

MICHIGAN STATE  

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UNIVERSITY

# 09/21: Project Plan

## The Capstone Experience

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Department of Computer Science and Engineering

Michigan State University

Fall 2020



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

# Project Plan

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## ➤ Functional Specifications

- Design Specifications
- Technical Specifications

# Functional Specifications

- What does it do?  
(Not “how” does it do it?)
  - What’s your client’s problem?
  - What’s your solution?
- Includes
  - List of Objectives
  - Use Cases
    - Vignettes
    - Of How User Would Use of Your System
- Not Necessarily Complete
- Understandable by End User
- Initial Problem Statement
- Usually Refined



# Functional Specifications Examples

- Amazon
  - Simplify Product Information Aggregation
  - With Automated Tool for Amazon Sellers
  - Help Improve Satisfaction
- Team United Airlines Digital Technology
  - In-depth Lounge Management System
  - Across Many Locations
  - Track and Manage Lounge Functions
- Volkswagen
  - Develop Route Planning Software
  - That Visits EV Charging Stations
  - Better Advertise for EVs

Understandable  
by End User



# Functional Specifications Interactions With Your Client

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- Derived With/From Client
- Documented For Client
- Presented to Client
- Agreed Upon With Client
- Your Job to Capture the Client's Intent!

# Project Plan

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✓ Functional Specifications

➤ Design Specifications

• Technical Specifications



# Design Specifications

- What's the user experience (UX)?
  - How does a user use it?
  - How does it look and feel?
  - What are the features?
- Includes
  - Business Process Flow
  - Specific Features
  - Use Cases
  - Screen Mockups
  - Data Flow Diagrams
  - Data Organization
  - Etc...
- Identifies All the Parts and Their Interactions
- (Mostly) Understandable by End User
- Usually Refined



# Design Specifications Examples

- Bedrock Detroit
    - Import New Team Members from CSV File
    - Determine Appropriate Parking Locations
    - Provide Web Application for All Types of Employees
    - Handle Large Amounts of Employees
  - Google
    - Automatically Aggregate System Logs
    - Build Appropriate Troubleshooting Trees
    - Build Model to Identify Relevant Resources
    - Submit New Support Cases
  - Proofpoint
    - Passively Measure Spam
    - Predict Trends within Society
    - Analyze Spammer's Behavior
- Mostly Understandable by End User



# Screen Mockups

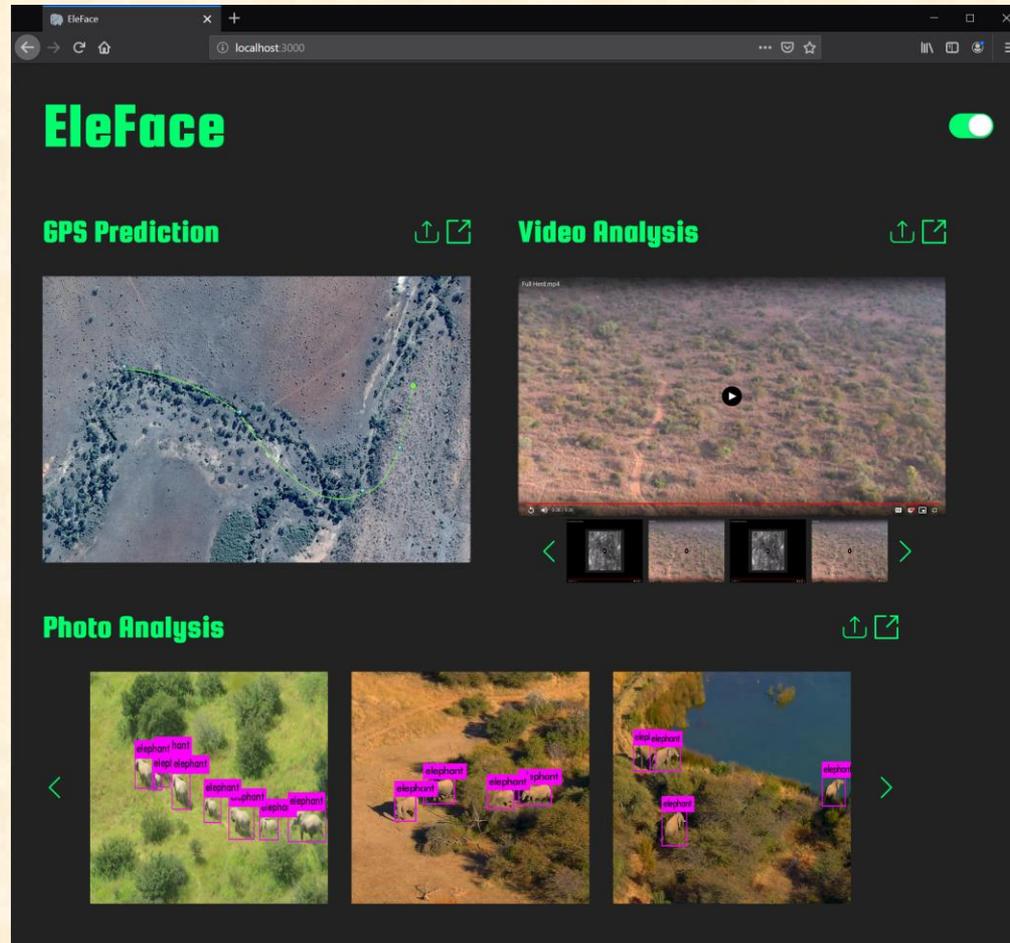
- User Interface Only
  - Shows Layout, Buttons, Pull-Downs, Etc...
  - Non-Functional
  - No Back End
- Helpful for Developing
  - Functional Specifications
  - Look-and-Feel
  - Use Cases
- Can Create with...
  - Pencil and Paper
  - PowerPoint (Developer View)
  - Photoshop
  - Etc...
- NOT Screen Captures of Other Software



