

# Internal Infrastructure Web Application (IIWA)



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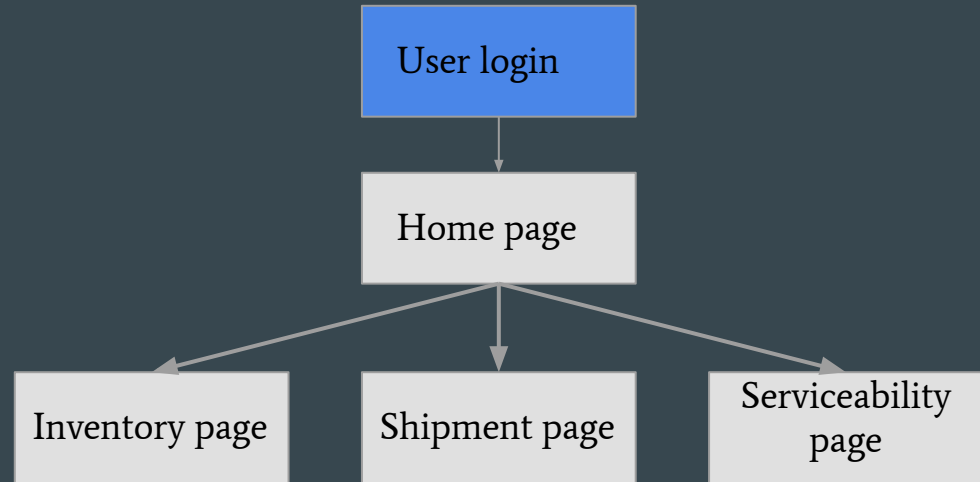
# Problem Statement

- The sponsor company Hinckley Medical LLC does not currently have an effective way of tracking and managing internal operations. To improve day-to-day operations we created a web application to offer these services.



# Functional Requirements

- Login page
- Home page
- Inventory page
- Shipment page
- Serviceability page



# Non-functional Requirements

- System needs to be reliable and interactive
- Needs to be able to store user data safely and securely
- Needs to require low maintenance







# Engineering Standards

- AES-256 encryption - The Advanced Encryption Standard (AES) specifies a FIPS-approved cryptographic algorithm that can be used to protect electronic data. The AES algorithm is a symmetric block cipher that can encrypt (encipher) and decrypt (decipher) information.
- IEEE-23026-2015 - Systems and software engineering- Engineering and management of websites for systems, software, and services information

# Market Survey

- We created a custom tool for the company to save money and convenience.
- Our website is tailored directly to all the clients needs.
- We use various services such as AWS Amplify and AWS Cognito to minimize pricing.

Kevin - 6

 FISHBOWL	<b>Fishbowl</b> Fishbowl is a hybrid manufacturing and warehouse management solution designed for small and midsize companies. Key features include inventory control, material requirements planning (MRP), job shop floor control, work order manage... <a href="#">Read more</a> ★ 4.15 (701 reviews) ↗ 74 recommendations <input type="checkbox"/> Compare <span style="float: right;"><input type="button" value="Price"/> <input type="button" value="Watch Demo"/></span>
 ORACLE NETSUITE	<b>NetSuite</b> With an integrated system that includes ERP, financials, commerce, inventory management, HR, PSA, supply chain management, CRM and more – NetSuite enables fast-growing businesses across all industries to work more effectively by a... <a href="#">Read more</a> ★ 4.10 (810 reviews) ↗ 63 recommendations <input type="checkbox"/> Compare <span style="float: right;"><input type="button" value="Price"/> <input type="button" value="Watch Demo"/></span>
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 AGILIRON	<b>Agiliron</b> Agiliron cloud-based point-of-sale (POS) solution is designed to serve both in-store and mobile businesses as well as online sales channels. The system offers a host of features that work in tandem with the point-of-sale solution... <a href="#">Read more</a> ★ 4.45 (32 reviews) ↗ 31 recommendations <input type="checkbox"/> Compare <span style="float: right;"><input type="button" value="Price"/> <input type="button" value="Watch Demo"/></span>
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# Technical/Constraints/Considerations

- Working product after two semesters
- Low cost web application
- Offline compatibility

