

**MICHIGAN STATE**  

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**UNIVERSITY**

# Project Plan Presentation

## Manufacturing Tracking System

### The Capstone Experience

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*From Students...  
...to Professionals*

# Project Sponsor Overview

- Tier 1 Automotive Supplier
- Designs and manufactures automotive components and systems
- Develops EV and autonomous driving technologies
- Operates globally with partnerships across the auto industry



# Project Functional Specifications

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- Enhances transparency and traceability in the manufacturing process using distributed ledger technology
- Tracks material flow, quality metrics, and operational parameters in real time
- Provides factory operators with a user-friendly tool for monitoring and decision-making.

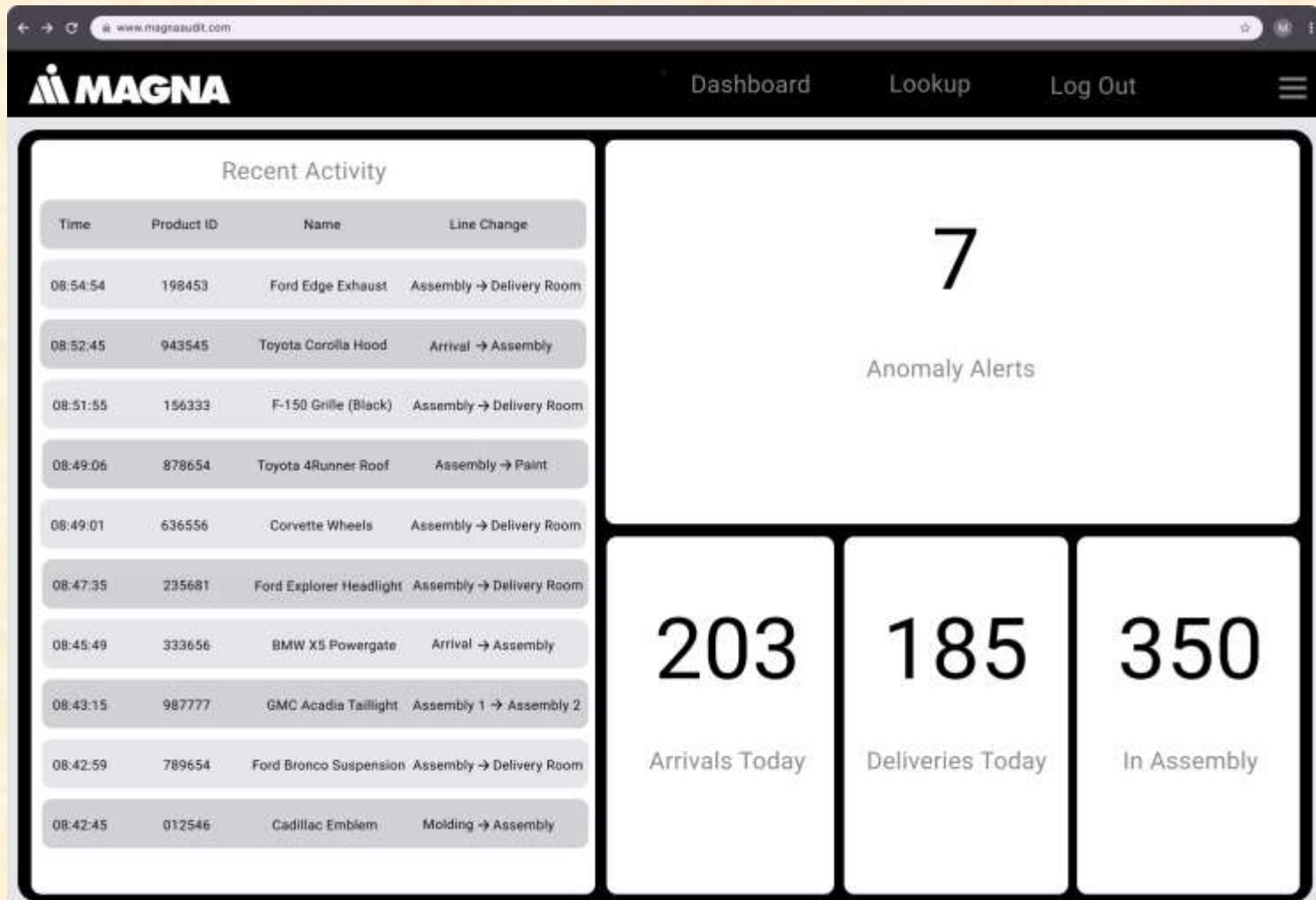


# Project Design Specifications

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- Web application to show data analytics of registered materials
- Blockchain technology for transparent processes
- Search and filtering feature
- Role-based access for different user types