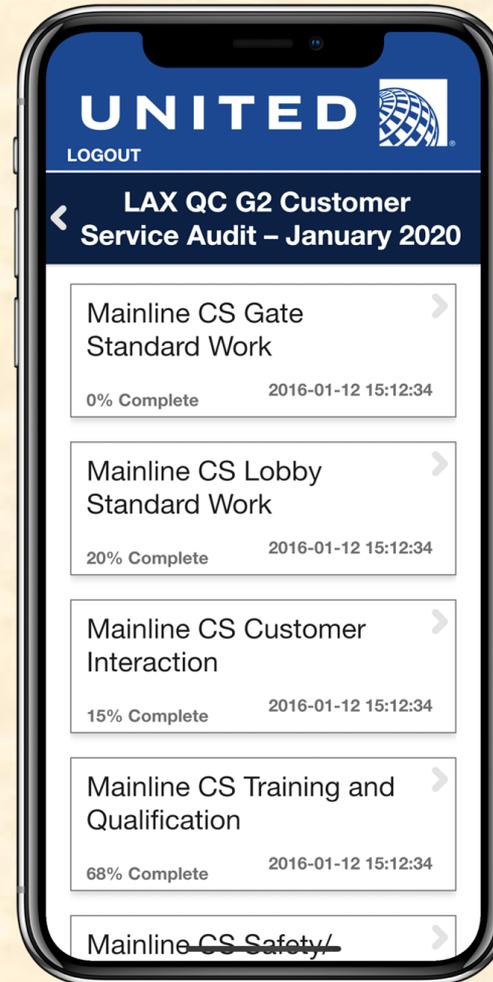
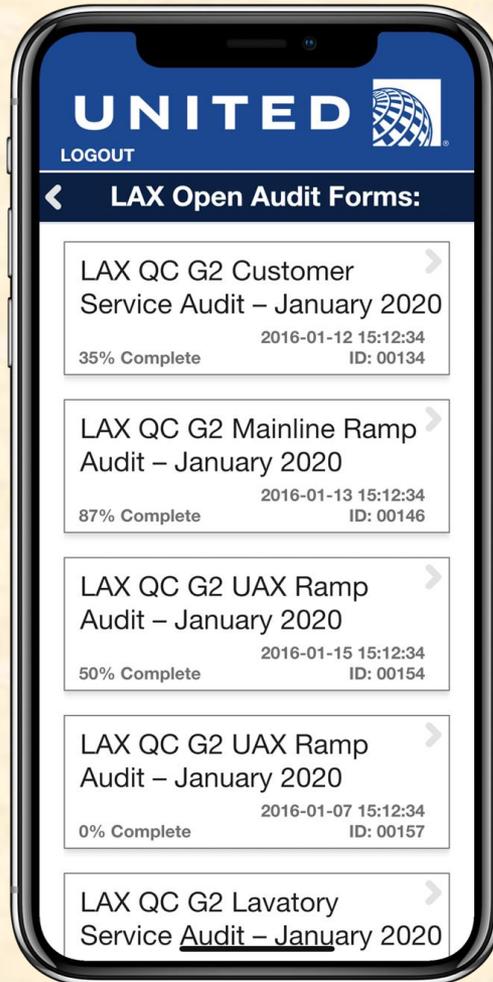
# Screen Mockups

- “Use” with Clients
  - Show to Clients
  - Go Through Use Cases with Clients
- “Cruder” may be better.
  - What?
  - Why?

# Screen Mockup Example



# Screen Mockups Example



# Screen Mockups Example

Phish Phinder Dashboard

https://www.phish-phinder-dash.ao.com

**Auto-Owners**  
INSURANCE

Phish Phinder Logistics Dashboard

Home Logistics Review Notes Logout

Filter Content

▼ Date

Year  to

Month  to

► Department

Logistics and Analytics

85% accuracy

30 hours 27 mins 10 secs

SAVED

Total Scanned Email Categorization

- Innocuous 38%
- Confirmed Phish 12%
- Suspected Phish 30%
- Spam 20%

Phish Phinder Button Use Over Time

Month	Number of Emails Scanned
Oct-19	120
Nov-19	250
Dec-19	530
Jan-20	200

Notes from IT

Working out some bugs in a new feature.  
- Bob

Adding some more parameters to new feature.  
- Jill

Confirmed Phish Statistics

Average Confidence Score: 95%

Lowest Confidence Score: 50%

Highest Confidence Score: 99%

Common Email Features

- Urgent or threatening language in subject line.
- Many misspellings in body of email.
- Links to known malware.



# Design Specifications Interactions With Your Client

---

- Derived With/From Client
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- Agreed Upon With Client
- Your Job to Capture the Client's Intent!

# Project Plan

---

✓ Functional Specifications

✓ Design Specifications

➤ **Technical Specifications**

# Technical Specifications

[1 of 2]

- How does it do it?
- Identifies All the Parts and Their Interactions
- Everything a Developer Needs to Write the Code
- Includes Things Like...
  - Overall System Architecture
  - Machine Architectures
  - Software Technologies
  - Algorithms
  - Production Environments
  - Development Environments
  - SDK's (Software Development Kits)
  - Network Topology
  - Database Schema
  - Continued...



# Technical Specifications

[2 of 2]

- Includes Things Like...
  - Object Models and Class Diagrams
  - UML Diagrams
  - Pseudo Code
  - Function Prototypes
  - Schedule
  - Test Plan
  - Risk Analysis
  - Etc...
- Probably Not Understandable by End User
- Usually Refined