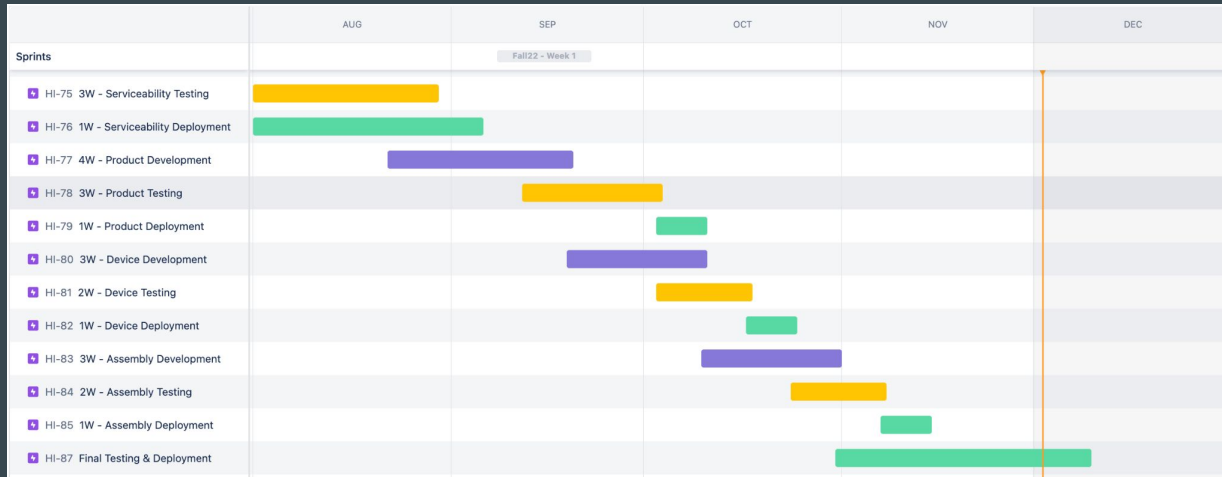
# Estimated Gantt Chart

## Semester 1



Purple: Development  
 Yellow: Testing  
 Green: Deploying

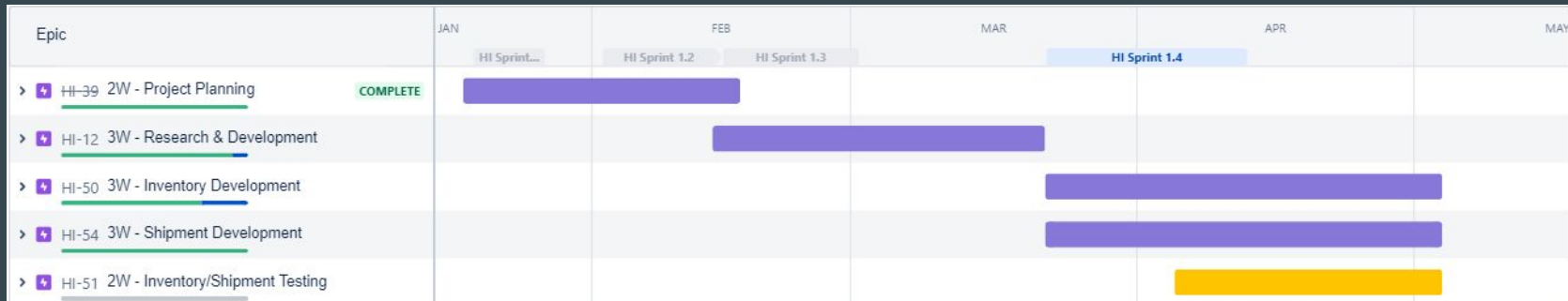
## Semester 2



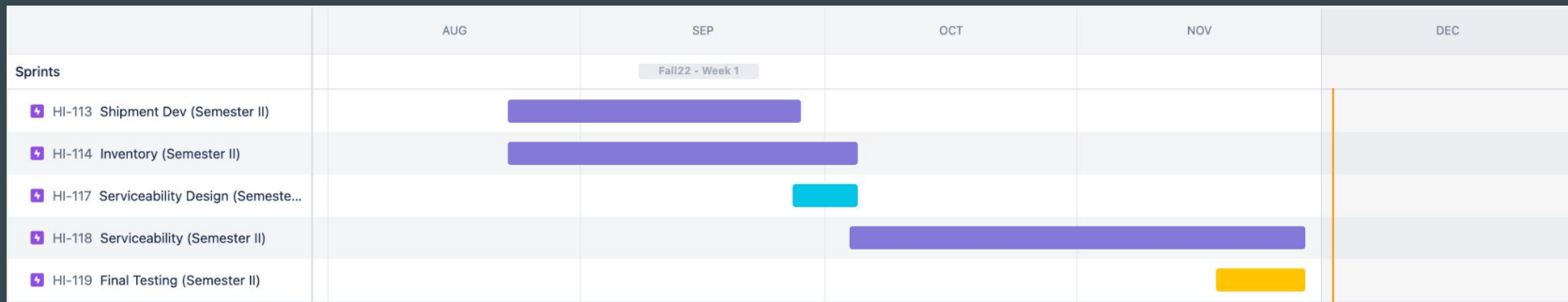


# Actual Gantt Chart

## Semester 1



## Semester 2



# Potential Risks & Mitigation

- Major risks - Cyber attacks
  - Cross-Site scripting (XSS) & SQL Injection attacks
    - Mitigated by filtering data inputs
  - Other cyber attacks
    - Mitigated by AWS services
- Some minor risks including..
  - Unintended database accessibility
    - Mitigated by: role-based access control (RBAC)
  - Unintended admin-level actions
    - Mitigated by: training in AWS functionality

# Resource/Cost Estimate

- **AWS Free Tier**
  - DynamoDB - database storage
  - AWS Lambda - Creating, Editing, Accessing, Deleting our data
  - Amazon SNS - Sending notifications to our users
  - AWS Cognito - User credentials and verification
- **AWS credit**
  - We received \$300 in AWS credit for developing the web application
- **AWS cost estimate**
  - Current Cost: \$0
  - Estimated Development Cost: \$0
  - Pay-as-you-go approach
    - Calculated Cost: roughly \$3-5 per month to host the website

# Initial Design - Functionality

- We used miro to map the functionality and design of each page.

## Home Page

### Functionality w/ Roles (A, DH, E, G):

- Log in
- Sign up
- Serial number entrance
  - Needed to gain access to some of the other pages
- When logged in
  - Menu to navigate to all other pages
  - Home board?

### Design Inputs:

- Login: Username, password
  - Verify user
- Sign Up: Username, email, password, role, department
  - Create user
- Serial Number: serial number
  - Verify serial number is active/in field product

### Known Database Items:

**User:** username, email, password, role, department  
**Department:** deptID, name, list of employees, list of products

### Ideas:

- Have home board with notifications and other important items