# Screen Mockup: Dashboard Main



# Screen Mockup: Lookup

www.magnaaudit.com

MAGNA

Dashboard Lookup Log Out

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Filter

Product ID	Type	Name	Current Line	Batch ID	Batch Arrival Date	Temperature	Anomaly Status
456132	Piston	Steel Piston Ford F-150	Engine Assembly	CDKE4893	01/25/25	75°F	✓
054561	Rotor	Premium Drilled Rotor	Arrival Room	HELK9658	01/27/25	76°F	✓
651135	Camshaft	Chevy Silverado Camshaft	Assembly	APWE8996	01/23/25	74°F	✓
456132	Piston	Steel Piston Ford F-150	Delivery Room	GG0D5621	01/26/25	75°F	✓
165513	Piston	Honda I4 Piston	Assembly	DLKE1233	01/21/25	143°F	!
156465	Body Panel	Buick Enclave Bumper	Painting	MLHB9647	01/25/25	65°F	✓
965845	Sensor	Accelerometer	Delivery Room	EFDE5122	01/24/25	75°F	✓
369854	Sensor	Passenger Airbag	Arrival Room	XZSD4879	01/24/25	73°F	✓



# Screen Mockup: Item Expanded

The screenshot shows a web application interface for Magna. The top navigation bar includes the Magna logo, 'Dashboard', 'Lookup', and 'Log Out' buttons. A search bar is located below the navigation. The main content area displays a table of items, with one item expanded into a modal window.

**Steel Piston Ford F-150**

Product ID: 456132  
Type: Piston  
Batch ID: CDKE4893  
Batch Arrival Date: 01/25/25

Temperature: 75°F  
Anomaly Status: ✓

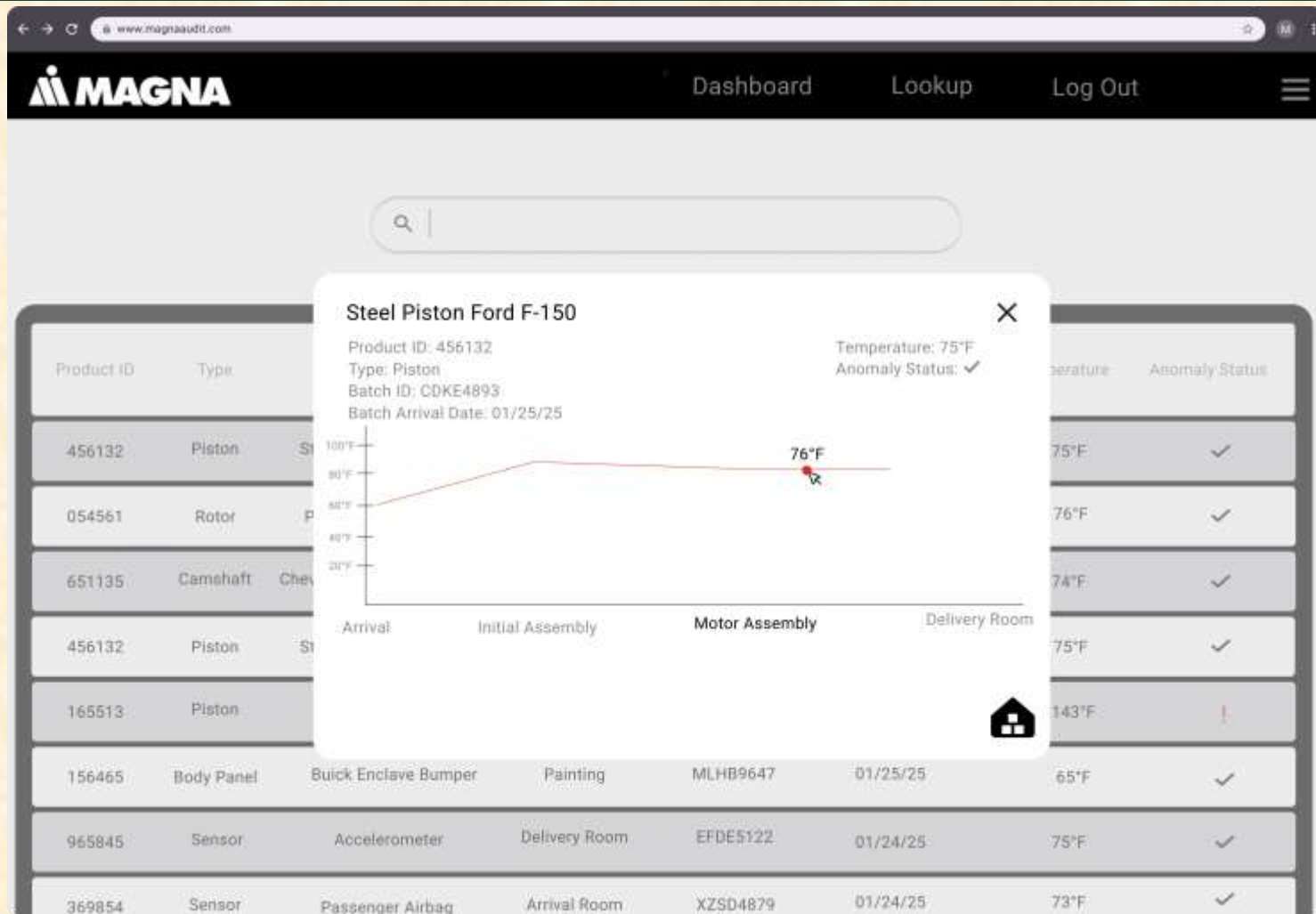
The process flow diagram shows four stages: Arrival, Initial Assembly, Motor Assembly, and Delivery Room. The first three stages are highlighted in red, indicating they are completed or active.

