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Rolls-Royce and IUPUI Threat Modeling Tool

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Abstract

Threat Modeling is the process of identifying and mitigating potential threats in the development cycle of a product or process. It has been a field limited to a select few, well-trained individuals. As a result, it is often introduced too late in a product development cycle, making it difficult and expensive to overcome flaws that are already built into the system.

This project seeks to make threat modeling more accessible to the average engineer, teaching them to think about it earlier in the process and continue as the project progresses. Doing this can greatly reduce the cost of implementing security features because work that has already been done doesn't need to be refactored around issues that were discovered too late.

Requirements

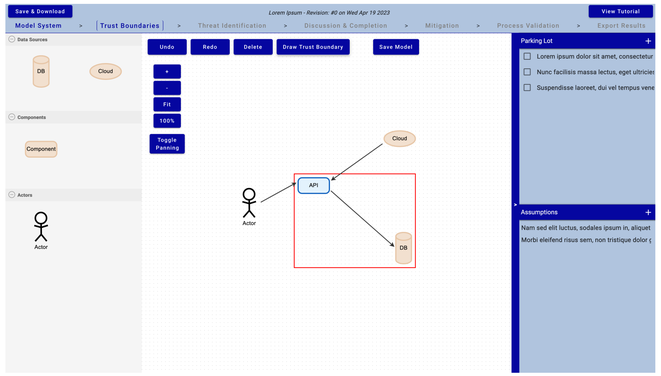
Technical Requirements:

- The application **shall not** require a hosting server.
- The application **shall not** require administrative privileges to run.
- The application **shall** be usable by an average engineer.
- The system **shall** allow a user to model their system in a user-friendly manner
- The system **shall** guide the user through the threat modeling process, based on STRIDE.
- The application **shall** support saving and loading.
- The application **shall** be extendible.

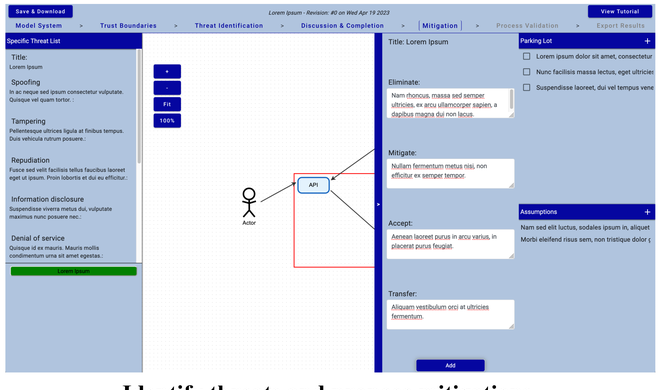
Visual Requirements:

- The application **shall** be accessible to colorblind individuals

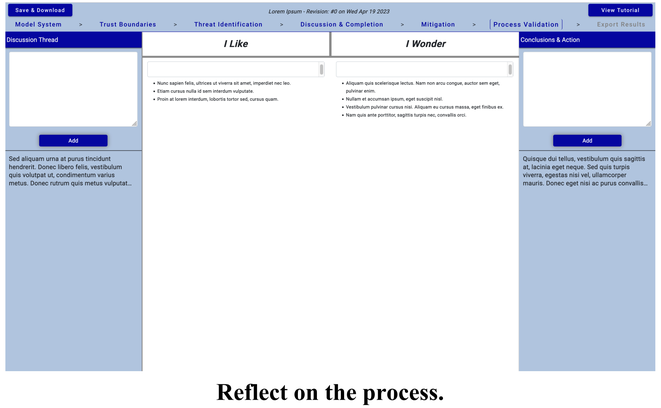
Software Design



Model your system with a user-friendly drag-and-drop interface.



Identify threats and propose mitigations.



Reflect on the process.

Results

- All requirements were met or exceeded.
- Data persistence was achieved through local saving and loading.
- Tool tips are provided for all clickables to guide the user through the process.
- A tutorial is provided for users that are new to threat modeling or looking for a refresher.
- All libraries used are have open-source licensing.
- The software is design to be extendible by future developers, including, but not limited to: Adding additional threat modeling processes and adding a database connection.
- The parking lot and assumptions panels allow users to capture thought throughout the project which they may not be ready to act upon.

Conclusion and Future Work

- We were able to create a fully function, easy-to-use, single-page application that can run in a user's browser.
- Our application leaves open the opportunity to expand the system to be more robust and connected.
- The STRIDE threat modeling tool has been built and additional tools can be added due to our extendible design.
- As our sponsor would like to connect this to a database in the future, the single point of entry for data allows the easy implementation of a database API.
- Implementing automated testing throughout the program would be something that would cover all edge cases that cannot be manual tested in our application.
- Modifications can be made to the flow of the program by someone with more experience in user experience and user interfaces.