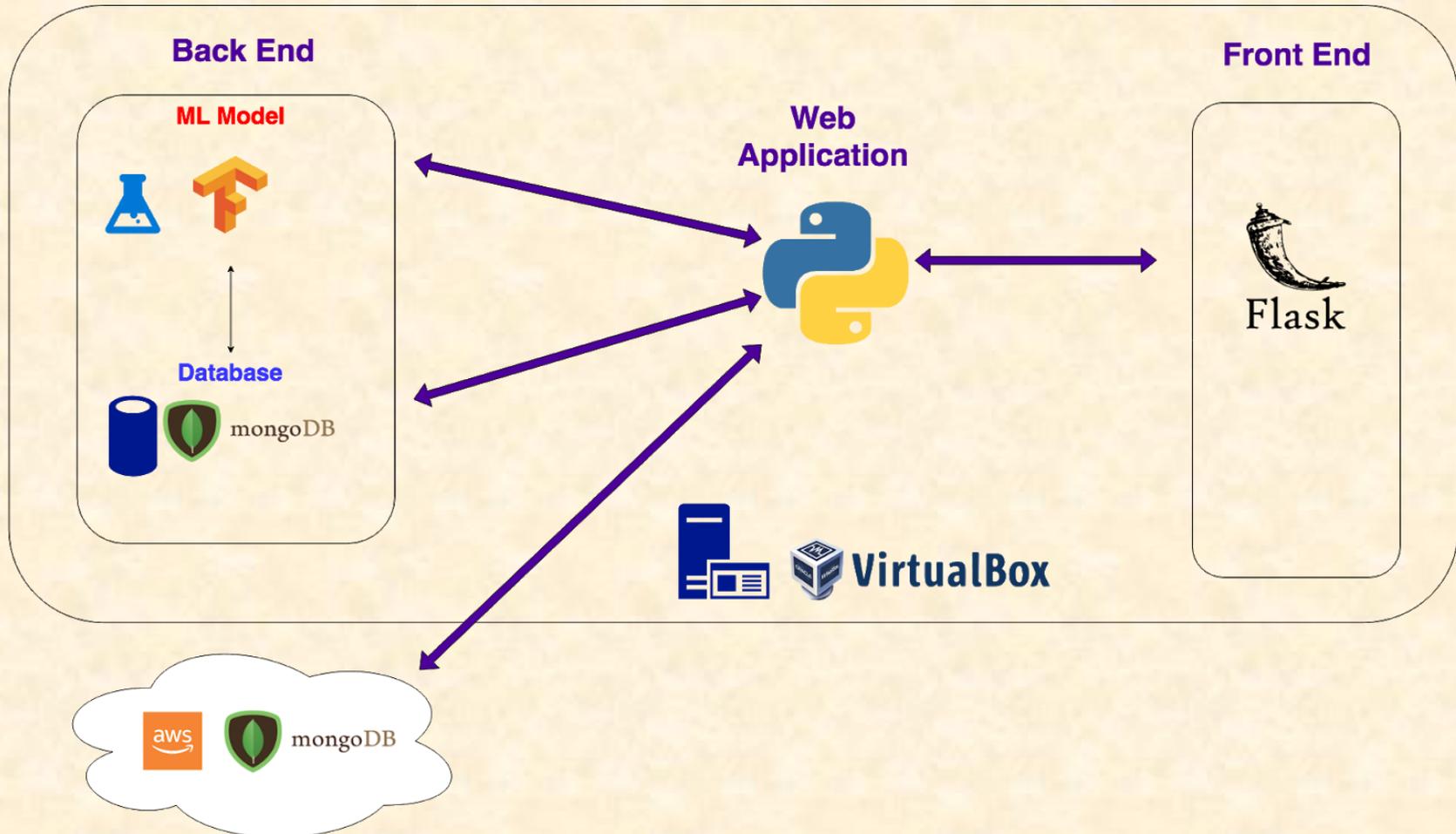
# Technical Specifications Examples

- Herman Miller
  - Amazon Web Service
  - HTML / CSS / JS
  - MySQL / Aurora
  - Mapbox GL JS
- Mozilla / Firefox
  - JavaScript
  - HTML
  - C++
  - Mercurial
  - Phabricator
  - Windows / macOS / Linux
- TechSmith
  - C# / .NET Core
  - Docker
  - Microsoft Azure
  - JavaScript / HTML

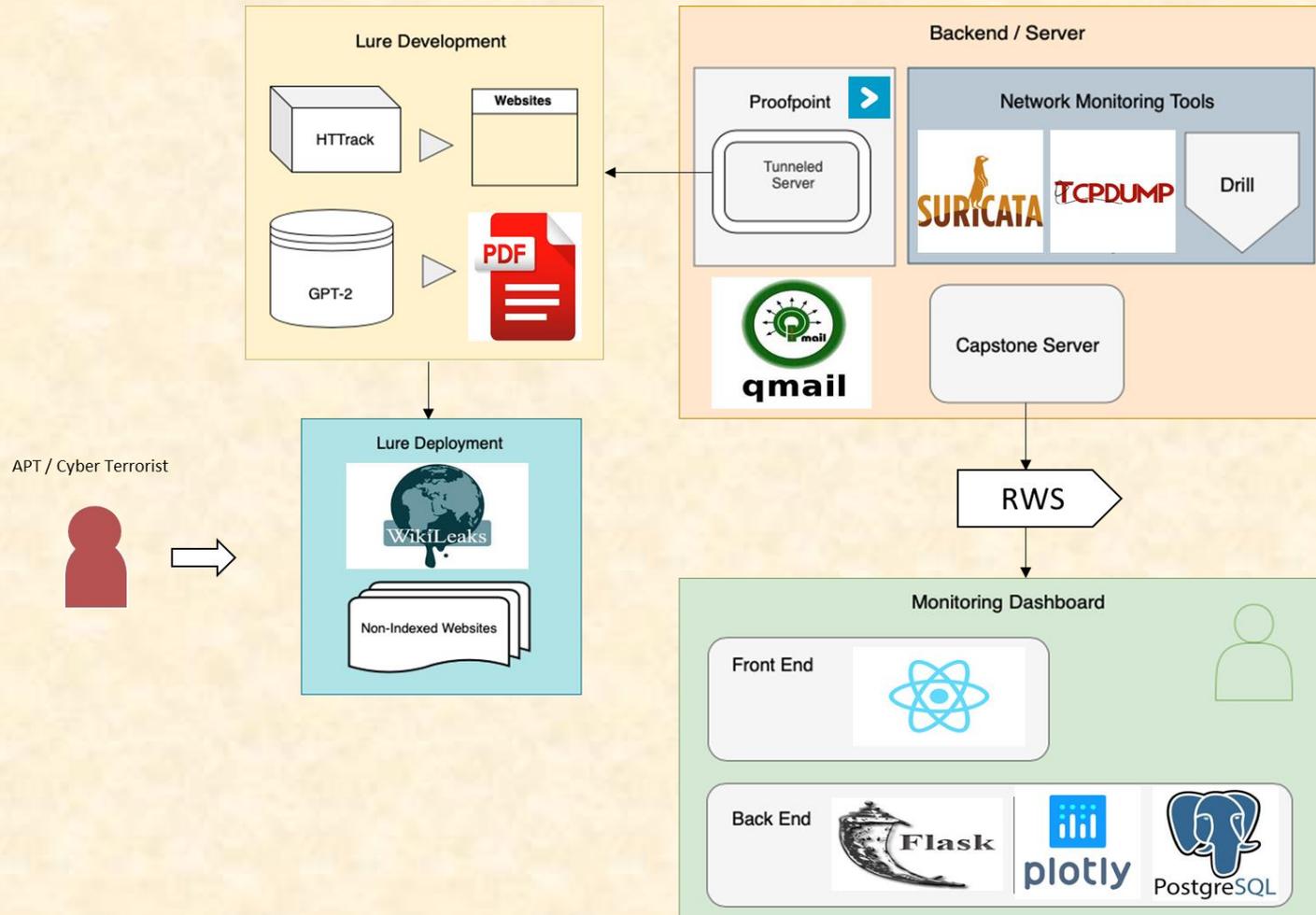
Probably Not  
Understandable  
by End User