Uses a top down approach. Admin has all functions employee, department head, and guest have. Unless specified. (Hint - start on guest and work up)

### User Role Capabilities

#### Admin:

- Log in to gain more functionalities
- Can see 9 page detailed in employee

#### Employee:

- Log in to gain more functionalities
- Can see 9 pages
  - Inventory, Assembly, QMS, (includes 6 DH pages)

#### Department Head:

- Log in to gain more functionalities
- Can see 6 pages
  - Warranty - (inside of product information page). List of Devices, settings (includes 3 guest pages)

#### Guest:

- Require active/in field serial number (S/N) of a product to access request for service (RFS) and product information
- Can access customer feedback form and FAQ without S/N
- Only can see the 3 page options
  - Service, product information, FAQ

## Inventory Page

### Functionality w/ Roles:

- Create/edit inventory item (A)
- Subtract/Add quantity of item (A,E)
- Notify low inventory - on dashboard (A, E)
- View all inventory items (A, E)
- Search inventory items by labels, part numbers, and part names (A, E)

### Design Inputs:

- Create/Edit inventory: part number, part name, quantity, part cost, quantity per full system, available systems in inventory, website, labels,
- Add/Sub: part number, amount
- Search: part number, part name, label
- Filter: label

Uses a top down approach. Admin has all functions employee, department head, and guest have. Unless specified

### User Role Capabilities

#### Admin:

- Can create and edit all inventory items
- Can do everything employee can

#### Employee:

- Can view all inventory items
- Can subtract and add quantities to inventory items
- Can search through all inventory items
- Can filter through all inventory items by name or labels

#### Department Head:

- N/A

#### Guest:

- N/A

### Known Database items:

**Inventory:** part number, part name, quantity, part cost, manufacturer, quantity per full system, available systems in inventory, label, website, red\_Quantity, yellow\_Quantity

