

# **Project 1: Team 4**

**Software Engineering CSE435**

**Michigan State University**

**Fall 2017**

## **Team members:**

Project Manager: Nathan Finley

Facilitator: Caleb Sherman

Customer Liaison: Christopher (Jack) Mansueti

Artifacts Manager: Hansheng Zhao

Safety/Security Engineer: Alex Lepird

**Customer: General Motors**

**Instructor: James Daly**

# Project Overview

- System provides an automated paint defect report generator for vehicles in a General Motors (GM) manufacturing plant
- Motivation for project
  - Address problem with paint defects only being recorded on paper
  - Provide easily accessible database of defects

# Domain Research

- Gathered contextual information about the old system - terminology, process, related systems
- Received clarification from customer regarding specific requirements
- Investigated best approach for the prototype framework - frontend, backend, data management, GUI design
- Project Constraints
  - Constraint 1: Web based prototype, not compatible on mobile platforms
  - Constraint 2: Limited space within database
    - Image conversion and compression to save space
  - Constraint 3: Recording the defect has restricted options regarding location and size
    - Handles the required attributes for each defect but forces uniformity in reports

# System Differences: Old vs. New

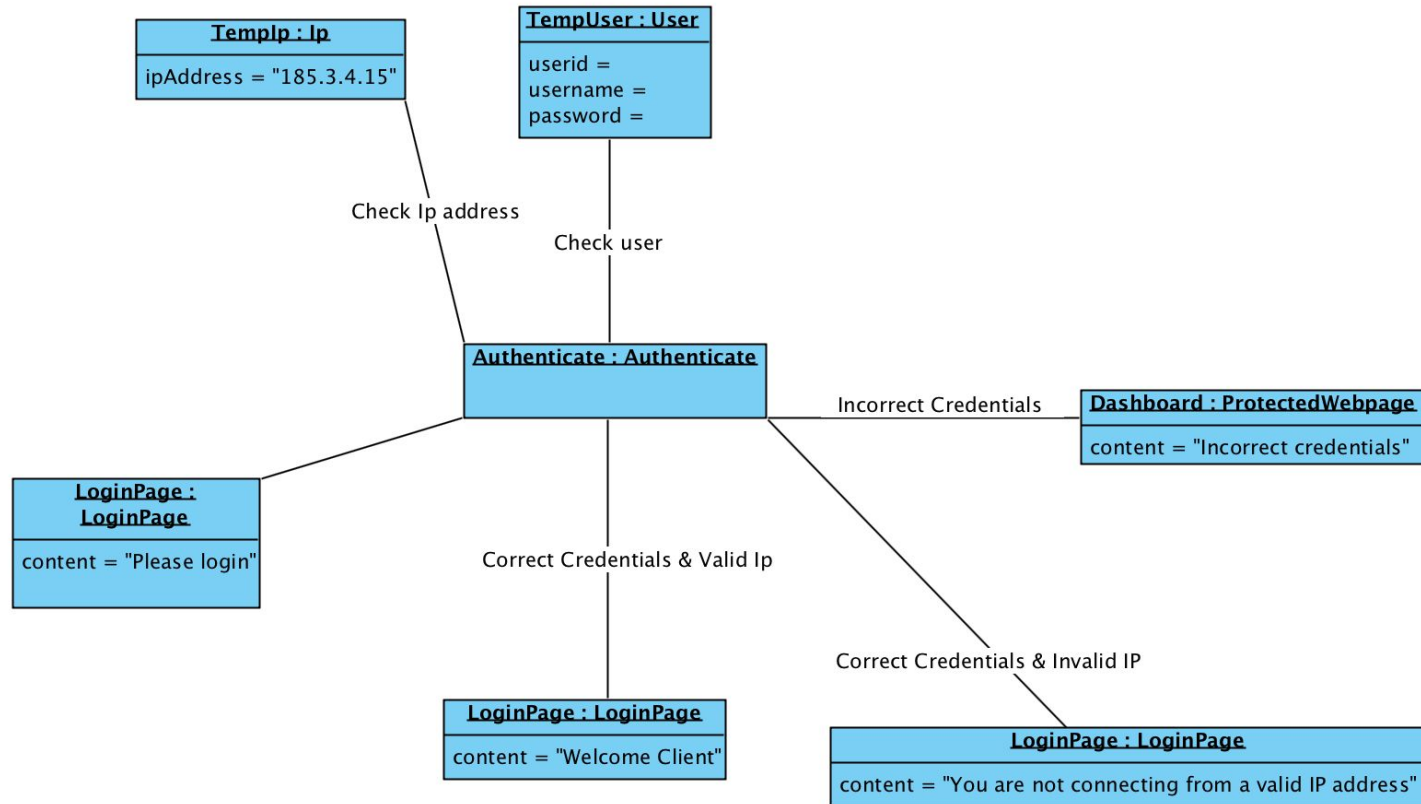
- Old system is on paper, new system is digital
- New system automatically generates reports
- New system helps negate user error
  - Poor handwriting during defect entry
  - Incorrect compilation of defects
- New system generates reports instantly