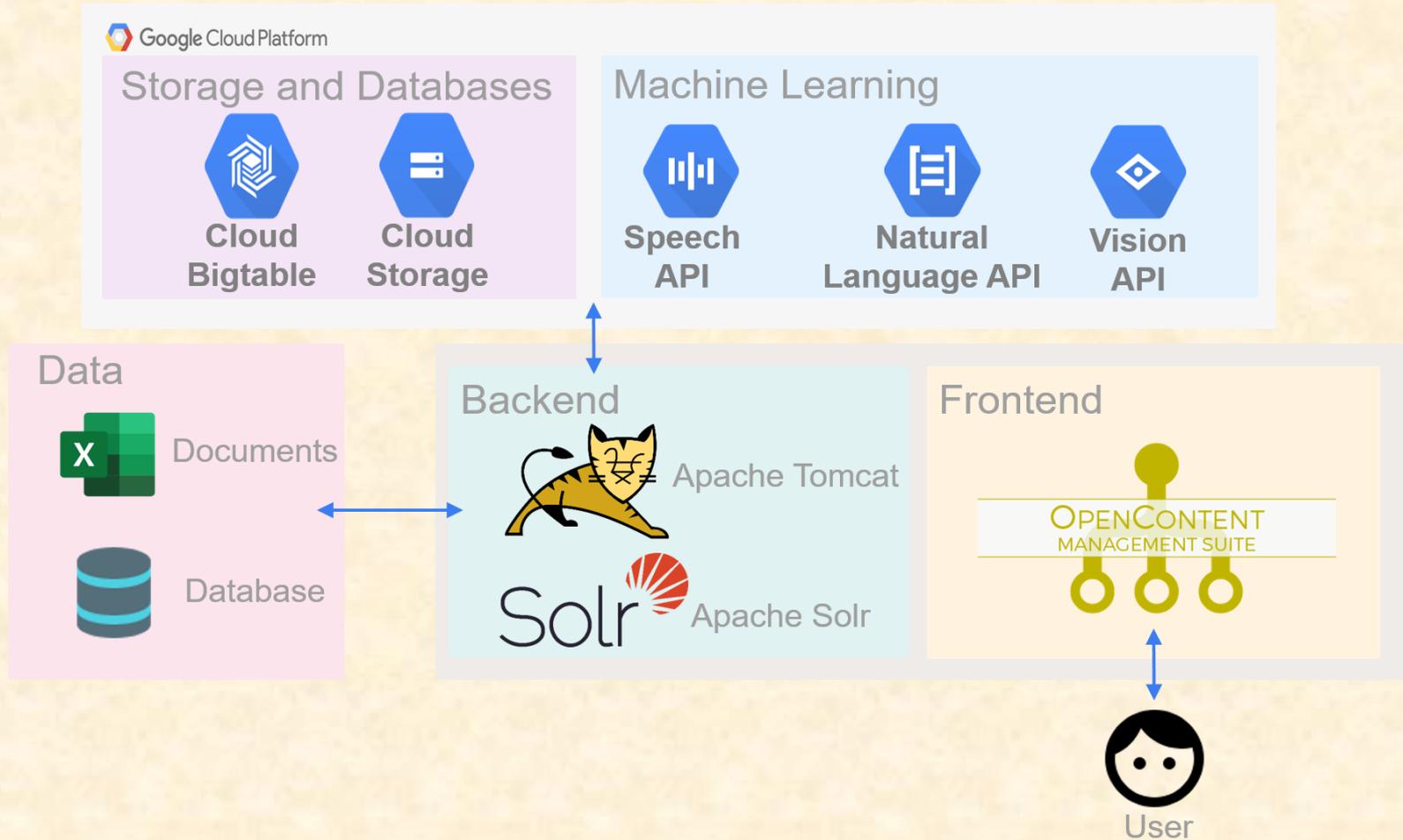
# System Architecture Example



# System Architecture Example



# System Architecture Example



# Approach

- Break Big Problems Into Smaller Problems
- Identify Constraints
- Identify “Risks” — Things You Don’t...
  - ...Know
  - ...Understand
  - ...Know How To Do
- Consider Tradeoffs
- Select Appropriate Technologies
- Identify Core Features for a Prototype



# Technical Specifications Interactions With Your Client

---

- Derived With/From Client
- Documented For Client
- Presented to Client
- Agreed Upon With Client
- Your Job to Capture the Client's Intent!

Cannot be emphasized enough!

# Project Plan Summary

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- Specifications
  - Functional: What does it do?
  - Design: How does it look and feel?
  - Technical: How does it do it?
- Testing Plan
- Schedule

# How To's

[1 of 4]

- Quickly identify...
  - ...what you don't know,
  - ...what you don't understand, and
  - ...what you don't know how to do.
- Conceptually...
  - Start with functional specifications.
    - Get agreement with client.
    - Include as first part of project plan.
  - Do design specifications.
    - Get agreement with client.
    - Include as 2nd part of project plan.
  - Do technical specifications.
    - Get agreement with client.
    - Include as 3rd part of project plan.
  - Do schedule.
  - Do development, testing, and deployment.
- In CSE498, must do all three in parallel (and iterate).



# How To's

[2 of 4]

- Approach

- Make Skeleton Document Immediately

- Will Get You Organized and Focused
- Include “Under Construction” Sections (Totally Empty)

- Develop In Parallel When Possible But...

- Complete Functional First
- Complete Design Second
- Complete Technical Third

- Refine As Needed

- Assign Sections to Team Members

- Share with Client

- Ask For (Specific) Feedback
- Highlight What's New
- Tricky Balance
  - ❖ Not Enough?
  - ❖ Too Much?



“Is this what you had in mind?”



# How To's

[3 of 4]

- Schedule
  - Dictated by Course
- Schedules > Major Milestones
  - 09/16: Status Report Presentations
  - 09/28: Project Plan Presentations
  - 10/19: Alpha Presentations
  - 11/16: Beta Presentations
  - 12/07: Project Videos
  - 12/09: All Deliverables
  - Other Milestones By Educated Guesses
- Track To It At Least Weekly at Triage Meetings
- Revisit Often and Revise If Necessary
- Delivery Slippage == Graduation Slippage



# How To's

[4 of 4]

- “Living Document”
- Make Sure Your Project Plan Has...
  - Cover Page
  - Title
  - Table of Content
  - Page Numbers
  - Headers and Footers
  - Etc...

(That is, make sure your plan looks professional.)



# Interactions With Client

## Client May Specify...

- Requirements
  - Functional
  - Design
  - Technical Requirements
    - Operating Systems
    - Programming Languages and Environments
    - Web Technologies
    - Etc...
  - Legacy
- Milestones
- Etc...

(You may explore and propose other ideas.)



# Nota Bene: Project Plan

- Must Use Windows Microsoft Office
  - Word and PowerPoint
  - Included with Windows 10 VM.
  - Get it done now!
  - (Do not attempt to use anything other than Windows Microsoft Office.)
- How many...
  - ...drafts will you write? Many.
  - ...drafts will you share with your client? A Couple.
  - ...final documents will you submit for CSE498? One
- Due Date
  - 11:59 p.m. ET, Sunday, September 27
  - < 1.0 Weeks
- All-Hands Formal Presentations  Get on it, now!
  - September 28 – October 7
  - PowerPoint Template Provided



# Resources on the Web

- Other Links > Downloads

## Project Plan Examples

- Fall 2019

- Team Technology Services Group
- Team United Airlines

- Spring 2020

- Team MSUFCU
- Team United Airlines Safety

- High Resolution Sponsor Logo

[www.capstone.cse.msu.edu/2020-08/projects/<sponsor>/images/originals/sponsor-logo.png](http://www.capstone.cse.msu.edu/2020-08/projects/<sponsor>/images/originals/sponsor-logo.png)

<http://www.capstone.cse.msu.edu/2020-08/projects/auto-owners/images/originals/sponsor-logo.png>



# Project Plan

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- ✓ Functional Specifications
- ✓ Design Specifications
- ✓ Technical Specifications

# Questions?

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# What's ahead?

