

# 09/15: Project Plan

## The Capstone Experience

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Fall 2022



*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?
  - **Why is Your Product Valuable – “What’s the Point?”**
- Includes
  - List of Objectives
  - Use Cases
    - Vignettes
    - Of How User Would Use of Your System
- Focus on Functionalities, not Features
- Not Necessarily Complete
- Understandable by End User
- Initial Problem Statement
- Usually Refined



# Functional Specifications Examples

- Amazon
  - Increase Buyer Trust and Loyalty
  - By Highlighting Low Quality Reviews
  - With a Visually Intuitive Web App
- Anthropocene Institute
  - Determine Public Opinion on Nuclear Power
  - To Enable Better Public Education
  - And Further Clean Energy Initiatives
- Kohl's
  - Improve Efficiency and Organization of Software Projects
  - With an Internal Developer Portal
- **Take Note of What is Not Here**

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

- Amazon
  - App is Web Application built Into the Amazon Dashboard
  - Provide Interactive Graph of Confidence Scores
  - Display Scores Without Low-Quality Reviews
- Anthropocene Institute
  - Home Page Has Interactive Map Opinions Geographically
  - Users can Change Parameters with Sliders
  - Full Information Shown in Modal Popup
  - Hamburger Menu Used for Site Navigation
- Kohl's
  - Platform Available as Responsive Webpage
  - Employees can Post Questions Using Modal Boxes
  - Threaded Comments are Supported
  - Like/Dislike Button Located Beneath Question
  - Navigate Website with Breadcrumb Navigation
  - Follows Kohl's Branding Standards
- **Take Note of What is Not Here**

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...
  - PowerPoint (Developer View)
  - Photoshop
  - Figma
  - Etc...
- Embed Mockups in Platform Frames
  - **Web Browsers** and Mobile Devices
  - Eliminate Shadows
  - See [mockuphone.com](http://mockuphone.com)
- NOT Screen Captures of Other Software

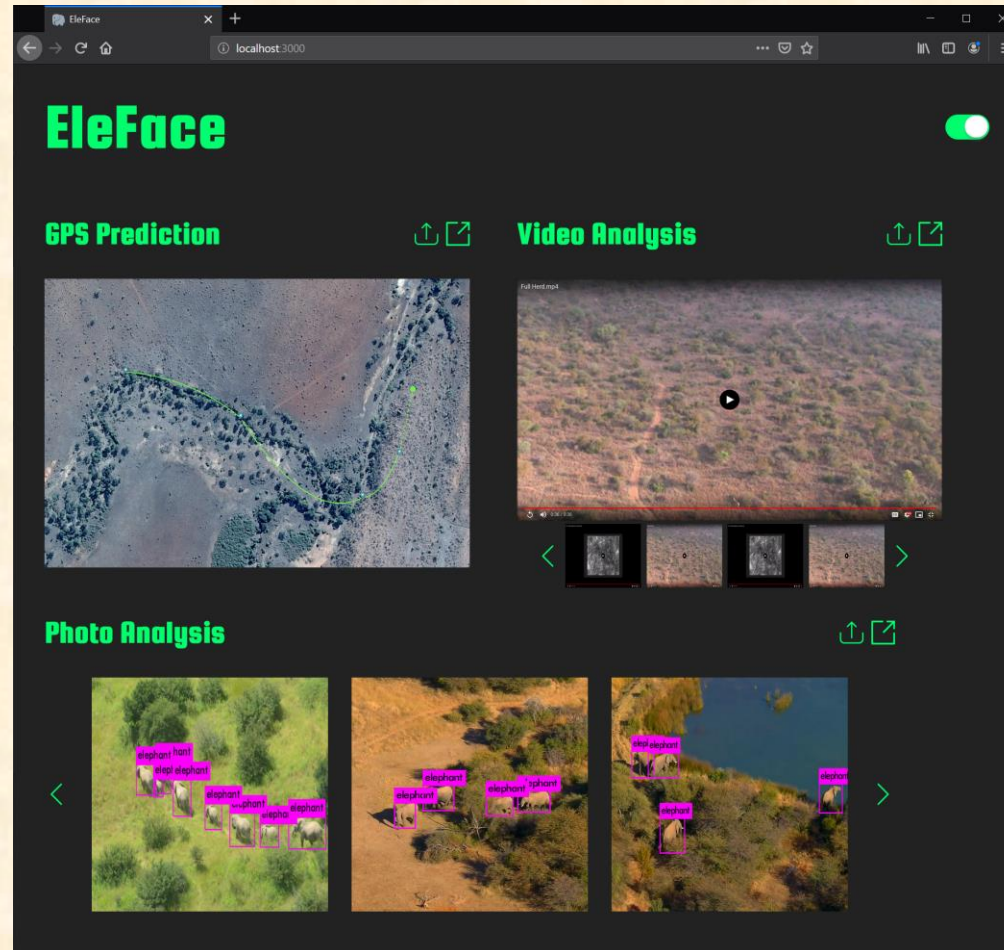


# Screen Mockups

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- “Use” with Clients
- Show to Clients
- Go Through Use Cases with Clients