Product ID	Type	Temperature	Anomaly Status
456132	Piston	75°F	✓
054561	Rotor	76°F	✓
651135	Camshaft	74°F	✓
456132	Piston	75°F	✓
165513	Piston	143°F	!
156465	Body Panel	65°F	✓
965845	Sensor	75°F	✓
369854	Sensor	73°F	✓



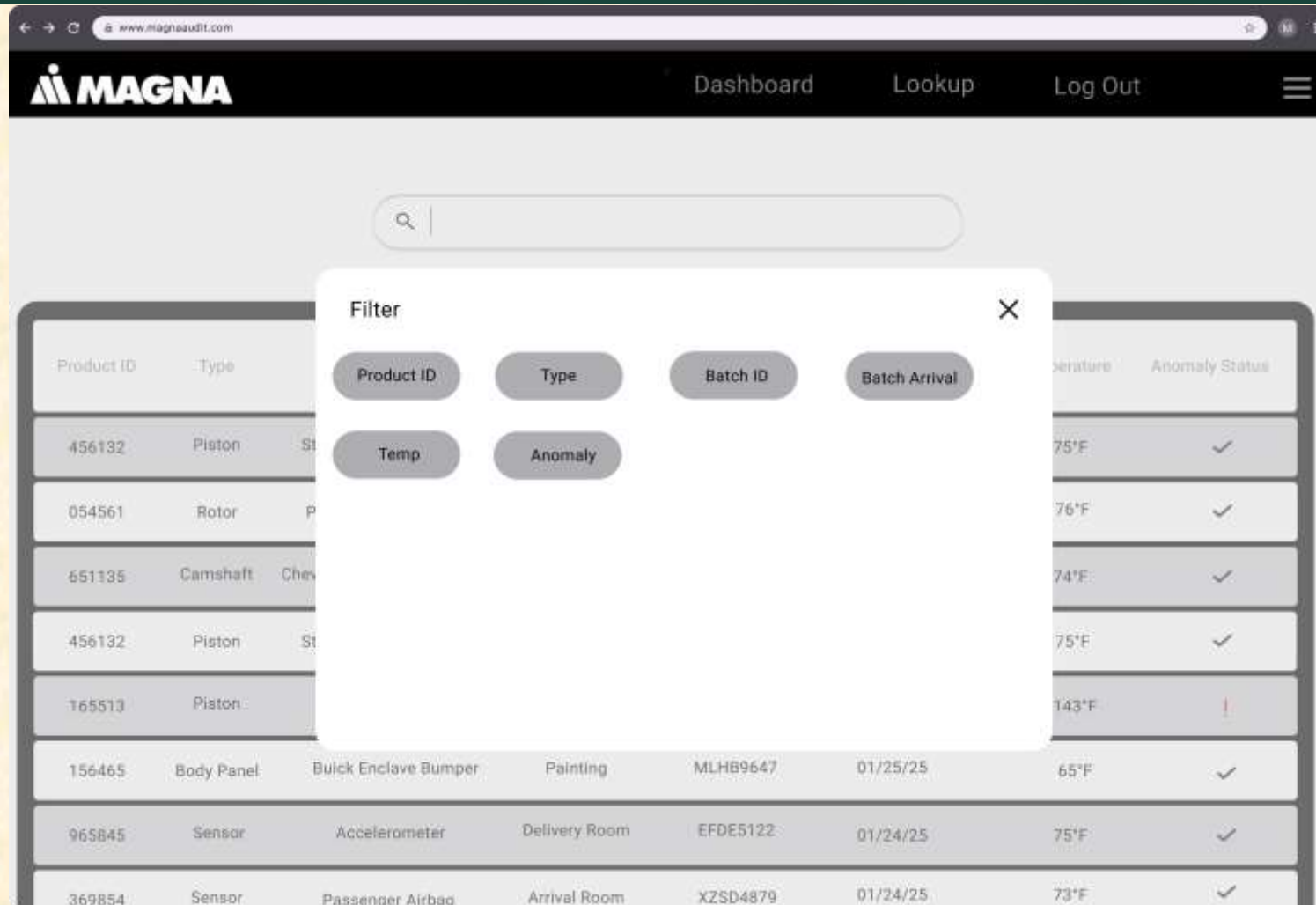


# Screen Mockup: Item Expanded (Temp)





# Screen Mockup: Filter Select



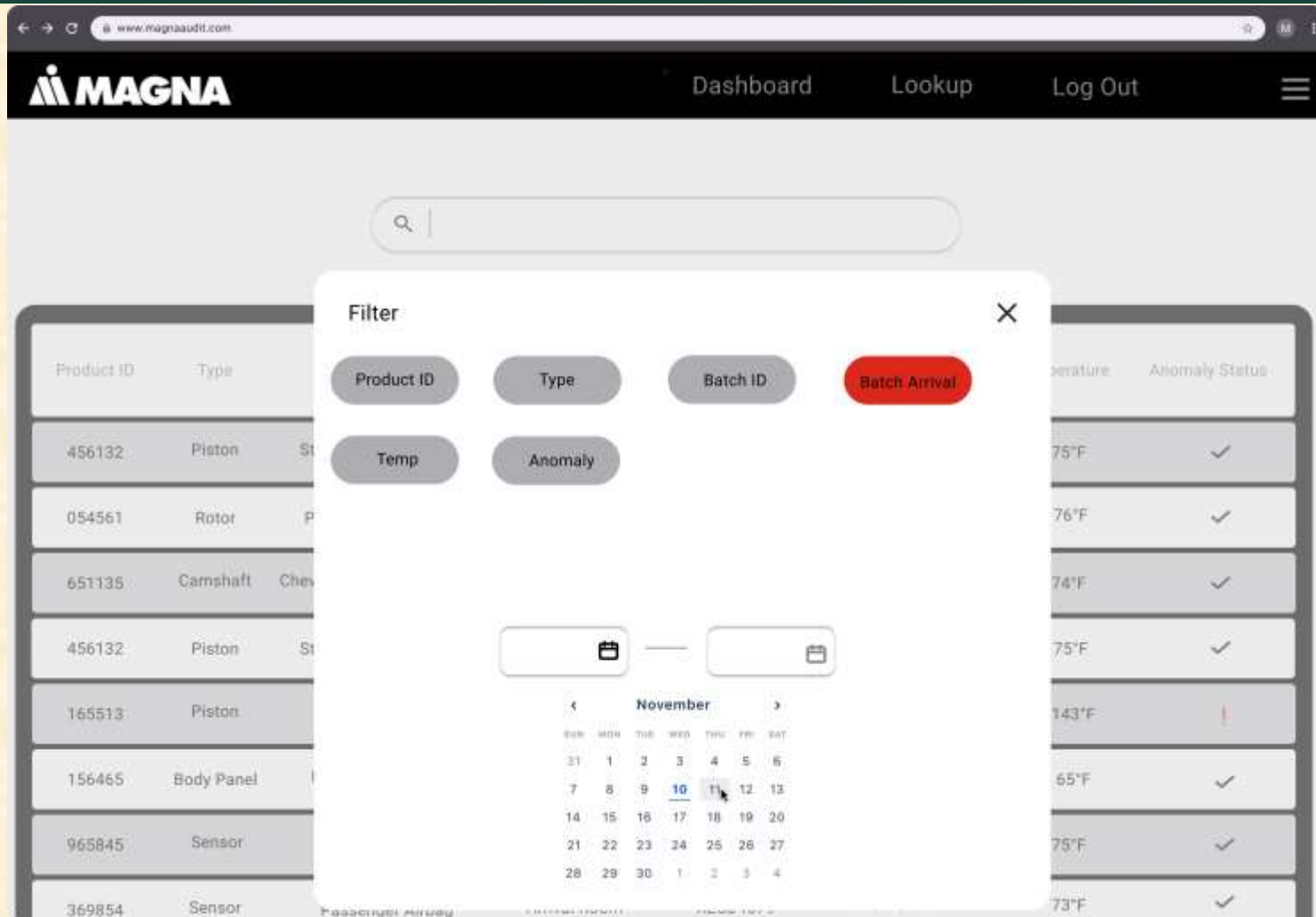
# Screen Mockup: Filer Category Selected