# Overview of Features

- Feature 1: Secure login system
  - Ensure proper credentials before entrance
- Feature 2: Grid-based system to record defects
  - Multiple defects per record
- Feature 3: Generation of reports of paint defects over a custom range
  - Site-wide reports vs. individual plants

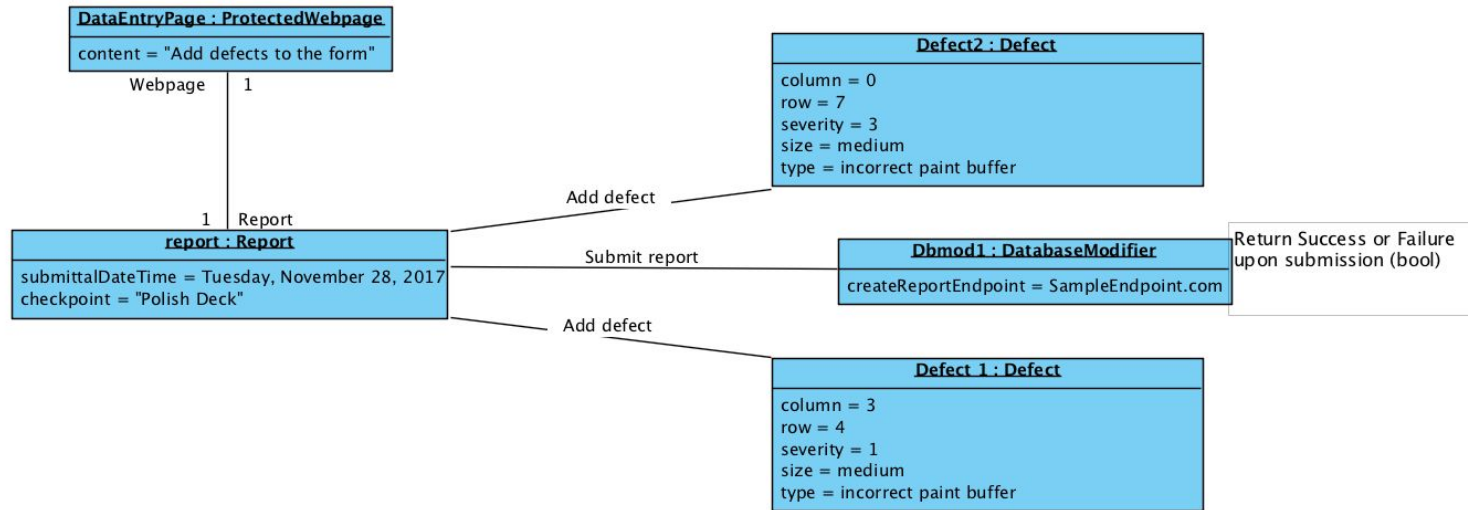
# Part II: Model-based View of System

- Sequence diagram 1: User Authentication