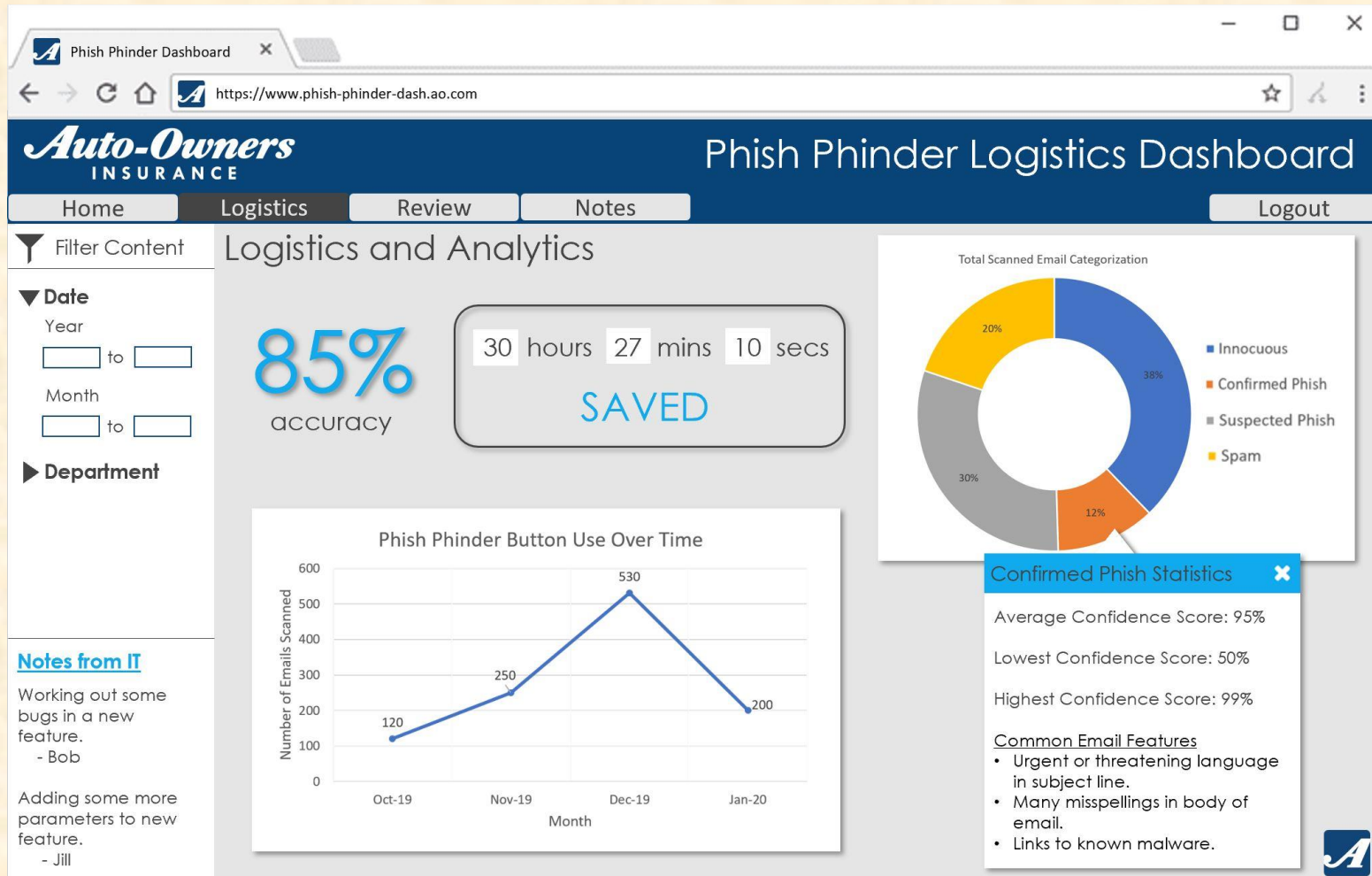
# Screen Mockup Example



# Screen Mockups Example



# Screen Mockups Example



# Design Specifications

## Interactions With Your Client

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- Derived With/From Client
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# Project Plan

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✓ 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