### Ideas:

- Display all important parts of inventory items and then display all information when an item is selected in a pop-up
  - Important parts: Part name, full system quantity, and inventory status color (red, yellow, green)
- Filter: Have a drop down of all of the labels to sort the inventory items
- During sub-assembly

# Initial Design - Functionality

## Shipment Page

### Functionality w/ Roles:

- Add/approve new shipment (A, E)
- View old & pending shipments (A,E)
- Edit old (locked) shipments (A)
- Search by bath no, manufacturer, PO
- Filter by label

Uses a top down approach. Admin has all functions employee, department head, and guest have. Unless specified

### User Role Capabilities

#### Admin:

- Edit old shipments

#### Employee:

- Update or create a new shipment order
- View the list of current/pending shipment orders
- View "archived" shipments
- Search for specific shipments
- Filter by label

#### Department Head:

- N/A

#### Guest:

- N/A

### Design Inputs:

- Add: Purchase Order (PO), date of order, quantity, cost/unit, additional cost, manufacturer contact
- Search: batch no, manufacturer, PO
- Filter: label

### Known Database items:

**Shipment:** Batch No., Inventory name, shipping status, Received/approved by, notes, supplier, contact, PO, date of order, date received, quantity, cost/unit, additional cost, total cost/unit, total cost/order, label

### Ideas:

- After a shipment is completed the information will be locked.
- All admin can edit previous shipment?
- Only show items that are currently in the inventory in the list of orders
  - Have the ability to access all orders but only show pending and relevant orders?

## Serviceability Page

### Functionality w/ Roles:

- RFS (G, DH)
- S/N List owned by department (DH)
- List of current RFS (DH)
- SRA (A, E)
- List of current SRA (A, E)
- Close service requests (A, E)
- 

Uses a top down approach. Admin has all functions employee, department head, and guest have. Unless specified

### User Role Capabilities

#### Admin:

- Veto or pause a SRA
- Only has the same capabilities as Employee and NOT DH or Guest

#### Employee:

- Service Request Action (SRA)
  - Take action on RFS by packaging part needing to be serviced
  - Include shipping label to send to receive the faulty part from DH
  - Update RFS with shipping information to DH
  - Track shipping on the faulty product being sent back
- Does NOT have same functionalities as DH and Guest

#### Department Head:

- Warranty status on part
- RFS will have a dropdown of all their departments S/N
- RFS
  - Approve/Create RFS
  - Track shipment and receive part
  - Ship faulty product with supplied shipping label
  - Update RFS with shipment status
- View current RFS in action with the important updates
  - Similar to amazon?
  - progress of shipping them the part

#### Guest:

- If under warranty can submit RFS to DH
  - Ability to create a RFS
  - Has the 4-5 parts as a selectable image
  - Then choose department
  - Submit will require reCaptcha
  - Limit to 5 RFS in 24 hours

### Design Inputs:

- RFS/SRA:
  - Stage 1 & 2: S/N, department, DH reporter, part # being serviced
  - Stage 3 & 4: S/N, department, DH reporter, part # being serviced, tracking # (to DH), tracking # (to HM)