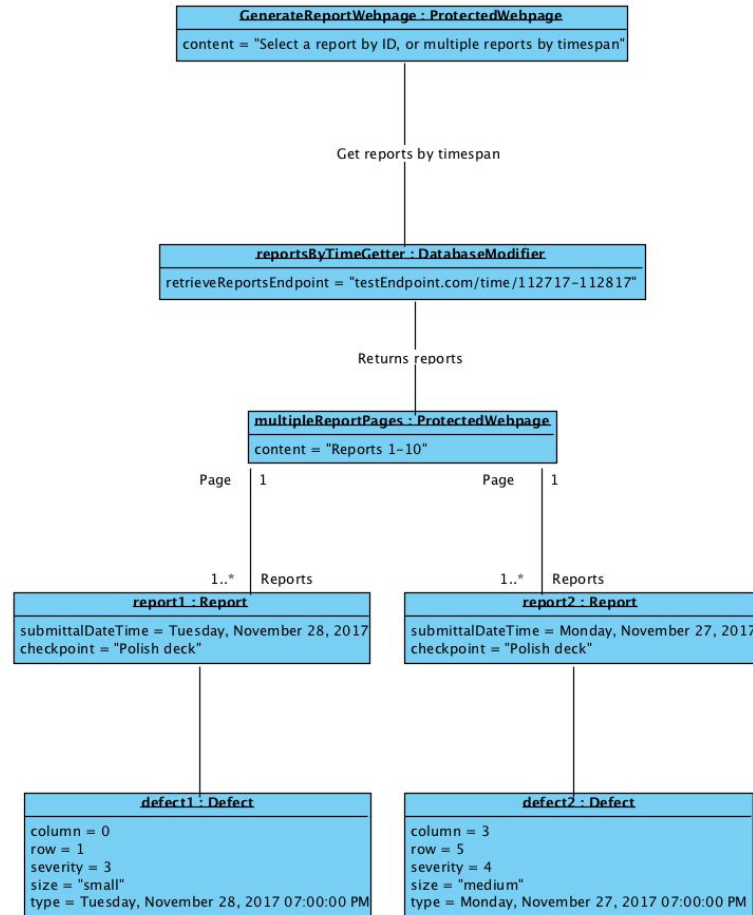
- Client enters login credentials, system validates or invalidates credentials and either redirects to dashboard page or back to login page with error message

- Sequence Diagram 2: Defect Analysis



- Client selects plant name, report type, model, and position
- They input individual defects by selecting the column and row that it is approximately located, the severity, type and size that the defect was recorded

