# Network Simulation Software Analysis of Alternatives

Date: 23 October 2022

## Overview

Data networking is a complex field. Designing networks is a complex task. Simulators have been developed to create hypothetical designs with configuration settings for evaluating architectures and settings. At least 2 simulators are freely available to IT professionals and students. This project involves researching the landscape of free network design simulators to determine how many there are, then downloading, testing, evaluating, and documenting the features of each by designing, on each, a network with multiple routers, switches, and host devices using IPv4 and IPv6, defining features appropriate for classroom use in a university, and finally determining which solution fits the classroom requirements using a vector shortest distance analysis.

## Project Team

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| **Roles** | **Name** | **Major responsibilities** | **Contact (Email and/or Phone)** |
| Project owner | Donald Privitera | Project Sponsor | [dprivit2@kennesaw.edu](mailto:dprivit2@kennesaw.edu) |
| Team leader | Justin McCannon | Project Management  Website Development  Networking Specialist | [Jmccanno@students.kennesaw.edu](mailto:Jmccanno@students.kennesaw.edu) |
| Team members | Nidhi Marsonia | Software and technical analysis  Presentation Development | n[marsoni@students.kennesaw.edu](mailto:Nmarsoni@students.kennesaw.edu) |
| Michael McInnis | Business Needs Analyst  Research | m[mcinni2@students.kennesaw.edu](mailto:Mmcinni2@students.kennesaw.edu) |
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| Advisor / Instructor | Donald Privitera | Facilitate project progress; advise on project planning and management. | [dprivit2@kennesaw.edu](mailto:dprivit2@kennesaw.edu) |

## Project website

https://netsimcapstonefall2022.netlify.app/

## Final Deliverables

* Identify candidate solutions
  + Find network simulation software that has the potential to be suitable for classroom use at KSU (Kennesaw State University).
  + At a minimum, all simulators should be able to simulate routers, switches, firewalls, and network endpoints (workstations, servers, VOIP phones, etc.)
* Install, run, test, and document feature sets
  + All simulators should meet minimum criteria. Ease-of-use, documentation, and other non-technical features should also be considered.
* Define features appropriate for classroom use and use vector shortest distance to identify the software solution which most closely matches. Provide a step-by-step manual on how to set up a working network design.
  + Set up an office network with network segregated into multiple VLANs
    - Routers – Focus on setting up static routing (between router and internet gateway) and dynamic routing (between internal routers), potentially RIP or OSPF. Create subnets for different departments.
    - Switches – Cover switchport configuration including VLAN assignment. Cover switchport trunking. Cover multi-layer switch configuration.
    - Hosts – Ensure all hosts have IP assignments and can access network resources.
      * If applicable in the chosen simulator, simple network servers may also be considered (DHCP, DNS, Etc.)

## Milestones

#1 - By 09/25/2022

* Create a list of requirements and features required for classroom usage
* Compile a list of viable simulator candidates
* Become familiar with candidates and their features
* Milestone 1 report

#2 - By 10/23/2022

* Test the following four network simulators against the performance vectors as ranked by the project sponsor
  + Cisco Packet Tracer
  + EVE-NG
  + GNS3
  + Cisco Modeling Labs
* Begin creating manual for chosen simulator.
* Begin Second stages of research report.
* Milestone 2 report

#3 - By 11/20/2022

* Finalize research report and presentation
* Begin Creating lab manual for cisco Packet Tracer
  + Manual should guide through creating a simulated network for a small office with multiple routers, switches, and endpoints.
  + The network will be derived from the network used for testing.

## Collaboration and Communication Plan

The main source for communication for the team will be GroupMe. The team will have weekly meetings every Monday and Thursday at 7:00 pm on Microsoft Teams to be in contact, distribute tasks, review timelines, and reset focus. These meetings will last from 10 minutes to an hour depending on the time needed. The goal of each meeting will be to obtain a status report of each team member’s progress in the project.

Team members should respond if contacted within 4 hours during typical working hours (8AM – 5PM) Monday through Friday. If a team member does not respond after 48 hours, they will be considered AWOL. This period may become stricter as deadlines approach.

Team members will notify the team leader in advance if they are unable to be contacted for more than 24 hours.

The team leader will conduct meetings with Professor Privitera no later than one week before each milestone report is due.

**Risk Management**

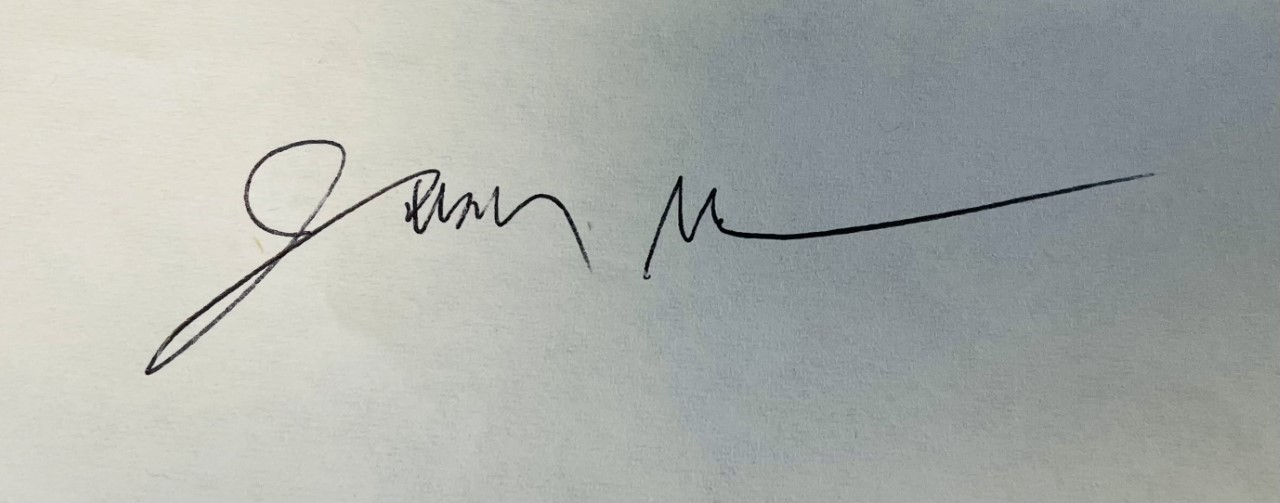
* Team member has a planned leave of absence with outstanding tasks:
  + Team member will meet with the team leader beforehand to go over outstanding tasks for the current deliverable and determine if tasks need to be re-assigned:
* Team member has an unplanned leave of absence (illness, family emergencies, etc.)
  + Team leader will review outstanding tasks for the current deliverable by the team member and redistribute as needed to meet deadlines.
* Team member is declared AWOL:
  + If a team member has stopped responding to communication, the team leader will inform the instructor immediately. The team will meet and begin re-distributing all outstanding tasks for all deliverables among team members.
* Chosen network simulator found unviable after work has begun on manual:
  + Apart from our primary choice, a second viable option should be available on backup in the event that the primary choice is found not viable.

## Project Schedule and Tasks Planning

See the Gantt chart file attached.

**Signed By:**

**Justin McCannon**



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