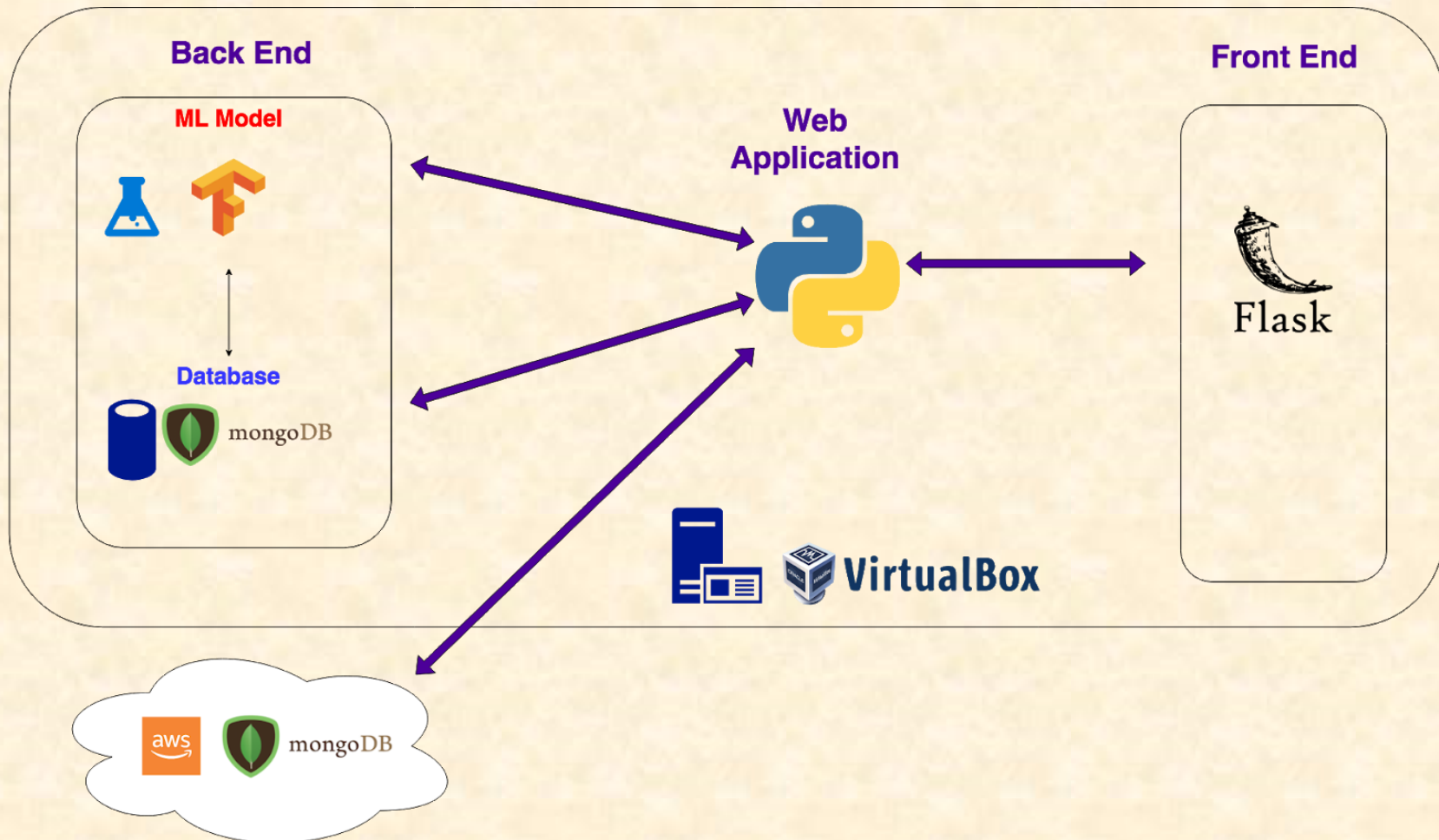
# Technical Specifications Examples

- Amazon
  - AWS Cloud Platform
  - JavaScript
  - Amazon Quicksight
- Anthropocene Institute
  - HTML / CSS / JavaScript
  - Database Technologies
  - Machine Learning
  - Sprout Social
- Kohl's
  - Micro Services
  - Cloud Native Technologies
  - NodeJS

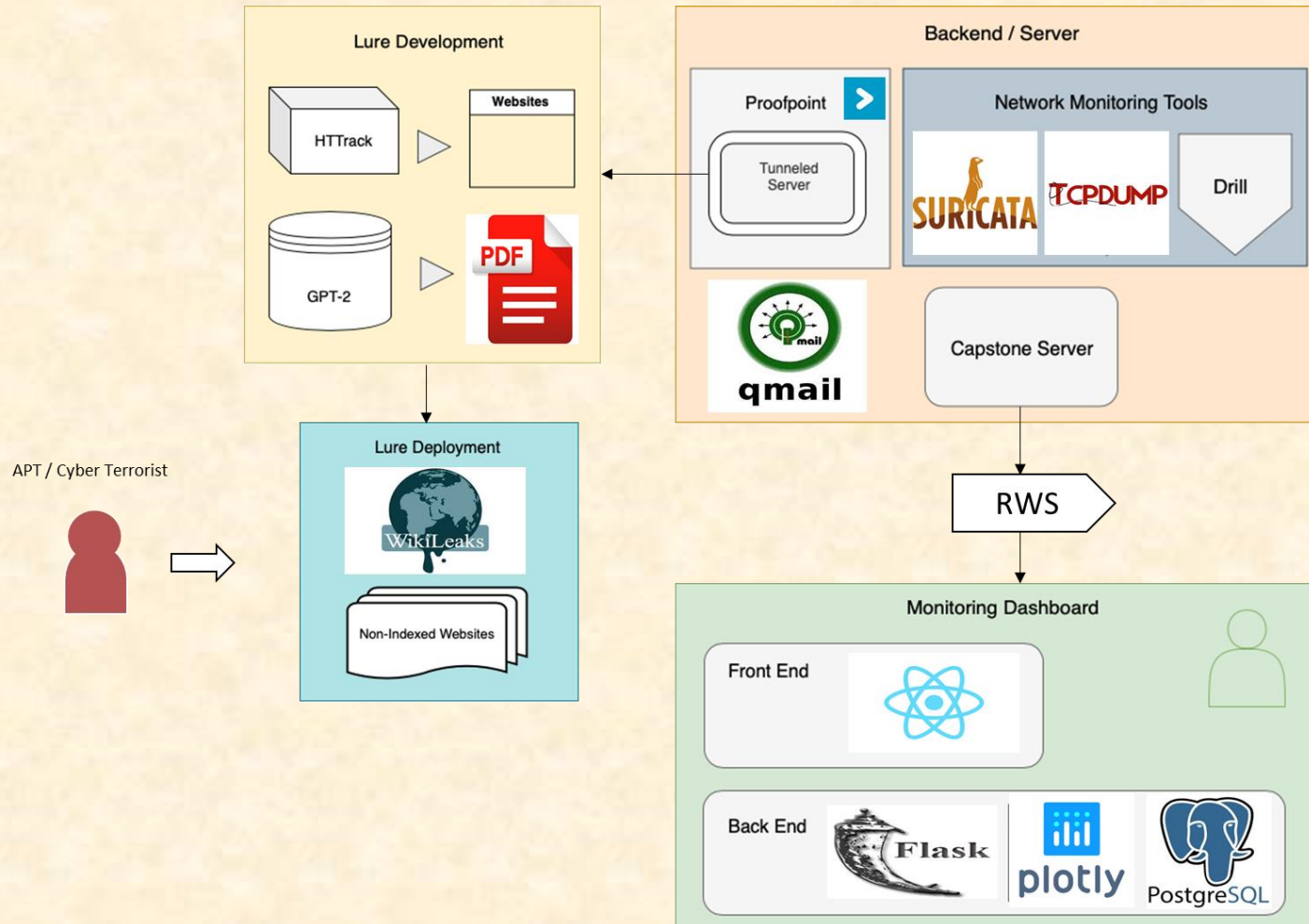
Probably Not  
Understandable  
by End User