[1 of 4]

- All-Hands Meetings
  - ~~09/02: Capstone Overview~~
  - ~~09/09: Capstone Overview~~
  - ~~09/14: Risks and Prototypes~~
  - ~~09/16: Team Status Report Presentations~~
  - ~~09/21: Project Plan~~
  - 09/23: Schedule and Teamwork
  - 09/28: Team Project Plan Presentations
  - 09/30: Team Project Plan Presentations
  - 10/05: Team Project Plan Presentations
  - 10/07: Team Project Plan Presentations



# What's ahead?

[2 of 4]

- Major Milestones
  - 09/28: Team Project Plan Presentations
  - 10/19: Team Alpha Presentations
  - 11/16: Team Beta Presentations
  - 12/07: Project Videos
  - 12/09: All Deliverables

# What's ahead?

[3 of 4]

- Team Status Report Slide Decks
  - Will Be Posted Online Tomorrow
  - May Submit Corrected Slide Deck
  - Due COB Today
- Team Photos
  - During Triage Meetings Next Week
  - Via Zoom
  - Dress Business Casual
- Project Plan Presentation Schedule
  - Every Team Must Be Prepared to Present on First Day
  - Schedule Posted Evening Before First Presentation



# What's ahead?

[4 of 4]

- **Project Plan Document and Presentation**
  - Due Sunday, September 27
  - All team members should...
    - ...read and check the document and slide deck carefully.
    - ...read and follow the submission instructions exactly.
  - Read Submission Instructions Carefully
- **Split All-Hands Meetings**
  - Split by James' and Luke's Capstone Teams
  - Two Public Microsoft Teams Channels
    - James Teams
    - Luke Teams
- **Each Team Presents**
  - One team member will use Microsoft Teams to...
    - Share PowerPoint Presentation
    - Advance the PowerPoint Slide Deck
  - At Most 14 Minutes Including "Setup" Time (Rehearse Timing)
  - Multiple Team Speakers
  - Practice
    - Sharing Presentation in Microsoft Teams
    - Advancing Slides
    - Switching Between Speakers



# READ ME

[1 of 2]

- Presenting
  - The purpose of the project plan presentation is to convince everyone that your team has scoped your project, understands the functional, design and technical specifications, and that your team has a crafted plan to develop, debug and deliver your project to your client on time (Wednesday, December 9) and on budget (\$0).
  - The time limit for your presentation is 14 minutes, which will be strictly enforced. Practice your presentation to ensure that you will finish within the allotted time.
  - All team members are required to dress business casual on the day of their presentation. Business casual does not include sneakers, tennis shoes, hats, coats, hoodies, t-shirts or shirts that are not tucked into pants. Google “what is business casual.”



# READ ME

[2 of 2]

- Content
  - Do not include any company confidential information in your presentation since all presentations will be posted on the web site.
  - Submit your presentation to your client for approval at least two days in advance.
  - Throughout the PowerPoint template, replace placeholders [...] with the appropriate information.
  - Edit the center footer by clicking the Header & Footer button on the Insert ribbon. Change [Team Name] in the footer to your company name as in “Team TechSmith Project Plan Presentation”. If necessary, extend the width of the center footer textbox on the master slide, making sure that you re-center the enlarged textbox.
  - Delete the example Screen Mockups and System Architecture slides and all Read Me slides from your presentation.
    - The screen mockups should contain little or no bordering transparent or whitespace. Use paint.net to crop them appropriately.
    - If a slide contains more than one screen shot or additional artwork (like an arrow), group all of the items into a single grouping so that it can be copied-and-pasted and resized as a single unit
- Required Template
  - Do not edit the Slide Masters.
  - Do not change the organization of slides.
- Presentations
  - Although the presentations are scheduled over the course of up to four meetings, all teams must be prepared to present on the first day scheduled, Monday, September 28.
  - The order of the presentations will be posted on our [All-Hands Meetings](#) page in the evening of the day before the first day scheduled for presentations.
- Submission ← **Read this carefully.**
  - Both your PowerPoint slide deck and Word document are due by 11:59 p.m. on Sunday, September 27. Email your slide deck to [Dr. D.](#) and your document to your TA. Email both your slide deck and document to your client in a separate email; do not cc me.
  - For subject, use “Team [Team Name]: Project Plan Presentation” as in “Team Amazon: Project Plan Presentation”.
  - Attach the Windows PowerPoint source file named “team-[team-name]-project-plan-presentation.pptx” replacing “[team-name]” with your team name (using all lower case and replacing all blanks with dashes) in your filename as in “team-urban-science-project-plan-presentation.pptx”.
  - Attach the Windows Word source file named “team-[team-name]-project-plan-document.docx” replacing “[team-name]” with your team name (using all lower case and replacing all blanks with dashes) in your filename as in “team-urban-science-project-plan-document.docx”.
  - Include some text in the body to practice being a professional and to avoid having your email sent to my junk folder.



**MICHIGAN STATE**  

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**U N I V E R S I T Y**

# Project Plan

## [Project Title 36pt]

### The Capstone Experience

Team [Team Name 24pt]

[Team Member 1 16pt]

[Team Member 2 16pt]

[Team Member 3 16pt]

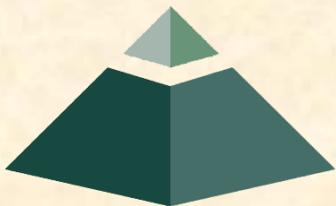
[Team Member 4 16pt]

[Team Member 5 16pt]

[Team Member 6 16pt]

Department of Computer Science and Engineering  
Michigan State University

Fall 2020



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

# Functional Specifications

- Point 1
- Point 2
- Point 3
- Etc...

This is your project overview.

Describe what problem your project solves.

Answer the question “What does your project do?”

This is your “elevator pitch”.

**Delete this textbox.**



# Design Specifications

- Point 1
- Point 2
- Point 3
- Etc...

Articulate a summary of your project's major features as well as its overall design.

**Delete this textbox.**



# Screen Mockup: [Title 1]

You may include as many screen mockups as you have like, but you must include at least four examples.

To include more than four, you can duplicate this slide as many times as necessary.

Good screen mockups should help you elicit project specifications from your client.

Do not include screen mockups of trivial things such as splash screens or login screens.

Do not include screen grabs of other software.

Give each screen mockup slide a title.

See below for examples and instructions.

**Delete this textbox.**



# Screen Mockup: [Title 2]

You may include as many screen mockups as you have like, but you must include at least four examples.

To include more than four, you can duplicate this slide as many times as necessary.

Good screen mockups should help you elicit project specifications from your client.

Do not include screen mockups of trivial things such as splash screens or login screens.

Do not include screen grabs of other software.

Give each screen mockup slide a title.

See below for examples and instructions.

**Delete this textbox.**



# Screen Mockup: [Title 3]

You may include as many screen mockups as you have like, but you must include at least four examples.

To include more than four, you can duplicate this slide as many times as necessary.

Good screen mockups should help you elicit project specifications from your client.

Do not include screen mockups of trivial things such as splash screens or login screens.

Do not include screen grabs of other software.

Give each screen mockup slide a title.

See below for examples and instructions.

**Delete this textbox.**



# Screen Mockup: [Title 4]

You may include as many screen mockups as you have like, but you must include at least four examples.