The screenshot displays a web application interface for Magna. At the top, there is a navigation bar with the Magna logo and links for 'Dashboard', 'Lookup', and 'Log Out'. Below the navigation bar is a search bar. A modal window titled 'Filter' is open in the center, showing a grid of filter categories: 'Product ID', 'Type', 'Batch ID', 'Batch Arrival' (highlighted in red), 'Temp', and 'Anomaly'. At the bottom of the modal, there are two date pickers. In the background, a data table is visible with columns for Product ID, Type, and Anomaly Status. The table contains several rows of data, including entries for Piston, Rotor, Camshaft, and Body Panel.

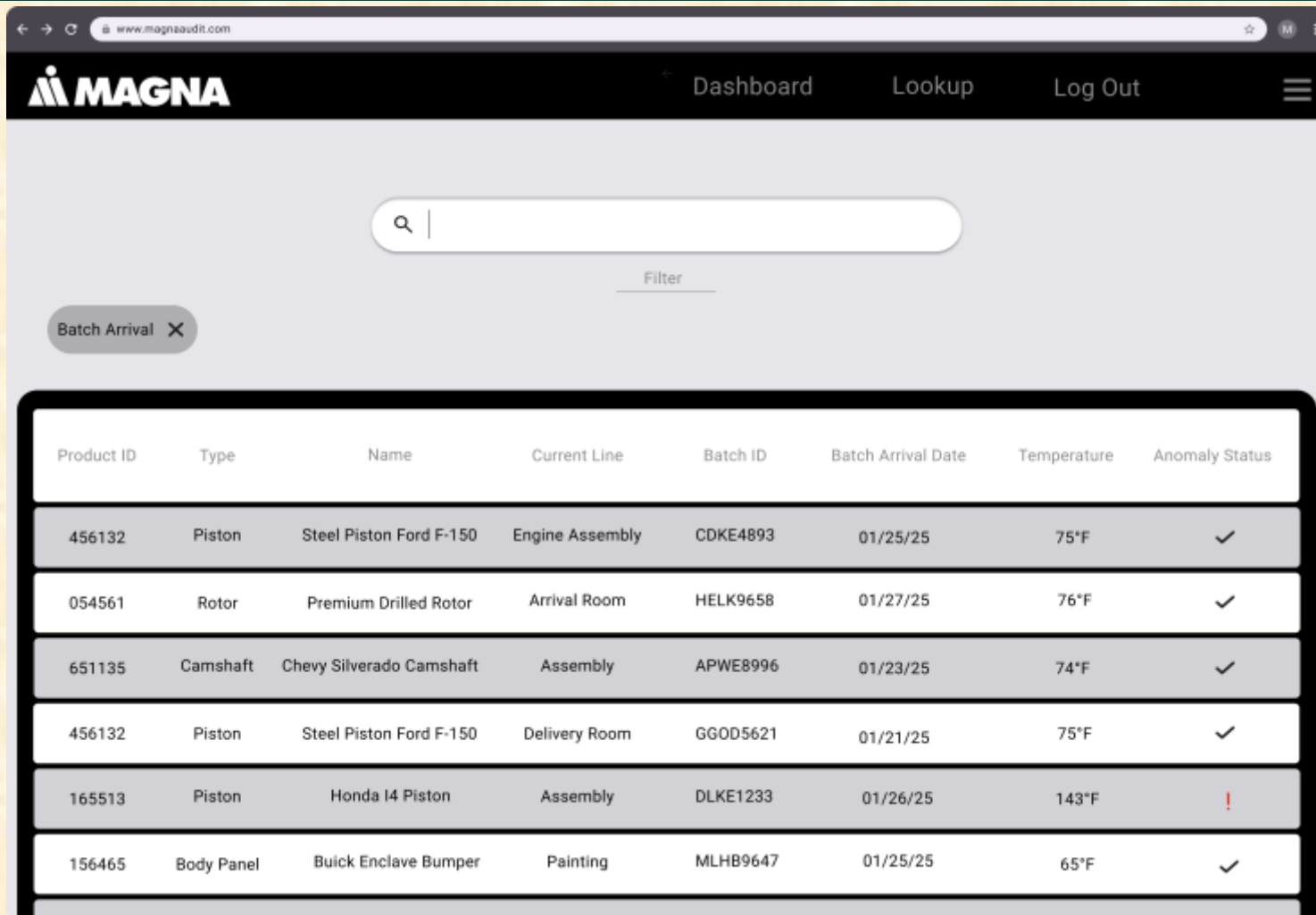
Product ID	Type	Temperature	Anomaly Status
456132	Piston	75°F	✓
054561	Rotor	76°F	✓
651135	Camshaft	74°F	✓
456132	Piston	75°F	✓
165513	Piston	143°F	!
156465	Body Panel	65°F	✓
965845	Sensor	75°F	✓
369854	Sensor	73°F	✓