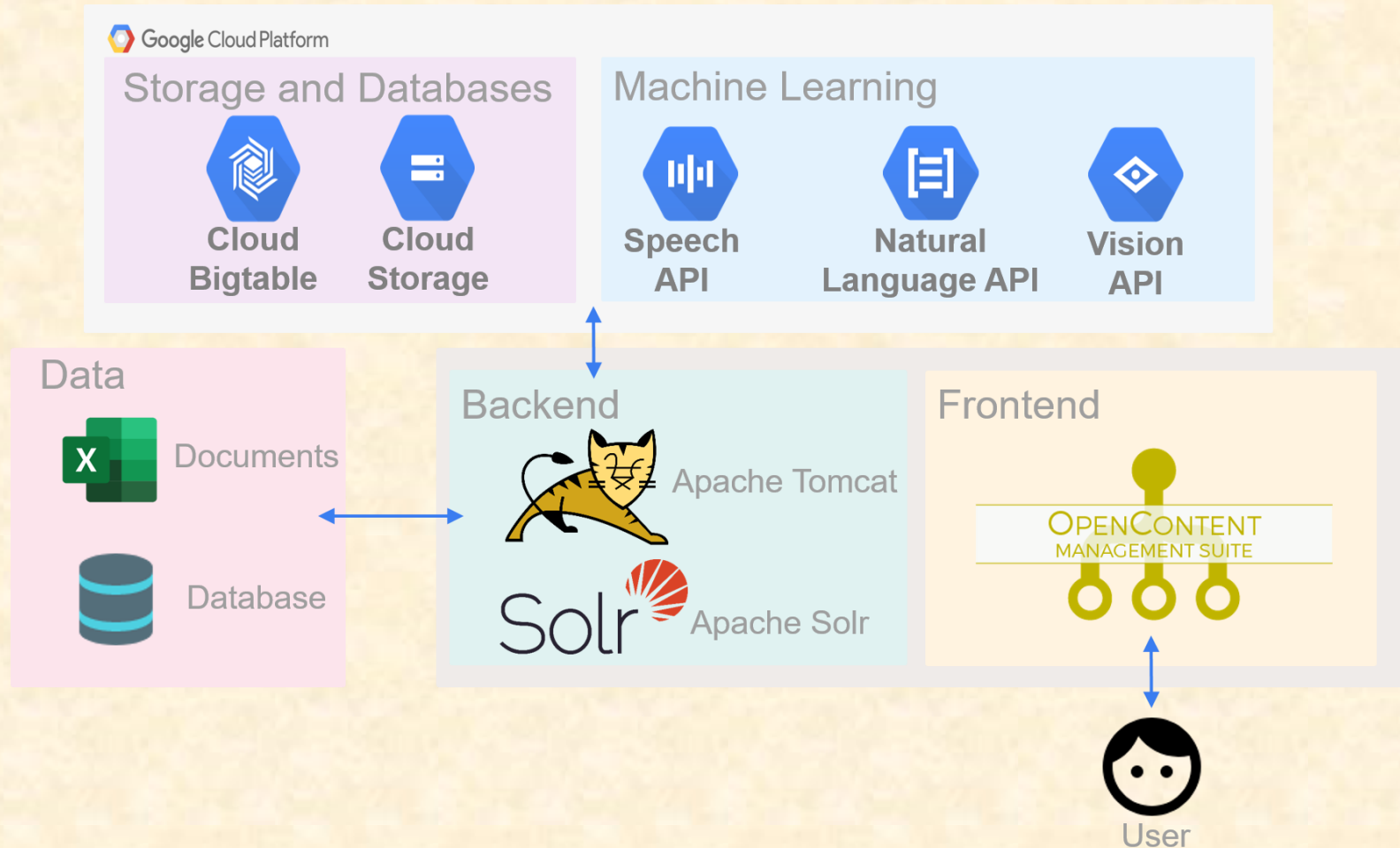
# System Architecture Example



# 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
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- **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

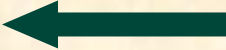
[1 of 4]

- 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  “Is this what you had in mind?”
    - Highlight What's New
    - Tricky Balance
      - ❖ Not Enough?
      - ❖ Too Much?



# How To's

[3 of 4]

- Schedule Dictated By...
  - Course
  - Project Sponsor
  - Team
  - TAs
- Schedules > Major Milestones
  - 09/22: Project Plan Presentations
  - 10/11: Alpha Presentations
  - 11/15: Beta Presentations
  - 12/05: Project Videos
  - 12/07: 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, Wednesday, September 21
  - ~1 Week
  - Slide Decks Submitted Through Teams
  - Documents Sent Directly to TMs
- Split-Hands Formal Presentations
  - September 22 – September 29
  - PowerPoint Template Provided
  - Email Instructors ASAP if Conflict



# 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
  - Microsoft Teams General Channel File Space
  - Folder project-sponsor-logos
  - High Resolution png With Transparent Background





# Project Plan

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





# Questions?

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# What's ahead?