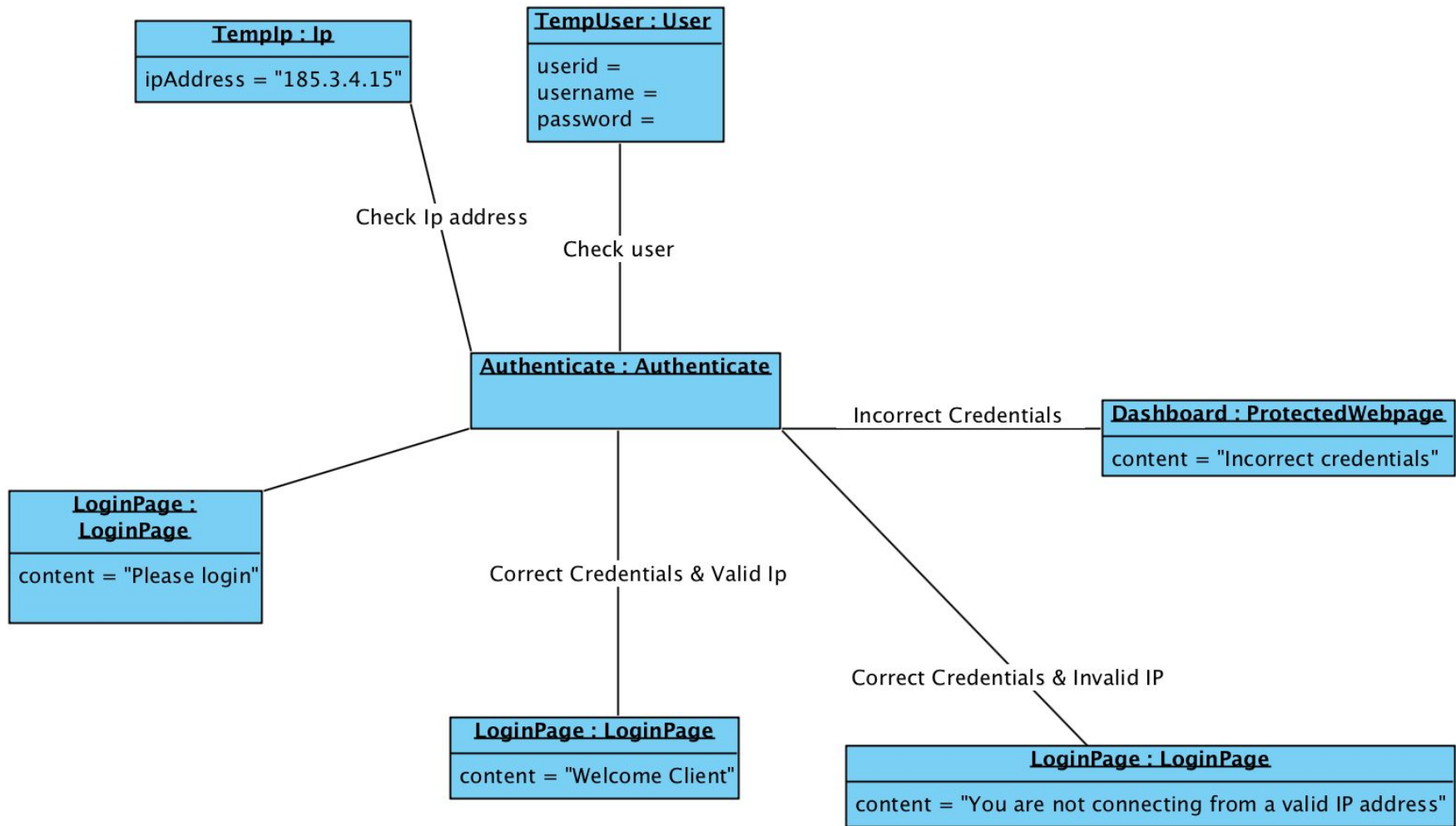
- Sequence Diagram 3: Report Generation



- The server will compile daily and weekly reports every day automatically.
- They can also compile a report within a specific timespan by choosing the start and end time



- Sequence Diagram 4: System Application



- When the user logs in, the system will verify the computer's location by checking its IP address.

# Part III: Demonstration

- Interface layout:

Prototype  
home page

### Prototype

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#### ABOUT THIS PROTOTYPE

Welcome to the prototype! Here are what you can do:

- Click "Submit Reports" on the side bar to submit new reports.
- Click "Generate Reports" to generate customized reports.
- Click on any of the generated reports to view it.

```
[ "author": "Study Group 4", "created_at": "2017-12-02" ]
```

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#### ABOUT CUSTOM REPORTS

The user can customize a report by clicking "Generate Reports" on the sidebar, once clicked, two date pickers will show below, choose desired "from" and "to" and click submit, a customized report will be generated by the server and send back to the user.

```
[ "author": "Study Group 4", "created_at": "2017-12-02" ]
```

### Controls

[Submit Reports](#)

[Generate Reports](#)

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### Reports

Daily Reports

[2017-12-03 - 2017-12-04](#)

Weekly Reports

[2017-12-03 - 2017-12-10](#)