### Known Database Items:

**RFS:** serviceID, S/N, department, status, stage, DH reporter, HM worker, tracking # (to DH), tracking # (to HM), Date

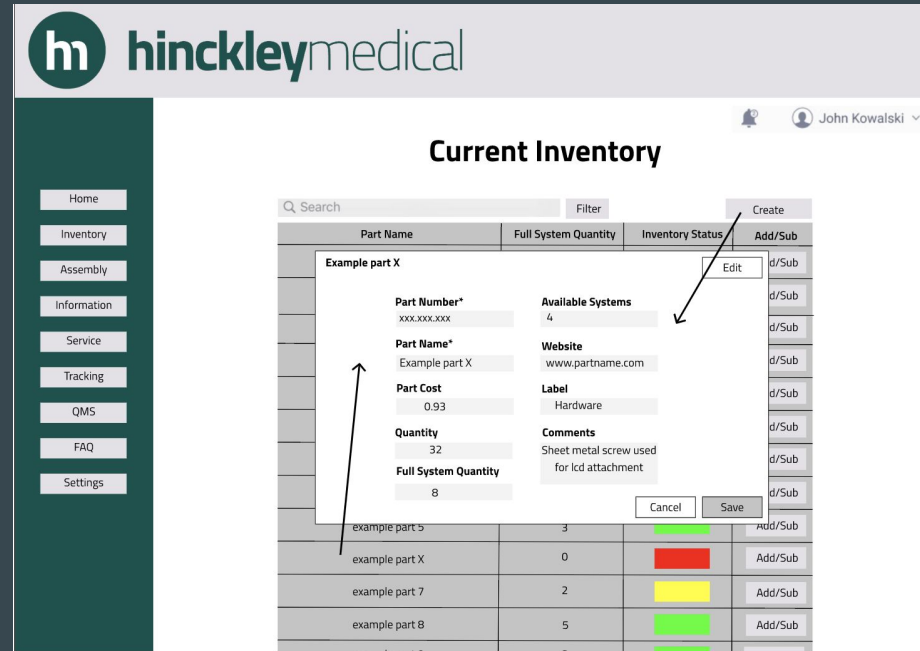
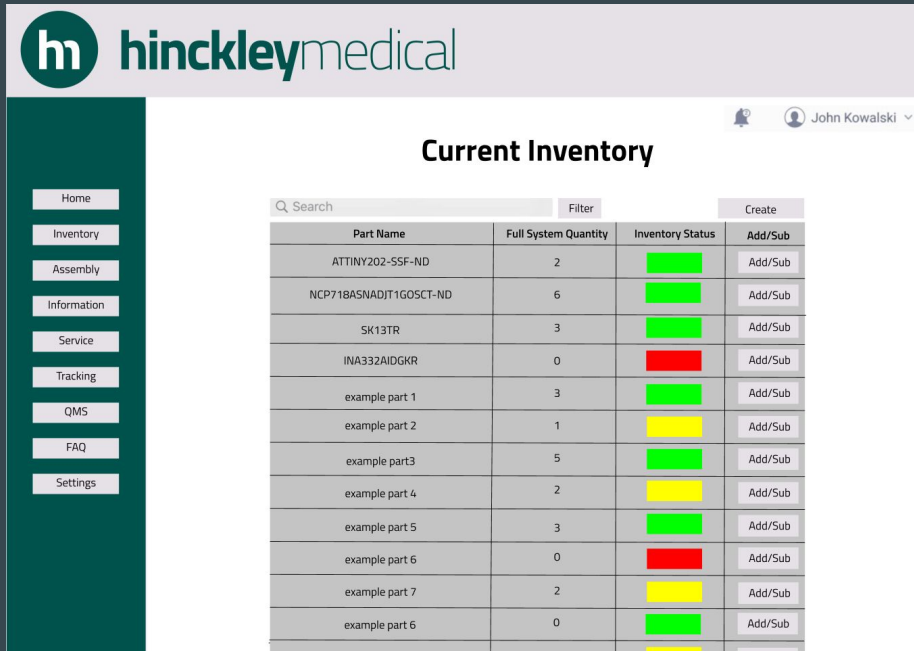
Later: part #

### Ideas:

- reCaptcha
- Guest View:
  - 4-5 Selectable images of the specific part for that product
  - Required to input the S/N
  - Auto-populate the department by S/N
  - reCaptcha to verify human user
- DH view:
  - Initially show a list of S/N they own and then show the same exact screen the guest saw above
  - They will be able to view current RFS
    - Only Employee and Admin can close a RFS
- Admin & Employee:
  - Will have new RFS on their Dashboard
  - Can view all current RFS in progress
  - Can move a RFS to the next stage (four stages)
    1. Submitted - When a DH approves/creates a RFS
    2. In progress - When an A or E click to start a RFS
    3. Shipped - when A or E shipped the product part. Will include tracking and package will have shipping label for the return
    4. Returning - when DH sends the faulty product back. Will already include the tracking based on label in step 3
- Admin:
  - Will just include a button to pause or veto a RFS