[1 of 2]

- Upcoming Meetings

- ~~09/08: Risks and Prototypes~~
- ~~09/13: Team Status Report Presentations~~
- 09/15: Project Plan
- 09/20: Schedule and Teamwork
- 09/21: Project Plan Document and Slide Decks Due
- 09/22-29: Team Project Plan Presentations
- 10/11-18: Alpha Presentations
- 11/15-22: Beta Presentations



# What's ahead?

[2 of 2]

- Upcoming Meetings

- 09/22: Team Project Plan Presentations
- 09/27: Team Project Plan Presentations
- 09/29: Team Project Plan Presentations

10% of  
Team Grade

- Split-Hands Meetings

- Used on Presentation Days
- Three Locations
  - Luke's Teams – STEM 1130
  - Griffin's Teams – Anthony 1279
  - Tommy's Teams – Engineering 1345
- Attendance Take as Usual Including Lateness
- Sit with Teammates at Front of Lecture Hall



# 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 7) and on budget (\$0).
- The time limit for your presentation is 15 minutes, which will be strictly enforced. Practice your presentation to ensure that you will finish within the allotted time.
- Each team will share and “drive” the slide deck for their own team. Practice this using Microsoft Teams.
- We will meet in “split-hands” meetings. Luke’s teams will meet in STEM 1130, Griffin’s teams will meet in Anthony 1279, and Tommy’s teams will meet in Engineering 1345.
- 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.”
- Although the presentations will be scheduled over the course of three meetings, all teams must be prepared to present on the first day scheduled, Thursday, September 22.
- The presentation schedule will be posted on our [Weekly Schedule](#) page in the evening of Wednesday, September 21.



# READ ME

[2 of 2]

- Creating and Editing

- Use only the Windows version of Office 365.
- You must use this PowerPoint slide deck template as is. Do not change the number of slides unless the instructions explicitly allow you to duplicate slides. Do not change the order of the slides. Do not change the styles. Do not edit the master slides.
- Throughout the 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.
- Do not include any company confidential information in your presentation.
- Delete every textbox that includes “Delete this textbox” and every slide that includes “Delete this slide.”

- Submitting

- All presentations are due to us and to your client by 11:59 p.m., Wednesday, September 21.
- Name your PowerPoint slide deck file as “team-[team-name]-project-plan-presentation.pptx” replacing “[team-name]” with your team’s name normalized by using all lower case, deleting non-numeric and non-alphabetic characters, and replacing blanks by dashes. Examples include “team-kelloggs-project-plan-presentation.pptx” and “team-urban-science-project-plan-presentation.pptx” .
- Upload your PowerPoint slide deck to the folder “Project Plan Presentation Slide Decks” in our Microsoft Teams General Channel file space by 11:59 p.m., Wednesday, September 21. In addition, upload your slide deck to your team’s private channel file space in case your slide deck is deleted by accident from the General Channel file space, and you need to prove that you did indeed upload your slide deck by the due date and time.
- Email a copy of your slide deck to your client as well by 11:59 p.m., Wednesday, September 21. Do not cc us on that email. Include some professional text in the body of your email to practice being a professional and to avoid having your email sent to your project sponsor’s junk folder.



# Project Plan Presentation

## [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 2022





# 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.

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Give each screen mockup slide a title.

See below for examples and instructions.

**Delete this textbox.**

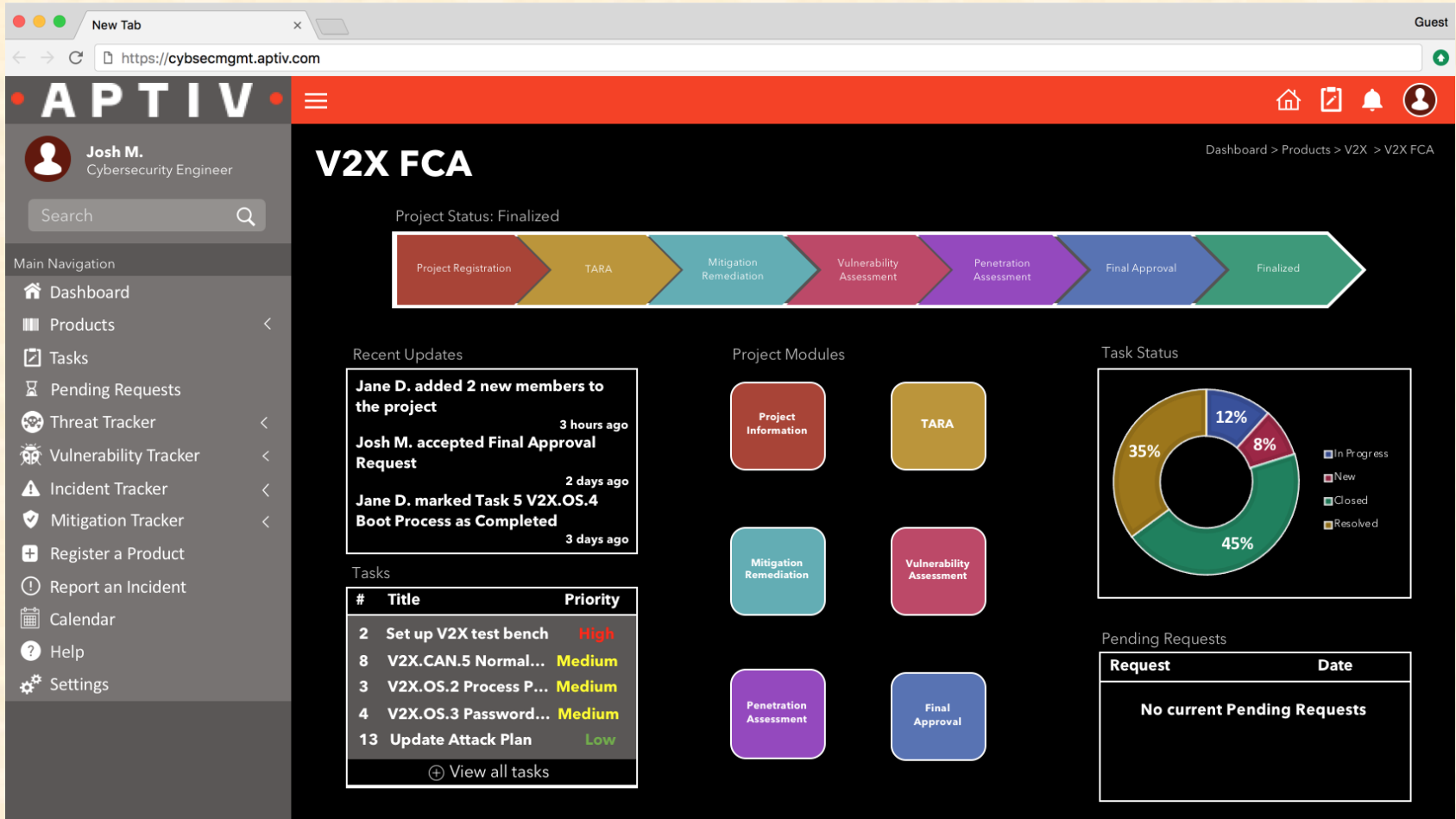


# Screen Mockup Instructions

- 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>.