Custom Reports

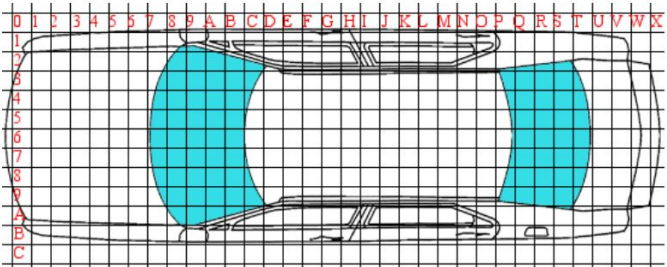
[2017-12-02 - 2017-12-04](#)

[2017-11-30 - 2017-12-21](#)

[2017-11-28 - 2017-12-12](#)

Defect input  
main page

### Submit Report



Plant:

Model:

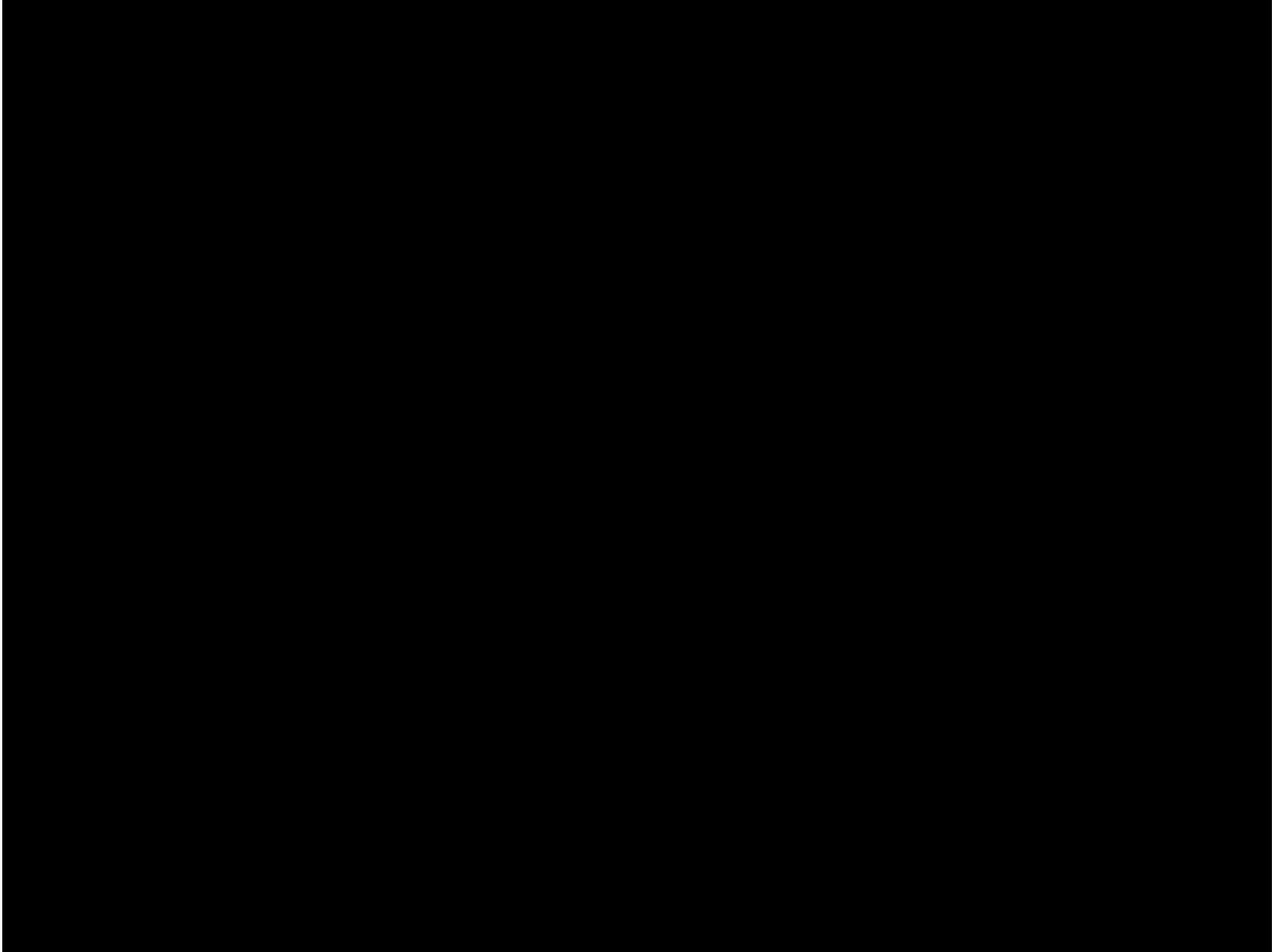
Position:

Checkpoint:

#	Column	Row	Type	Size	Severity	Remove
0	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="Missed Prime Defect"/>	<input type="text" value="Small"/>	<input type="text" value="Sev I"/>	<input type="button" value="Remove"/>

Usage: Change the "Plant", "Position" and "Model" on the top of the page, fill in detected defects on the table below. **Notice:** All the filed defects will use the "Position" filled above.

# Defect Addition Animation



# Scenario 3 - Generating Report

Prototype

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[ "author": "Study Group 4", "created\_at": "2017-12-02" ]

Controls

[Submit Reports](#)  
[Generate Reports](#)

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Reports

Daily Reports

[2017-12-03 - 2017-12-04](#)

Weekly Reports

[2017-12-03 - 2017-12-10](#)

Custom Reports

[2017-12-02 - 2017-12-04](#)  
[2017-11-30 - 2017-12-21](#)  
[2017-11-28 - 2017-12-12](#)

Select "Generate Reports"

Report Summary generated

Time span

From

mm/dd/yyyy

To

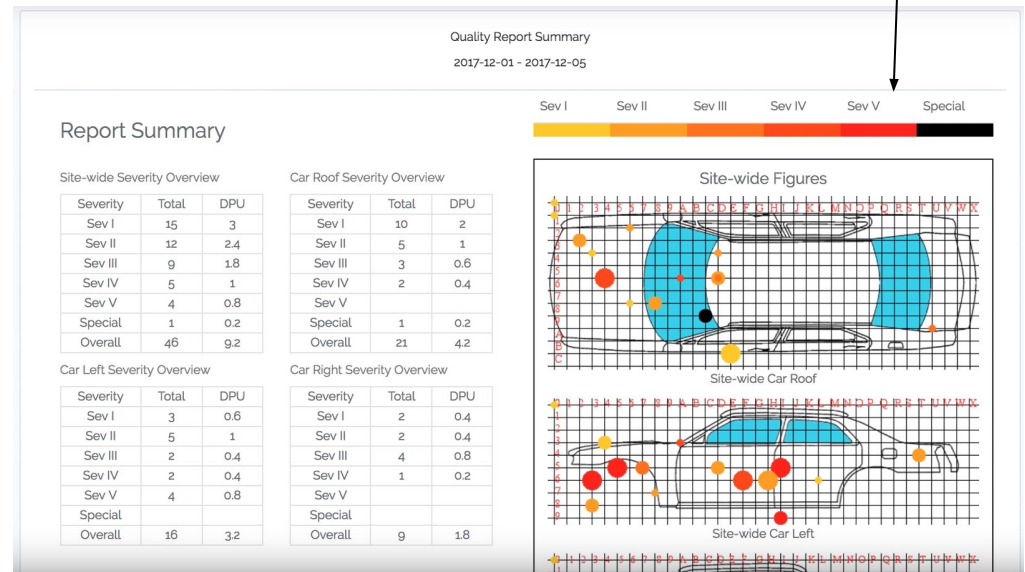
mm/dd/yyyy

Note: Time for both dates will be at 00:00.