# Screen Mockup: Filter Calendar Drop Down



# Screen Mockup: Filter Applied



The screenshot shows a web application interface for Magna. The browser address bar displays 'www.magnaaudit.com'. The navigation bar includes 'Dashboard', 'Lookup', and 'Log Out'. A search bar contains a magnifying glass icon and a vertical bar. Below the search bar, a 'Filter' label is centered. A 'Batch Arrival' filter is applied, indicated by a pill-shaped button with an 'X' icon. The main content area displays a table with the following data:

Product ID	Type	Name	Current Line	Batch ID	Batch Arrival Date	Temperature	Anomaly Status
456132	Piston	Steel Piston Ford F-150	Engine Assembly	CDKE4893	01/25/25	75°F	✓
054561	Rotor	Premium Drilled Rotor	Arrival Room	HELK9658	01/27/25	76°F	✓
651135	Camshaft	Chevy Silverado Camshaft	Assembly	APWE8996	01/23/25	74°F	✓
456132	Piston	Steel Piston Ford F-150	Delivery Room	GGOD5621	01/21/25	75°F	✓
165513	Piston	Honda I4 Piston	Assembly	DLKE1233	01/26/25	143°F	!
156465	Body Panel	Buick Enclave Bumper	Painting	MLHB9647	01/25/25	65°F	✓