To include more than four, you can duplicate this slide as many times as necessary.

Good screen mockups should help you elicit project specifications from your client.

Do not include screen mockups of trivial things such as splash screens or login screens.

Do not include screen grabs of other software.

Give each screen mockup slide a title.

See below for examples and instructions.

**Delete this textbox.**



# Screen Mockup Instructions

- Ensure that your mockups...
  - are readable (size-wise),
  - have the correct aspect ratio,
  - are scalable, and
  - are centered vertically (between the green bar in the title and the footer) and horizontally (Use Home > Arrange > Align).
- The screen mockups should not contain any bordering transparent or whitespace. Use [paint.net](https://www.paint.net/) to crop them appropriately and change any bordering whitespace to transparent.
- In PowerPoint use Home > Arrange > Group to group the objects in your mockup into a single object that can be copied-and-pasted (and scaled).
- Embed your screen mockups into platform frames, like a mobile phone or a tablet or a web browser. See <https://mockuphone.com>.



# Screen Mockups: Web Interface

**APTIV** | Guest

Josh M. Cybersecurity Engineer

Search

Main Navigation

- Dashboard
- Products
- Tasks
- Pending Requests
- Threat Tracker
- Vulnerability Tracker
- Incident Tracker
- Mitigation Tracker
- Register a Product
- Report an Incident
- Calendar
- Help
- Settings

**V2X FCA** | Dashboard > Products > V2X > V2X FCA

Project Status: Finalized

Project Registration → TARA → Mitigation Remediation → Vulnerability Assessment → Penetration Assessment → Final Approval → Finalized

Recent Updates

- Jane D. added 2 new members to the project (3 hours ago)
- Josh M. accepted Final Approval Request (2 days ago)
- Jane D. marked Task 5 V2X.OS.4 Boot Process as Completed (3 days ago)

Project Modules

- Project Information
- TARA
- Mitigation Remediation
- Vulnerability Assessment
- Penetration Assessment
- Final Approval

Task Status

Donut Chart: 35% (Resolve), 45% (Closed), 12% (In Progress), 8% (New)

Pending Requests

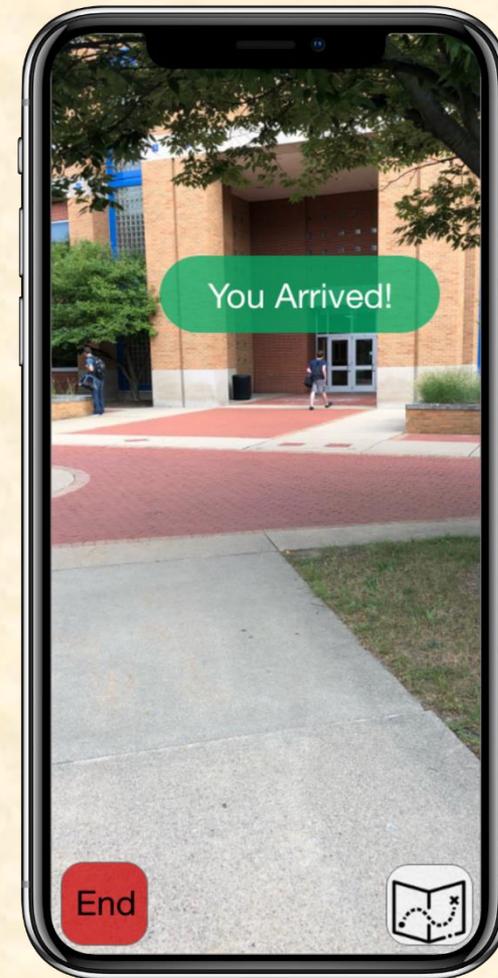
Request	Date
No current Pending Requests	

Tasks

#	Title	Priority
2	Set up V2X test bench	High
8	V2X.CAN.5 Normal...	Medium
3	V2X.OS.2 Process P...	Medium
4	V2X.OS.3 Password...	Medium
13	Update Attack Plan	Low

View all tasks

# Screen Mockup: iOS Application



# Technical Specifications

- Point 1
- Point 2
- Point 3
- Etc...

List the technical components of your project.

**Delete this textbox.**



# System Architecture

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Show a diagram that illustrates the overall architecture of your project including how all of the parts and pieces are connected and interact.

See below for examples and instructions.

