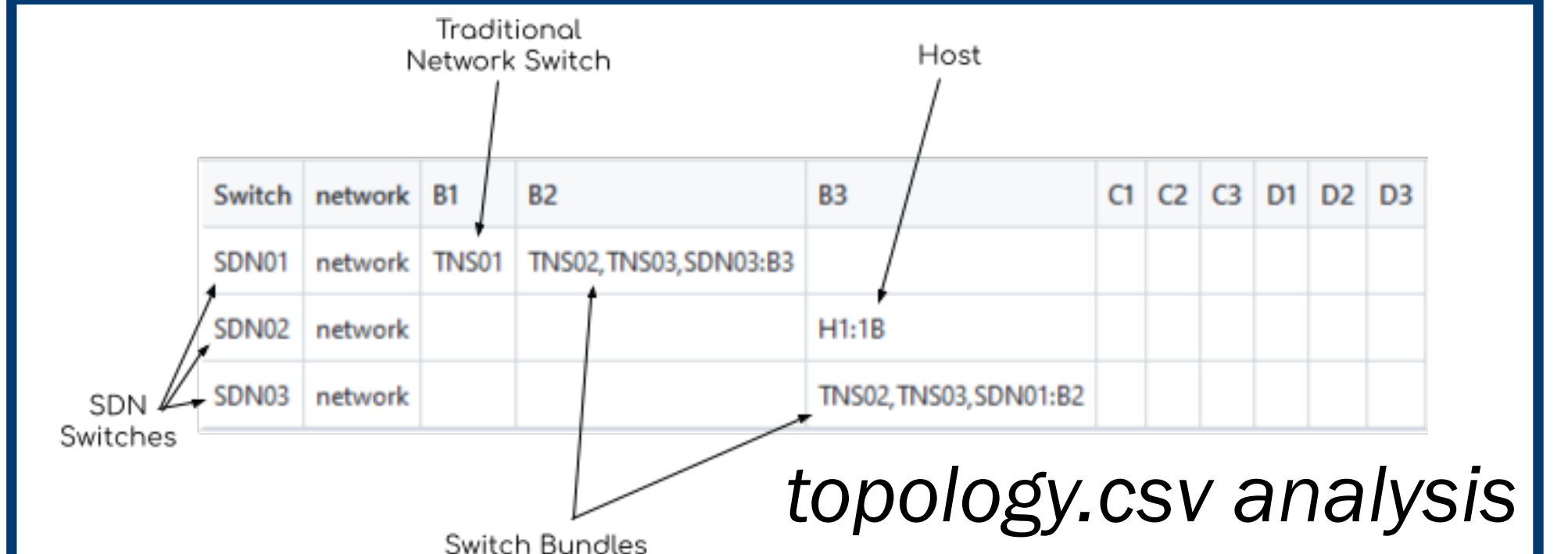


SDN Parser



Mapping algorithm analysis

VALIDATION



Successfully wrote and implemented the mapping algorithm in C#, as well as learned shape generation and parsing.

SUMMARY & CONCLUSION

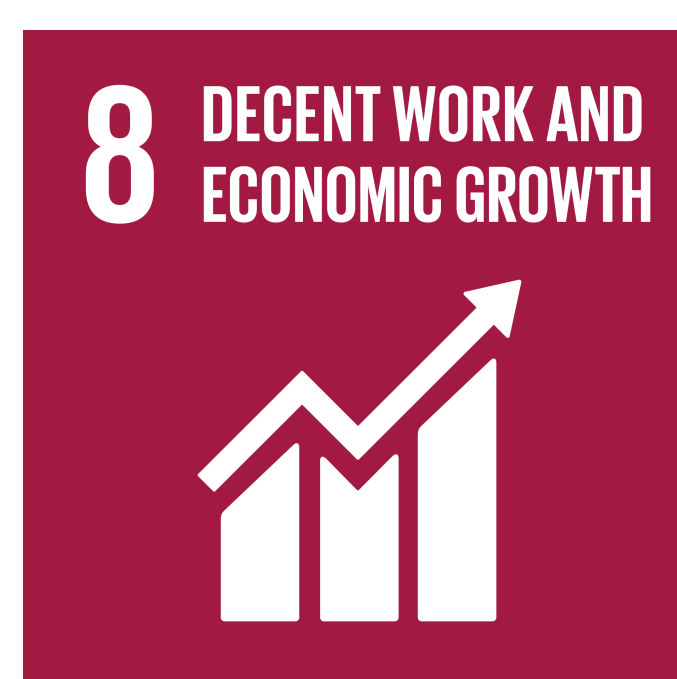
We built a Visio plugin which converts SEL's topology.csv representations of their SEL Networks to simple representative Visio drawings.

RECOMMENDATIONS

- Untangle connections between ports
- Implement host.csv data into shapes
- Better data separation in topology.csv
- Improve the program speed

ACKNOWLEDGMENTS

We would like to thank Jason Dearien, our SEL project sponsor, as well as Bruce Bolden, our faculty advisor.



2023 Capstone Project