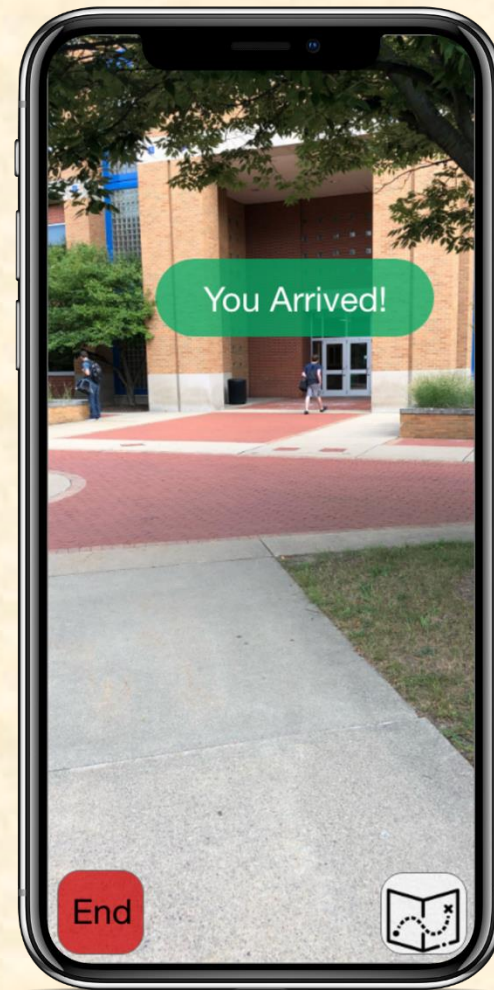


# Screen Mockups: Web Interface





# 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

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.**



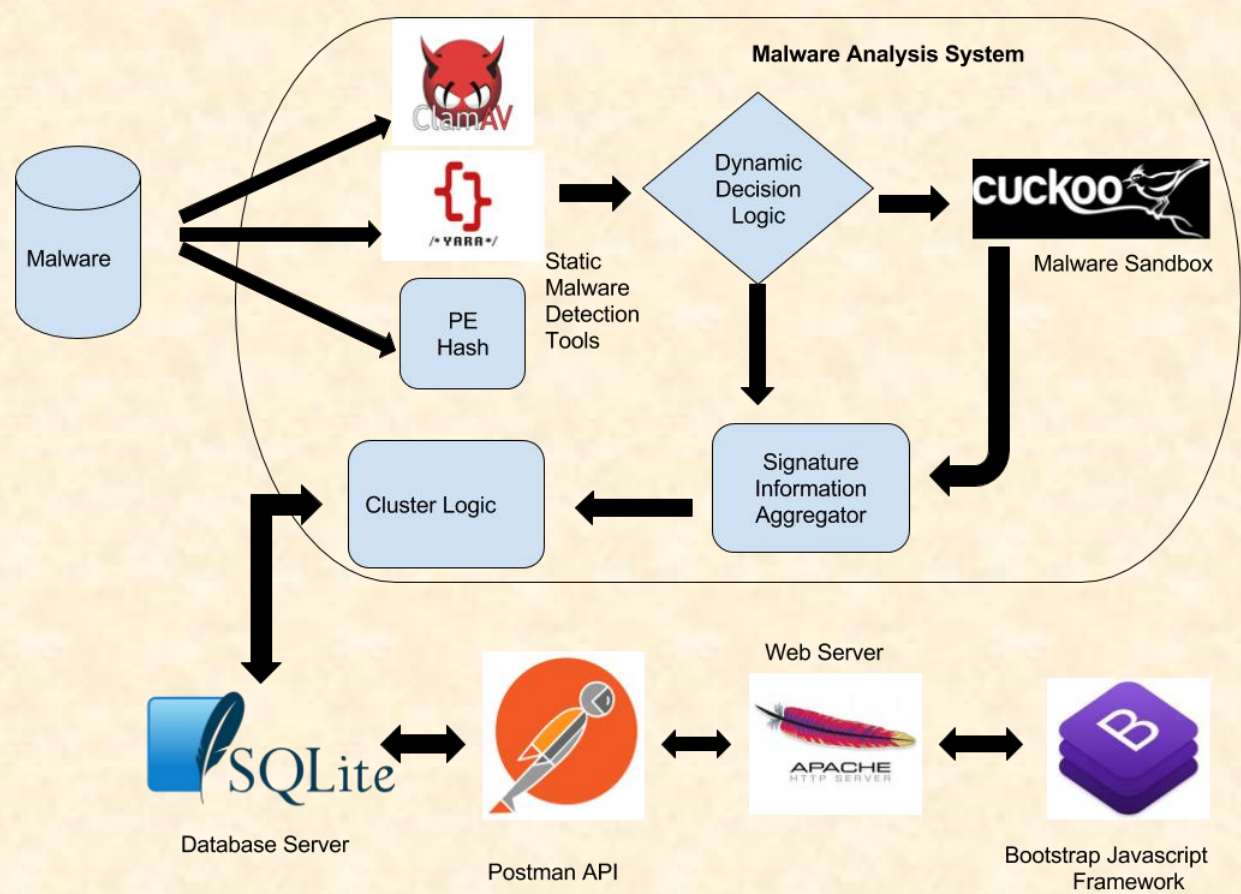
# System Architecture

- 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).