**Delete this textbox.**



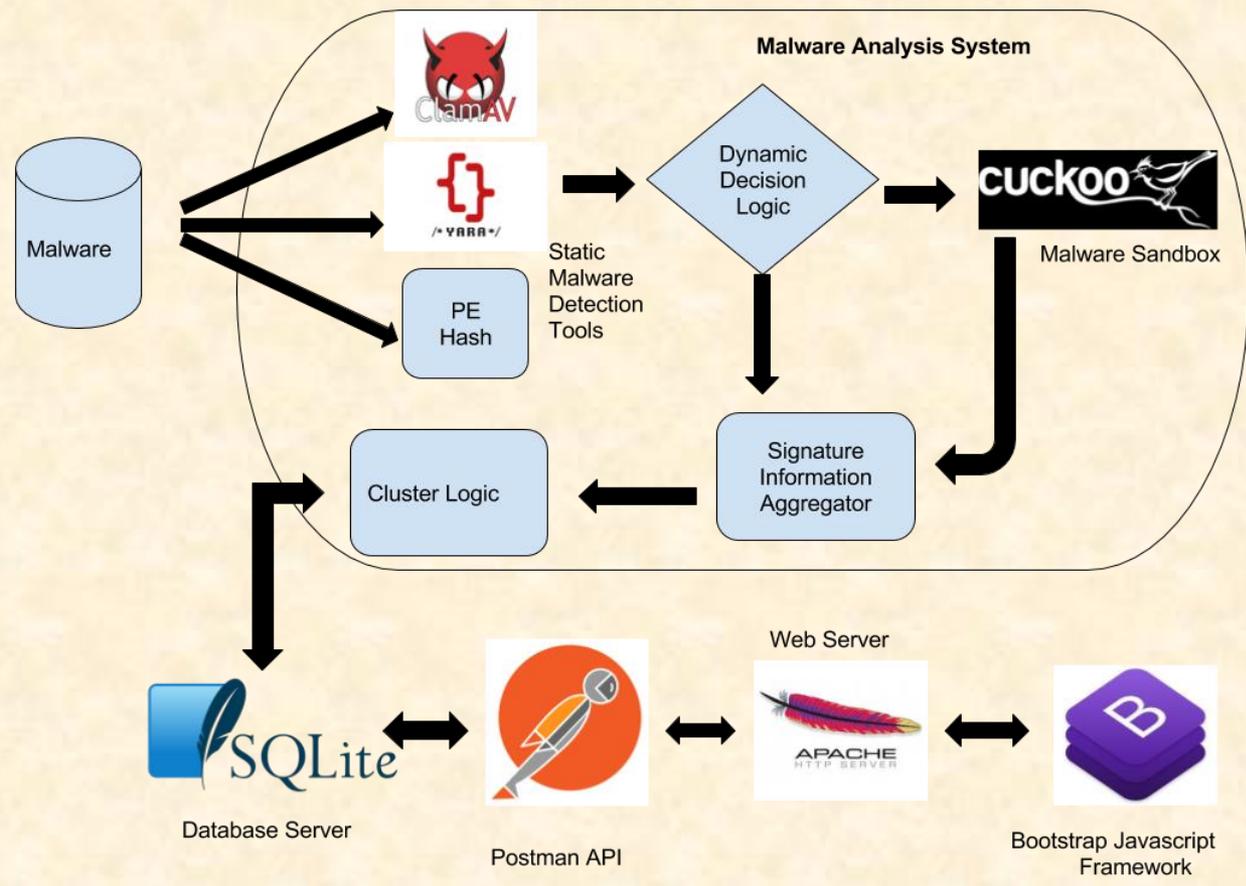
# System Architecture

- Draw your system architecture diagram natively in PowerPoint; do not cut-and-paste a diagram from your project plan document.
- Create your system architecture diagram in a separate PowerPoint file.
  - Use a white background with a blank slide layout.
  - Use Home > Arrange > Group to group all of the objects in your diagram into one single PowerPoint object that can be copied-and-pasted.
  - Once grouped, save the diagram as a PNG image so that the entire image will scale including text.
- Use Paint.NET to make the background of your diagram transparent.
  - Download and install it from [www.getpaint.net](http://www.getpaint.net).
  - Copy your diagram into Paint.NET.
  - Select Tool > Magic Wand.
  - Click on a background area.
  - Push the Delete button (on your keyboard).
  - The background area should be a checkerboard pattern.
  - (N.B.: Paint.NET was a capstone project at the University of Washington.)
- Copy-and-paste your PNG image into the slide deck System Architecture slide.
- Ensure that your diagram...
  - is readable (size-wise) when projected,
  - has the correct aspect ratio,
  - is scalable, and
  - is centered vertically (between the green bar in the title and the footer) and horizontally (Use Home > Arrange > Align).