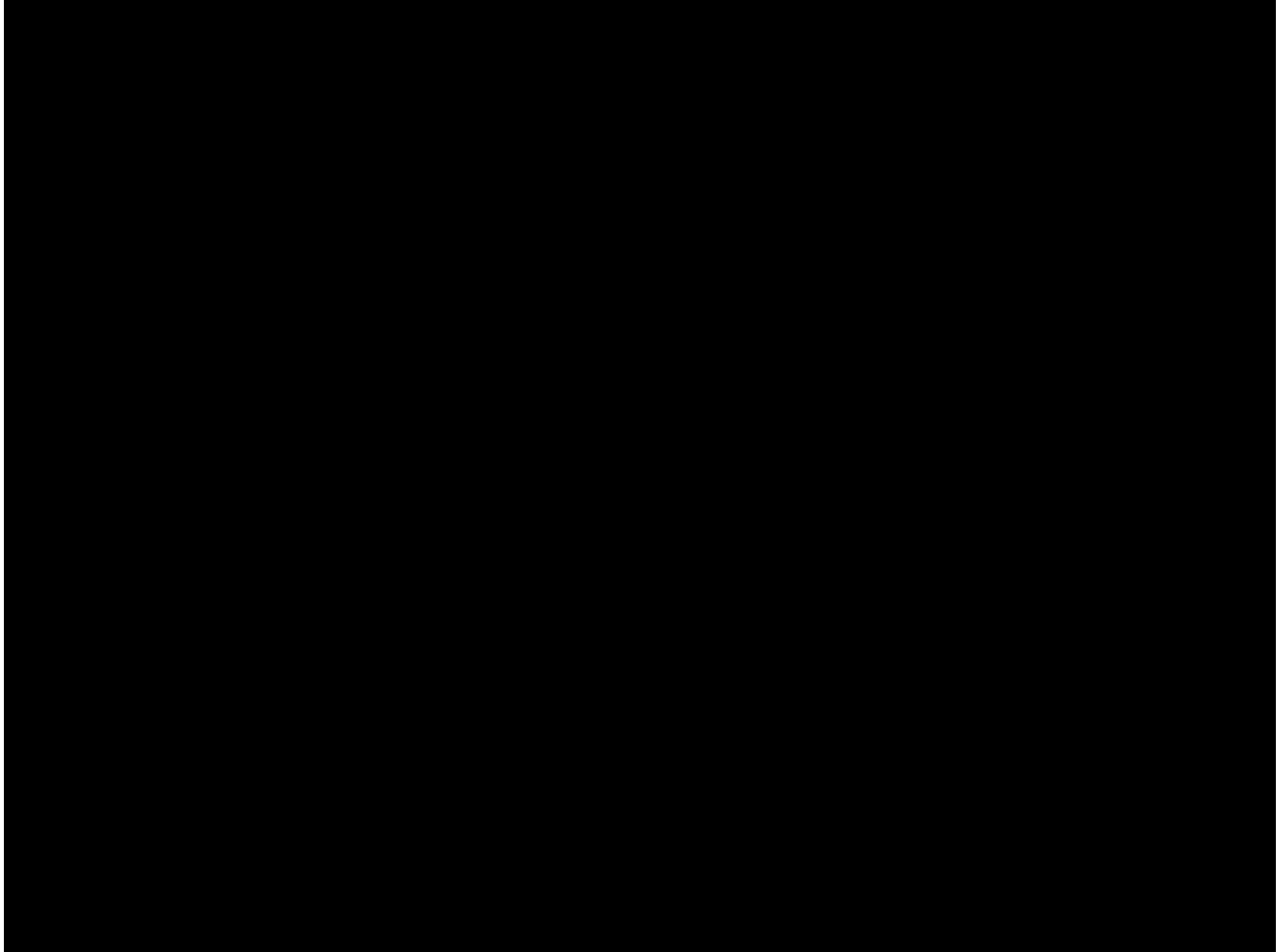
Cancel

Submit

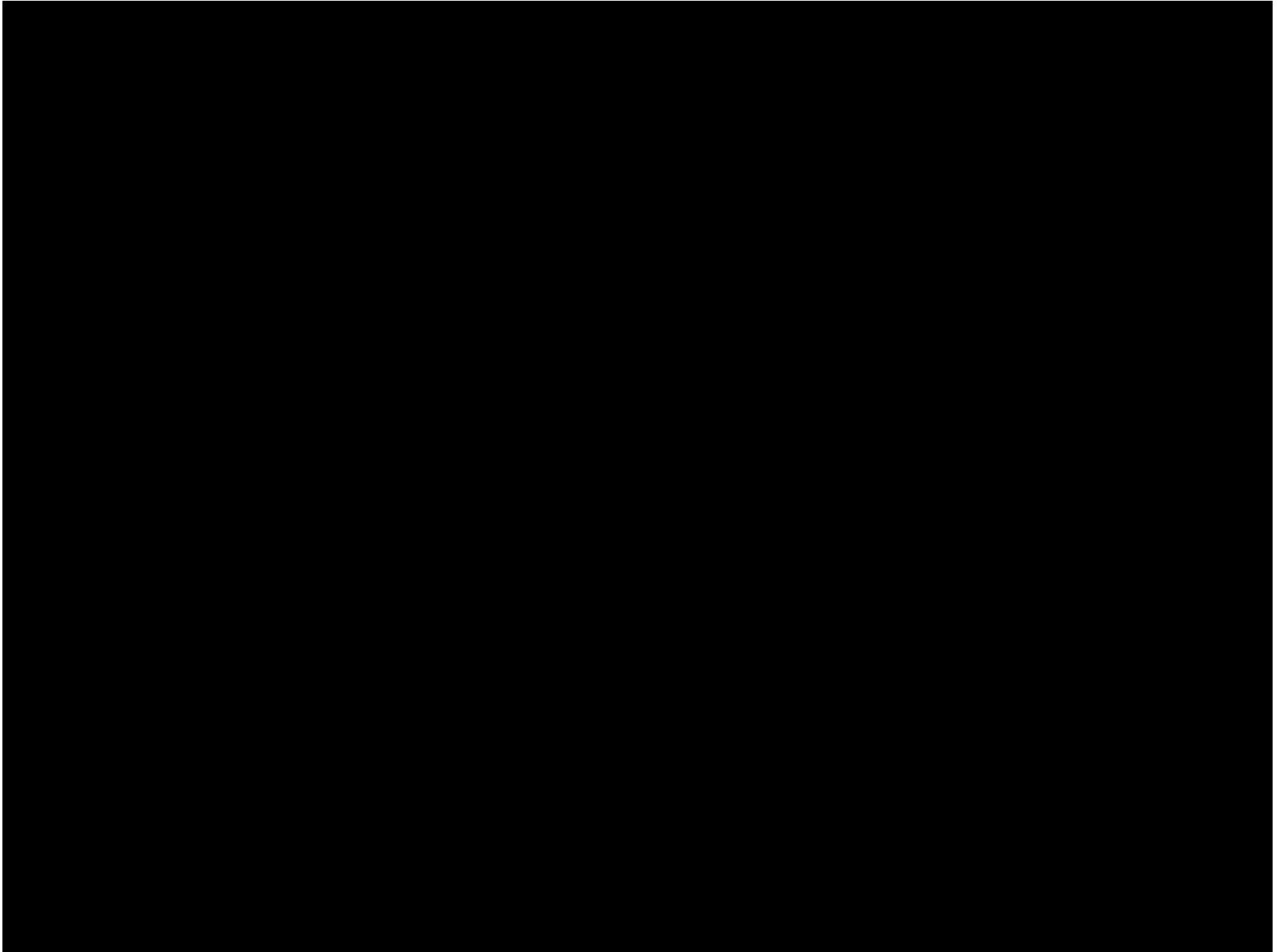
Enter dates to generate report from



# Report Generation Animation



# Report Summary Animation



# Conclusion

- Tasks accomplished:
  - Secured
  - Reduced Error
  - Paperless
  - Efficient
- Weakness:
  - Able to submit defects off of vehicle

# Acknowledgements

- We gratefully acknowledge and appreciate the participation of our customer, James Daly from General Motors