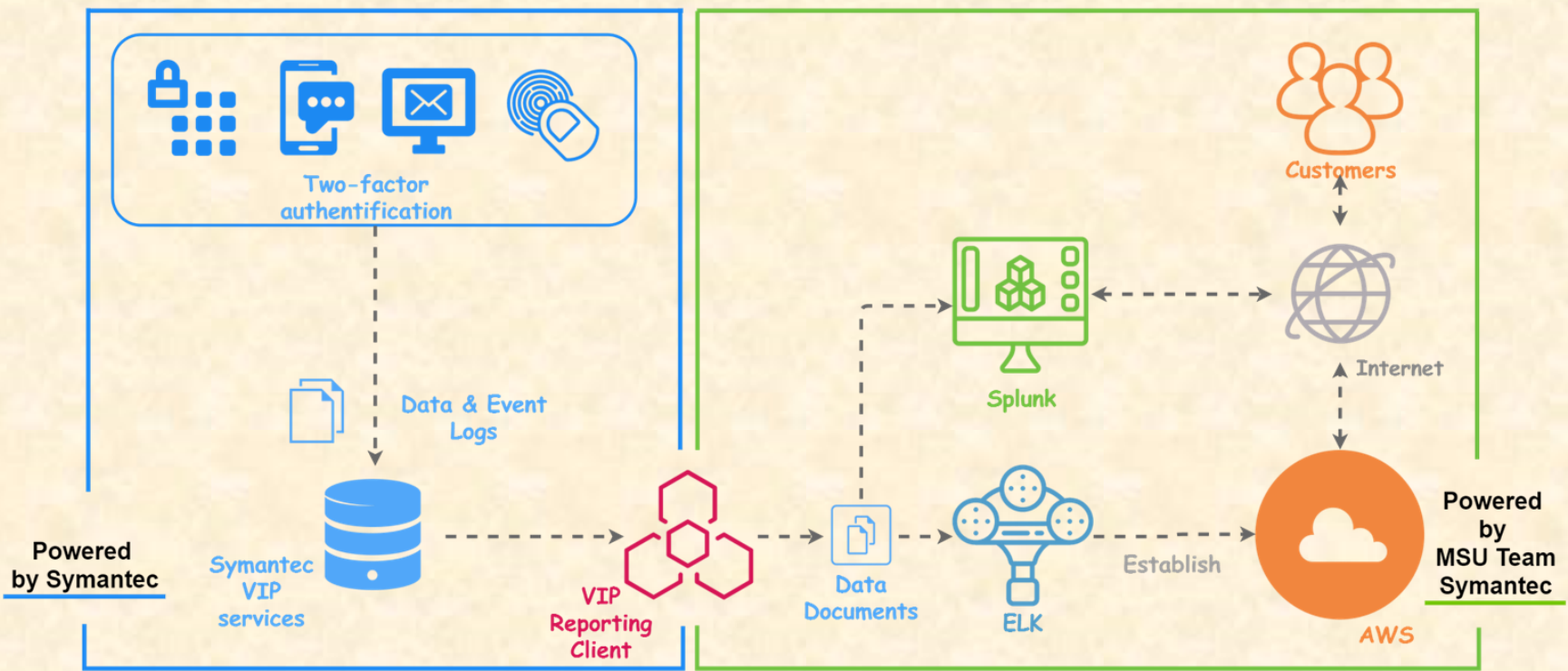
**Read this  
carefully.**



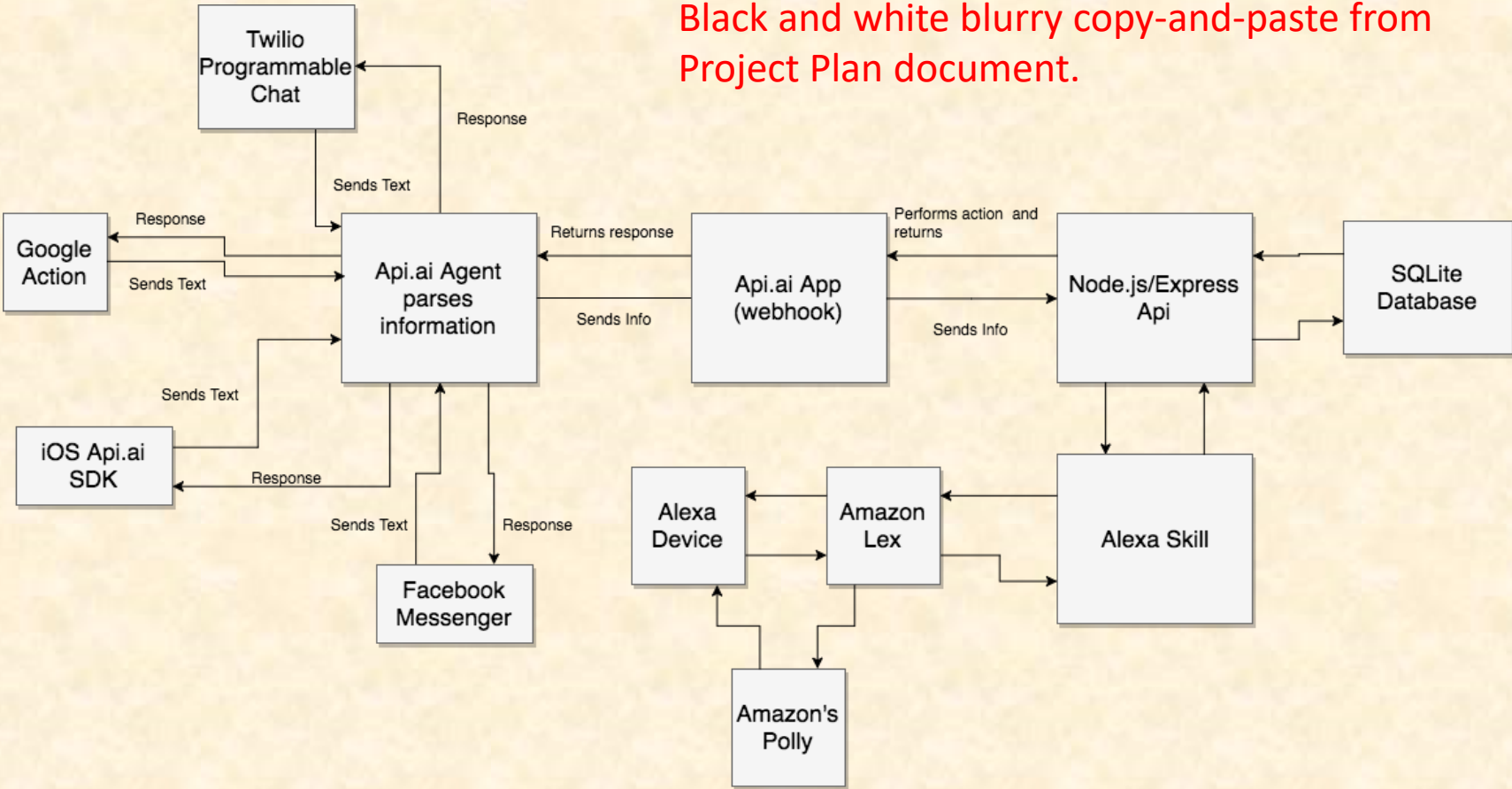
# System Architecture



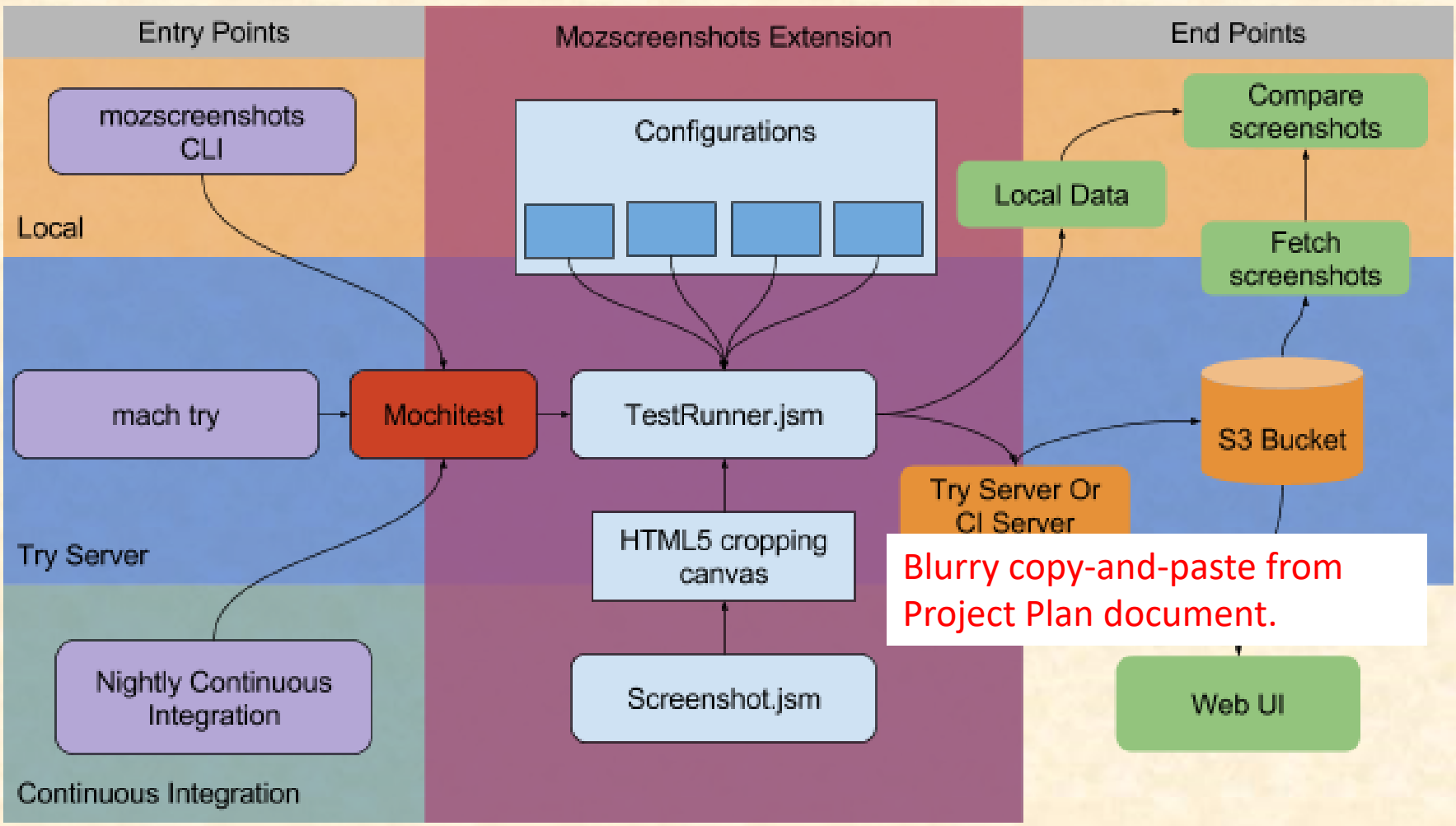
# System Architecture



# System Architecture



# 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.

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# Questions?

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