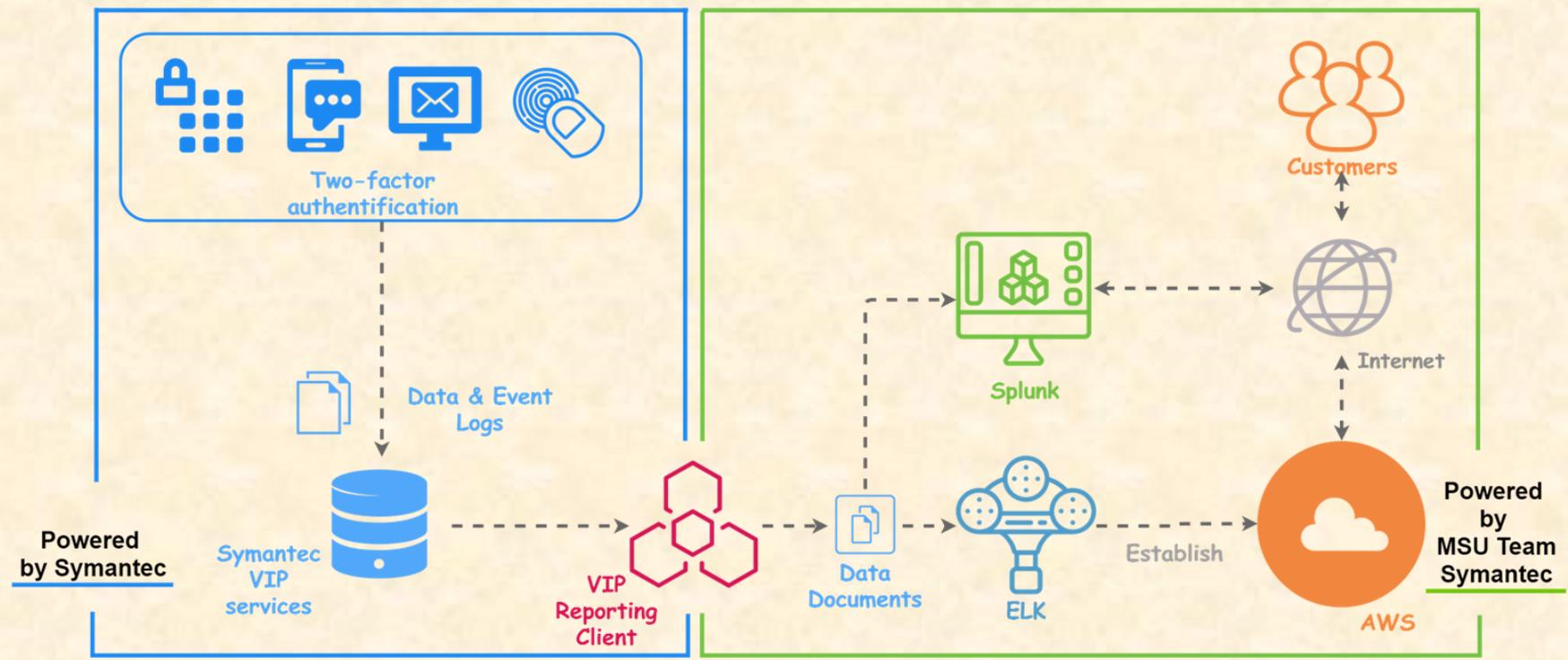
**Read this  
carefully.**



# System Architecture

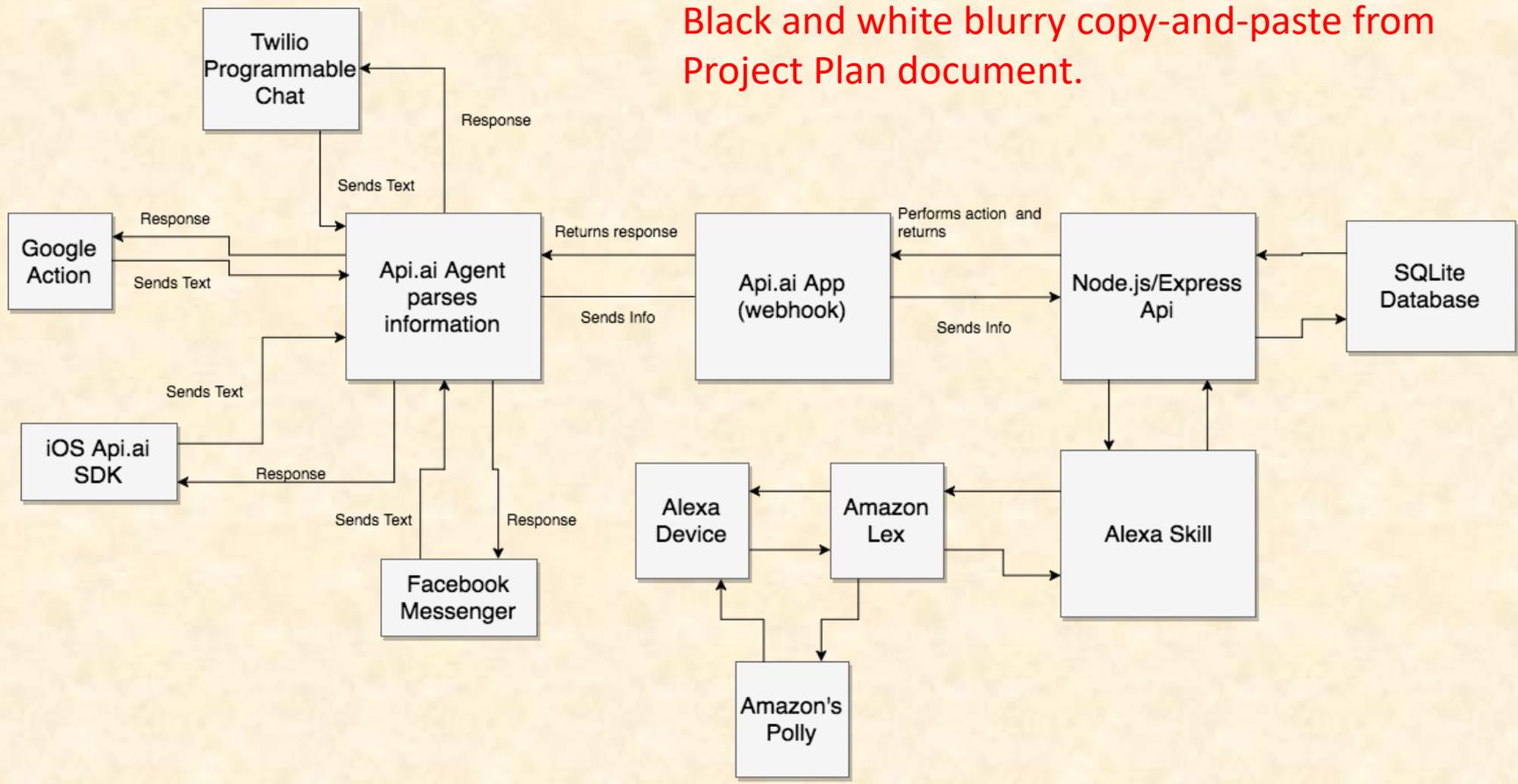


# System Architecture

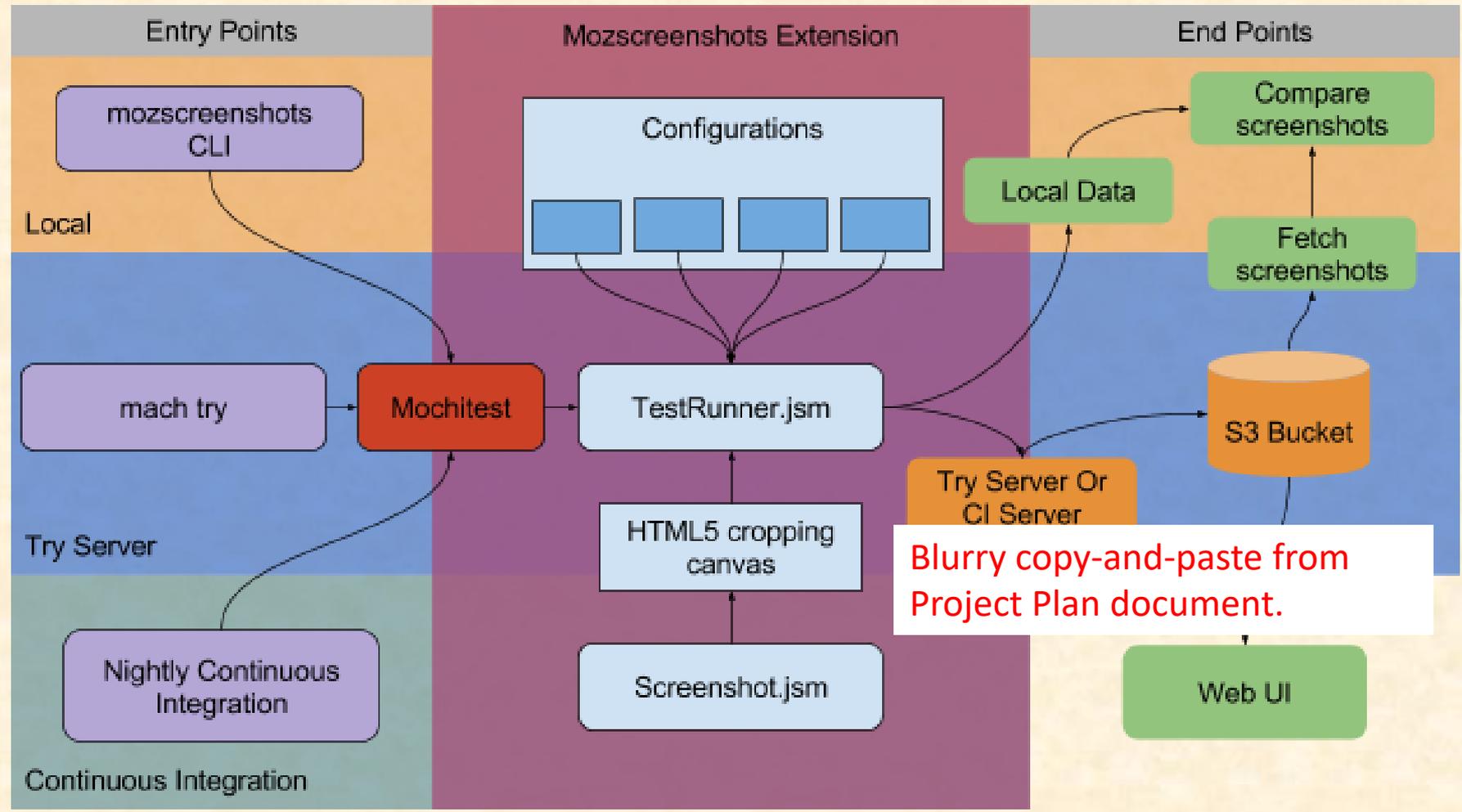


# System Architecture

Black and white blurry copy-and-paste from Project Plan document.



# System Architecture



Blurry copy-and-paste from Project Plan document.



# System Components

- Hardware Platforms

- Point 1
- Point 2
- Point 3
- Etc...

List your hardware and software platforms including all of the technologies that your project will use.

**Delete this textbox.**

- Software Platforms / Technologies

- Point 1
- Point 2
- Point 3
- Etc...



# Risks

- Risk 1
  - Description
  - Mitigation
- Risk 2
  - Description
  - Mitigation
- Risk 3
  - Description
  - Mitigation
- Risk 4
  - Description
  - Mitigation

Articulate your major risks.

For each risk, describe what the risk is and how you plan on mitigating it.

DO NOT duplicate this slide. All of your risks must fit on this one slide.

**Delete this textbox.**



# Questions?

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