# Initial Design - Inventory Prototype

- Used figma to design wireframes for pages



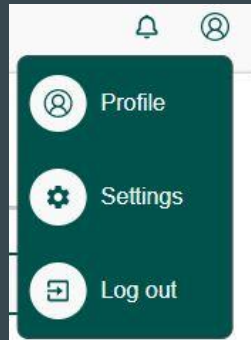
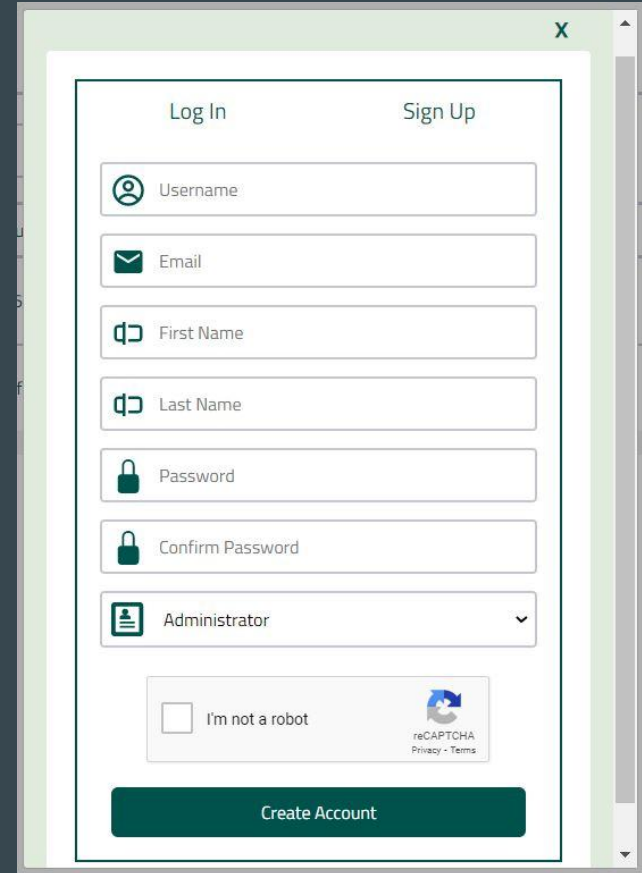
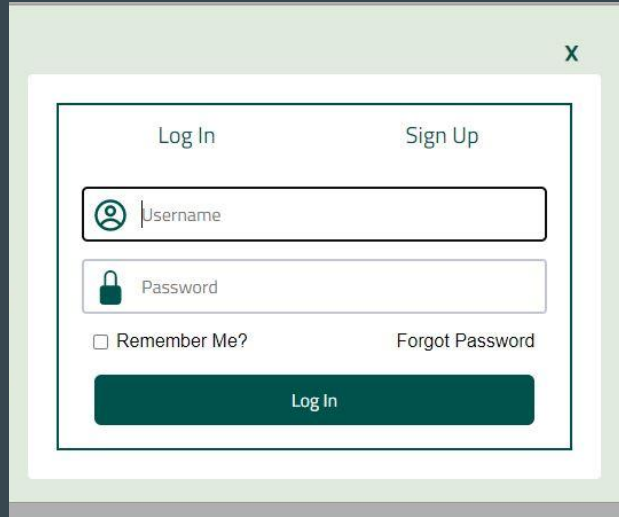


