

PAWR Program

Developing Advanced Hands-On Labs

Lightning Talk (Project Plan)

SDMAY24-20

IOWA STATE UNIVERSITY

Project Goal

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The Challenge:

On August 1, 2023, GENI (Global Environment for Network Innovation), a virtual lab environment used for simulation of networking and systems for research and education, shut down its servers and effectively went defunct.

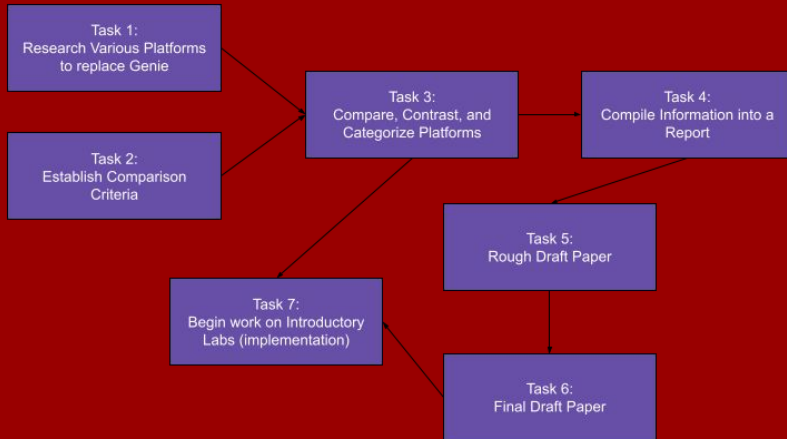
Iowa State has used GENI for networking classes in the past (CPR E 431, for example). As a result of GENI's shutdown, our goal is to find alternative platforms to research, develop, and test networking and cybersecurity labs using their resources and environments.

The Solution:

The goal of this project is to research and analyze a variety of platforms that educators can use to replace GENI within their curriculum. In the end this will take the form of a publishable research paper comparing and contrasting the various platforms we discover and their potential use cases.

Task Decomposition

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Task 1: This task is a huge part and time-consuming milestone. Researching and getting a firm understanding of the capabilities and restraints of the platforms is crucial to achieving our end-of-project goal.

Task 2: Taking our research and begin to critique it and categorize the platforms to get a better understanding of what we have at hand. Since the research of each platform is done by a single team member, this step allows for collaboration and discussion based on our findings.

Task 3: Task 1 and Task 2 need to be completed in order for us to pit the platforms together and directly see disadvantages and advantages of each other.

Task 4: Taking our findings, we will now compile the research and information into a report and begin writing our paper.

Task 5: Take the paper and complete a full and tensive rough draft.

Task 6: This stage will be completing our final draft of our paper and submitting for publication.

Task 7: Can be done in conjunction with the completion of Task 3 as we would have a good understanding of the platforms at play and can start creating the introductory labs.

Project Management

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Waterfall + Agile Approach

Our group has elected a *Waterfall+Agile* mix project management style to complete our project goals.

We believe this approach will be most effective as we have a rather sequential approach that allows us to divide into distinct phases.

We want to adopt the agile aspect in terms of flexibility and adaptability; we want to be open to changes in project requirements and priorities at any stage if any new development comes from the platforms we are researching.

Relation to Project Goals

With our project goals, the waterfall approach works well as we break our goals into phases:

Requirements, Research, Comparison, Report, Implementation, Testing, Documentation, and Deployment.

We plan on striving for heavy documentation and detailed explanations and research at each step of this project. With little risks foreseen, using a mix of Agile helps us battle them independently and immediately.

Project Communication

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Communication

Our main form of communication and project management is currently the application of Microsoft Teams.

Microsoft Teams allows us to communicate, plan, and create a roadmap to success.

Advisor/Client Communication

Luckily, our Project Client is our Project Advisor, so communication takes place twice a month in person to go over details, research, and next steps.

We have an universal document that outlines the following:

- What we plan to accomplish
- What we did accomplish
- How much time dedicated to the project

Milestones & Metrics

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How do we measure Progress?

Due to our project being heavily reliant on research and data collection of various platforms and architectures, our metric of progress is rather abstract and arbitrary.

Some metrics with our goals are as follows:

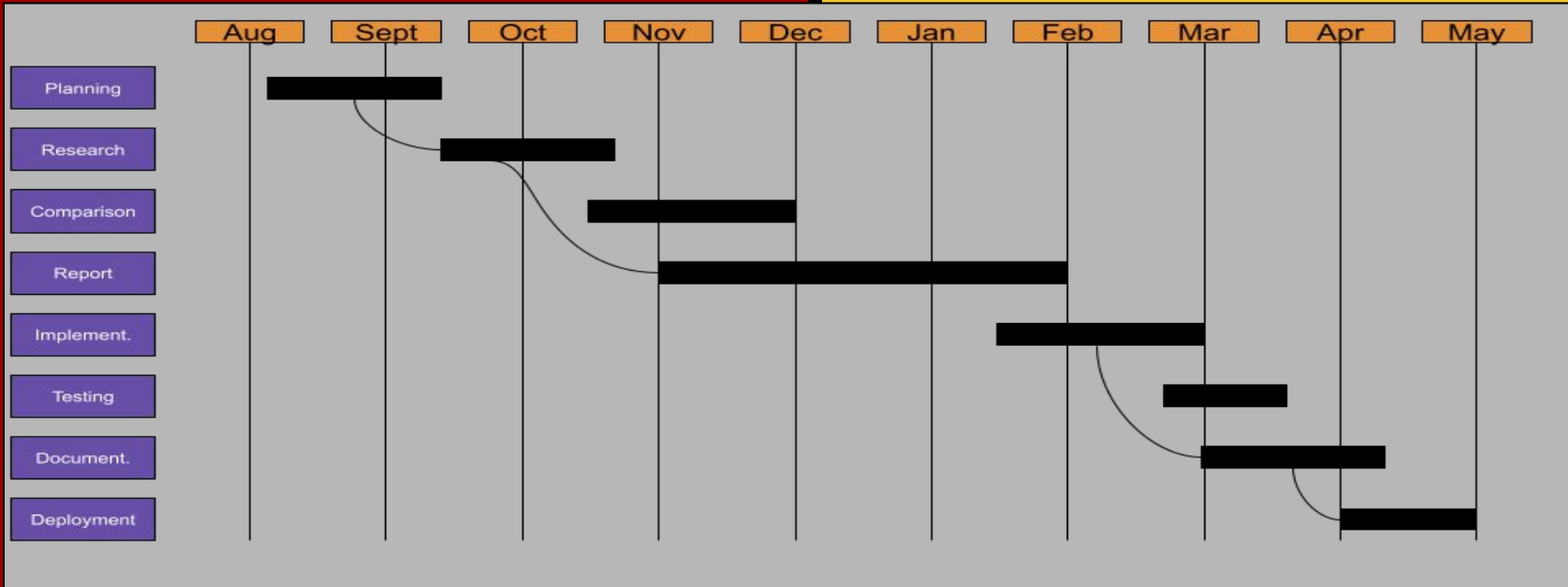
- The Scale of the Network
 - *Coverage and size it's capable of supporting*
- The Ease of Use
 - *How easy is it to use for an introductory lab*
- Capabilities and Abilities
 - *How advanced and how many tools are in our arsenal*
- Knowledge of the assigned platform

Milestones (*Subject to change)

- 1) Fully research 8+ various platforms to allow the team member to have 80% knowledge of public website and infrastructure.
- 2) Categorize the platforms and aim for a scalability of 75% rating
- 3) Categorize the platforms and aim for a usability of 60% rating
- 4) Categorize the platforms and aim for a capability rating of 80%
- 5) Select the best platform(s) that score the highest in our rating criteria based on our arbitrary metrics
- 6) Create lab assignments that have a rating of 60% or higher for usability

Project Timeline

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Project Timeline Cont.

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Gantt Chart:

Planning

Look at the defining the project's scope, objectives, requirements, and timeline. Compose a comprehensive project plan to meet expectations.

Research

With Research being the main focus of our project, it's important we build ethos on various platforms and architectures to help us gain information and data.

Comparison/Analysis

Using the research gathered from each team member, it's crucial for us to create categories and comparison between the platforms to find the most efficient, effective, and useable.

Report Drafting/Writing

Compose and compile all researched and collected data into a formal paper set for publication. This will entail grouping and gathering various research information and composing a well-written and fluent paper.

Implementation

Using the research gathered, begin to create introductory labs for Cyber/Network related courses.

Testing

Test the lab designs, implementations, and overall effectiveness to ensure it's appropriate for the class.

Documentation/Deployment

Release and make public all research and lab documentation to Iowa State University and other Universities across the nation.

Risks & Mitigations

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Risk #1: **Information Collection Phase**

Our concern is being able to find the correct and accurate information used for comparison and whether we can get a timely response from the platform if the information isn't made public.

An expected Risk Factor for this does not exceed 0.5 as the companies are expected to respond to requests in a timely manner.

Mitigation

Mitigation will be difficult due to the risk being out of our hands and control. Our group will try to request early and often, but cannot and will not be hindered with the absence of information.

Risk #2: **Implementation Phase**

Our concern is our inability to fully create a functional lab due to the limitations of the platform and the costs of their services.

An expected Risk Factor for this could be estimated to be rather high due to the limited access to the platform at early stages

Mitigation

While the labs we plan to develop are small and relatively simple, we may need the platform support and assistance to reach our goal.

Personal Efforts/Reqs

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Task/Goal	Description/Explanation	Estimated Person-Hours
Project Planning	Define the scope, objectives, timeline, dilemmas, roadblocks, and requirements	40 hours
Research & Analysis	Research various platforms, gather information, and analyze their capabilities	80 hours
Analysis & Comparison	Take the research and begin to compare and assess the strengths & weaknesses	60 hours
Report Writing	Take our final research and compile it into a research paper for publishing	210 hours
Implementation	Begin to create introductory labs based on the platforms researched	120 hours
Testing	Conduct various tests, collect data, and ensure the project description is met	30 hours
Documentation	Create student-friendly lab documentation to accompany the implementation	60 hours
Deployment	Release and publish research, labs, and other activities	40 hours
		640 Hours

*Subject to Change

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Camron Corcoran, Bryan Pope, Corey Lieu, Brendon Droege, Susanna Noble, Leha Dutta

SDMAY24-20 - Mohamed Selim

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