Healthcare/IoT Cybersecurity Testbed

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Project Goals

- Integrate many different tools into one seamless test suite
- Provide for manufacturers and prospective users alike to test the security of their devices
- Maintain security requirements wherever necessary
- Automate as much of the reverse-engineering/cybersecurity testing as possible
- Do all of this via a GUI for ease of use

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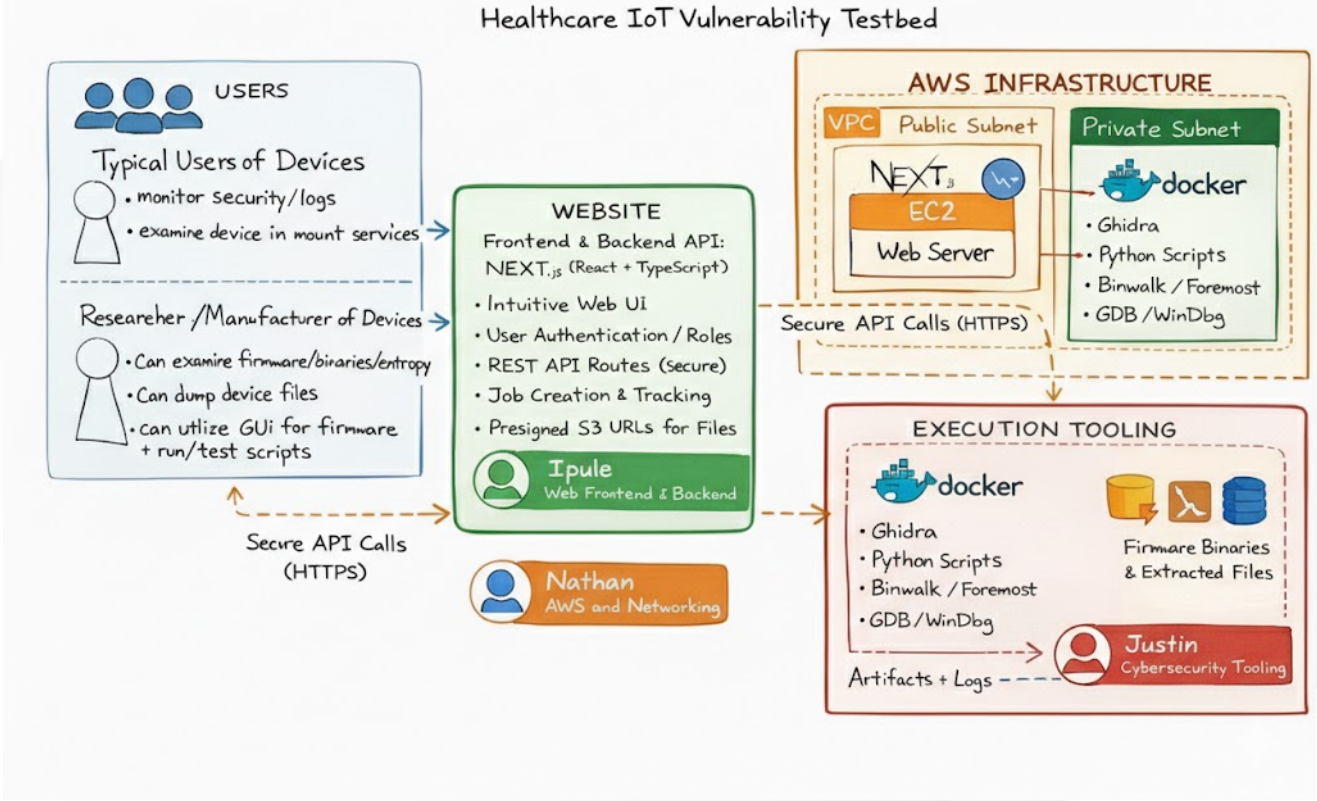
System Architecture Diagram



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Cybersecurity Tooling

- GDB/pwndbg for assembly level tasks (firmware/binary analysis)
- binwalk/foremost for entropy analysis and file segmentation
- Ghidra for binary analysis tooling and potential scripting due to recent python support
- Python as a standalone tool and supporting component to other tools for scripting tasks

Benefits of Docker

- Containerized for security conscious applications
- Shares kernel with the host system for low level tasks
- Minimal bloat for optimal performance
- Operates headlessly (beneficial for backend CLI tools)
- Can be integrated via terminal windows for advanced users

Cloud Providers and Architecture

AWS

- AWS offers many services and types of instances
- We already have experience with AWS
- AWS has a more complicated interface due to many services
- Integrated directly with services bring uses in other sections of our design

Architecture

- Dedicated servers are more simple to use
- Serverless solutions offer more compute for less money
- Relational database offers better data parsing
- Non relational databases offer greater control

Web Interface Tools & Technologies

NEXTJS

- Web framework built by vercel used for serverless rendering
- Build web UI, handle auth, call AWS APIs, display results.

TYPESCRIPT /JAVASCRIPT

- Use to implement api calls aws server
- Clean separation of layer
- Strict type safety

Tailwind CSS

- Seamless styling using by adding attributes to components

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Milestones

Milestone 1

- Compare tools for cloud, web servers, firmware analysis
- Build tests for selected tools
- Create design document and requirements document
- Sourcing potential scripts for RE

Milestone 2

- Setup cloud infrastructure
- Implement device connection interface and firmware extraction/analysis tooling
- Create secure test environment for running exploitation scripts

Milestone 3

- Build web based GUI for core services
- Add system for uploading custom test scripts
- Conduct testing to ensure features follow design documents
- Create full workflow demo

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Thanks for listening!
Questions?

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