# Implemented Pages



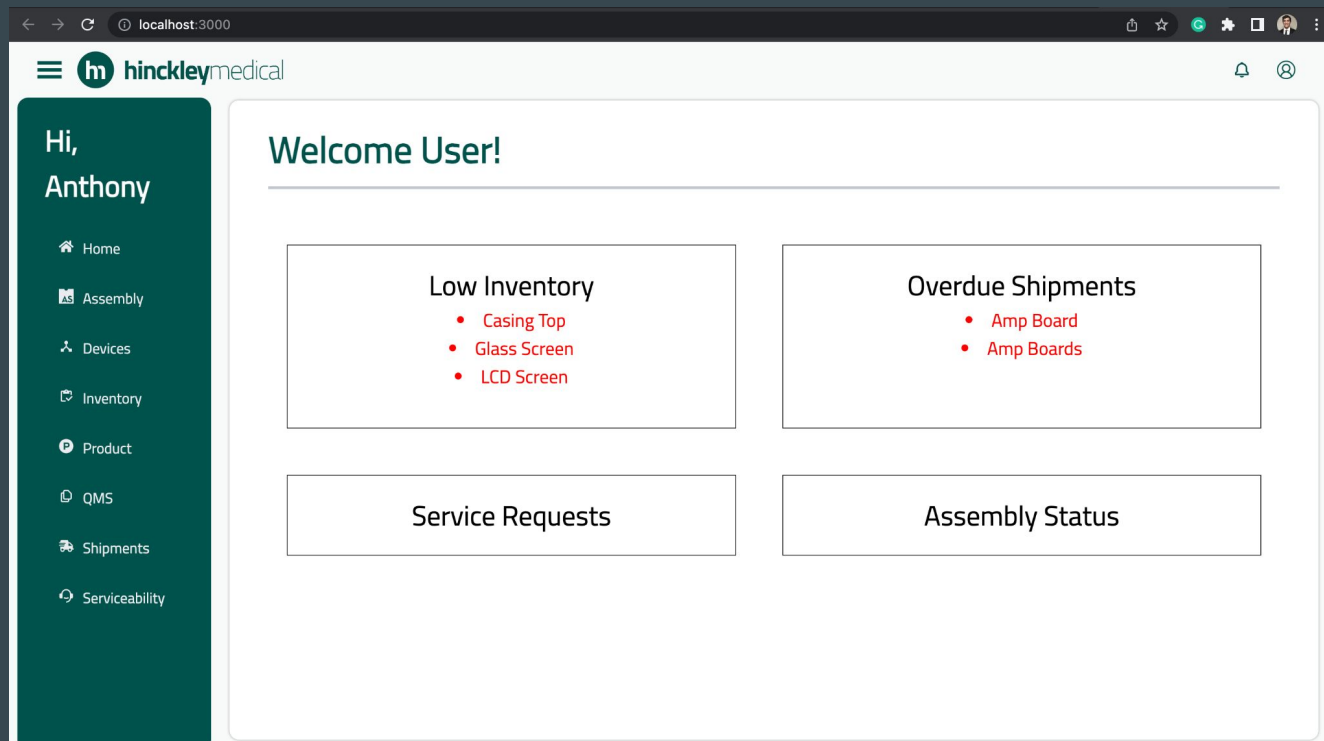
# Login

- Signup
  - Email Verification
  - reCAPTCHA
  - Required password size and symbols
- Login
- Profile Drop Down
  - Access to profile
  - Settings
  - Logout



# Home Page

- Shortcuts
  - Low Inventory
  - Overdue Shipments
  - Service Requests
  - Assembly Status
- Collapsible Sidebar on all pages



# Inventory Page

- List of Items
  - More information drop down
- Creating Inventory Part
- Filtering
  - Search Bar
  - Drop Down Filters

**Add a New Part** X

<b>Part Name:</b> <input type="text"/>	<b>Quantity:</b> <input type="text"/>
<b>Supplier:</b> <input type="text"/>	<b>Part Cost:</b> <input type="text"/>
<input type="text" value="Q Select..."/> <input type="button" value="v"/>	
<b>Label:</b> <input type="text"/>	<b>Amount PWSA:</b> <input type="text"/>
<input type="text" value="Q Select..."/> <input type="button" value="v"/>	
<b>Website:</b> <input type="text"/>	<b>Amount PWSB:</b> <input type="text"/>
<input type="button" value="Cancel"/> <input type="button" value="Save"/>	

hinckleymedical
Hi, Anthony
🔔 🗑️

Hi, Anthony

- 🏠 Home
- 📦 Assembly
- 🔧 Devices
- 📦 Inventory
- 📦 Product
- 📦 QMS
- 📦 Shipments
- 📦 Serviceability

## Inventory

Part Name	Full System Quantity	Label	Inventory Status
PWS-100A SN Labels	12101	Misc.	Full

Url:  Cost per unit:

Amount PWSA:  Amount PWSB:

Supplier ID:

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Hi, Anthony
🔔 🗑️

Hi, Anthony

- 🏠 Home
- 📦 Assembly
- 🔧 Devices
- 📦 Inventory
- 📦 Product
- 📦 QMS
- 📦 Shipments
- 📦 Serviceability

## Inventory

Part Name	Full System Quantity	Label	Inventory Status
PWS-100A SN Labels	12101	Misc.	Full
lkjdjfidf	NaN	Misc.	Full
Casing Top	2	Loadcell Casing	Low
PWS-100B SN Labels	100	Misc.	Full
PWS-100B	131	Overlays	Full
Glass Screen	1	Main Casing	Low

# Shipment

- Used to keep track of items the client company has ordered
- Filter all shipments by supplier, labels, status and date
- Drop down containing more shipment information
- Create new shipment from existing inventory part

Search Inventory Part(s) X

Part Name (s):