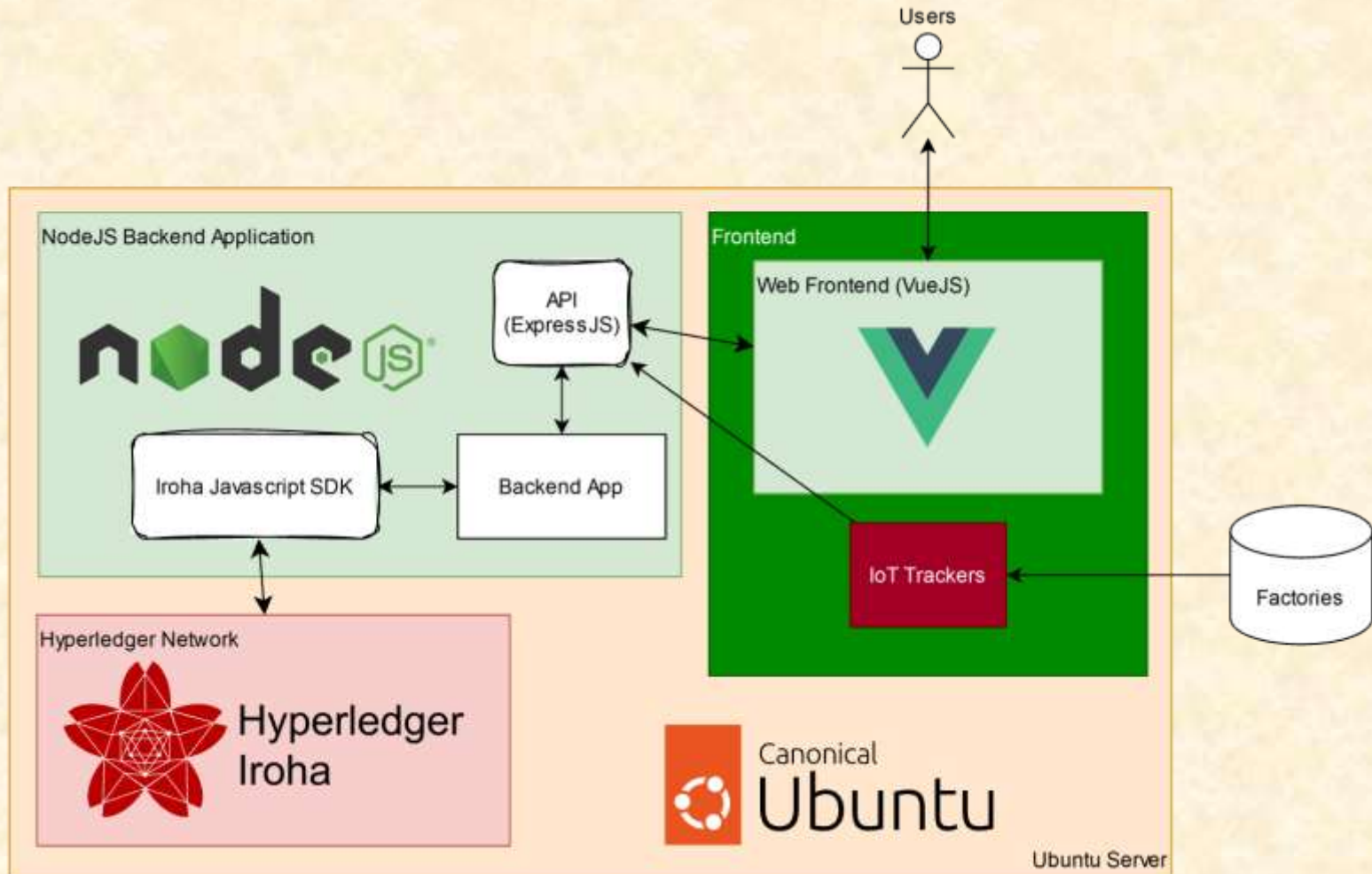
# Project Technical Specifications

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- Hyperledger Iroha
- IoT trackers
- Vue.js
- Node.js
- Express.js API



# Project System Architecture



# Project System Components

- Hardware Platforms
  - DECS server
  - iMac VMs
- Software Platforms / Technologies
  - Gitlab / MS Office
  - Linux (Ubuntu 22.04)
  - VScode
  - Docker





# Project Risks

- **Sponsor software integration**
  - Must integrate our application with pre-existing Magna software
  - Need to finish the application early to account for issues during integration
- **Proper configuration of Hyperledger blockchain**
  - It's not clear how it can be integrated and configured in a way to make a material tracking system on a large scale.
  - We need to create a proof-of-concept Hyperledger network that proves on a small scale that Hyperledger can be configured and integrated to meet our needs for an audit trail and data storage. blockchain record
- **Anomalous data**
  - Not all data processed by the factory will be valid
  - Ensure there is ample error checking/exceptions thrown to account for anomalous data. This needs to be done in a way in which we maintain an accurate and authentic record.



# Questions?

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