Q Select... v

+ Add another item

Cancel Continue

Create New Shipment X

JLPCB

Order Number: kristen122221

Order Date: mm/dd/yyyy Estimated Delivery: mm/dd/yyyy

**Amp Boards**

Quantity:	Cost/Unit:	Batch Number:
10	0.98	AB1000-3

Shipping/Other: 10.00 Total: 0.98

Back Review >

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Hi, Anthony

Shipments

Export to Excel + New Order

Search Batch Number

Date Supplier Labels Status

Batch No	Part Name	Date	Supplier	Labels	Quantity	Status
AB1000-2	Amp Boards	11/29/2022	JLPCB	Loadcell Casing	2	Shipping
AB1000-1	Amp Boards	11/25/2022	JLPCB	Loadcell Casing	150	Overdue
MB1000-6	Amp Board	10/25/2022	JLPCB	Loadcell Casing	7	Received
MB1000-5	Amp Board	10/07/2022	JLPCB	Loadcell Casing	2	Received
BT1001-2	Main Board	09/29/2022	GHMT Co.	Main Casing	4	Received
OL1111-2	PWS-100C	09/13/2022	Perrin	Overlays	1	Received
MB1000-3	Main Board	09/09/2022	GHMT Co.	Main Casing	10	Received
MB1000-2	Amp Board	05/30/2022	JLPCB	Loadcell Casing	20	Overdue

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Hi, Anthony

Shipments

Export to Excel + New Order

Search Batch Number

Date Supplier Labels Status

Batch No	Part Name	Date	Supplier	Labels	Quantity	Status
AB1000-2	Amp Boards	11/29/2022	JLPCB	Loadcell Casing	2	Shipping
Order Num: 345432		Order Date: November 23, 2022	Delivery Date: November 30, 2022	Supplier: JLPCB	Main Contact: Customer Service	
Inventory Quantity: 246		Cost / Unit: \$0.98	Other Cost: \$15.00	Total: \$17.64	Confirm Delivery	
AB1000-1	Amp Boards	11/25/2022	JLPCB	Loadcell Casing	150	Overdue
MB1000-6	Amp Board	10/25/2022	JLPCB	Loadcell Casing	7	Received
MB1000-5	Amp Board	10/07/2022	JLPCB	Loadcell Casing	2	Received

# Serviceability

- Keeps track of all customer service tickets created by the client companies customers
- Create a service request
- Easy to keep track of services with the different filter buttons

**Add a New Service** X

Department: _____	Serial Number: _____
Reporter: _____	Time and Date: _____
Problem: _____	

Cancel
Save

Hi, Anthony

**Serviceability** + New Service Request

Search here...

**To Do** **In Progress** **Closed**

Department	Serial Number	Date Requested	Problem	Status
Hennepin EMS	B00010021	8:14 AM November 28, 2022	E-07	0
Hennepin EMS	B00010021	8:14 AM November 28, 2022	E-07	0
Hennepin EMS	B00010021	8:14 AM November 28, 2022	E-07	0
Hennepin EMS	B00010021	8:14 AM November 28, 2022	E-07	0
Hennepin EMS	B00010021	8:14 AM November 28, 2022	E-07	0

# Security Concerns and Countermeasures

- Security Concerns
  - Encrypting data for the user in transit
    - AWS Cognito is encrypted to industry standards
    - Data is transferred over the TLS (Transport Layer Security) protocol
  - User authentication
    - Only authenticated users can access information
  - User accessibility
    - Each user can only access their departments information
    - Role Based Access Control (RBAC) within each department

# Technical Details

All of our tools were integrated with Amazon Web Services (AWS)

- **AWS Amplify**
  - AWS Amplify to develop our website with a cloud based backend
  - Provides Amplify Studio UI for development
- **Amplify Data Store**
  - Serverless website approach
- **AWS Cognito**
  - Amazon Cognito provides authentication, authorization, and user management for your web and mobile apps.
  - Users can login with account credentials or third party (Google, etc)
- **AWS AppSync**
  - Syncs local database changes to the cloud

# Testing

- Development backend environment in AWS amplify
- Created unit tests that run and confirm the functionality of the pages
- All units tests were inserted into the CI/CD pipeline
- All merges must pass units tests
- After milestones were reached system testing was performed to ensure working
- Interface testing was performed on all AWS service calls to ensure proper use
- Lastly, acceptance testing was from the client company Hinckley Medical



# DEMO

# Q & A