

MICHIGAN STATE

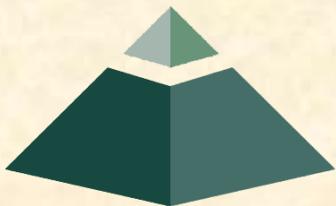
UNIVERSITY

09/05: Project Plan

The Capstone Experience

Dr. Wayne Dyksen
James Mariani

Department of Computer Science and Engineering
Michigan State University
Fall 2024



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

Project Plan

➤ 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
 - Improve Security of AWS
 - By Automatically Identifying Security Concerns
 - To Provide Peace of Mind to Customers
- Urban Science
 - Improve Profits of Car Dealers
 - With a Predictive Sales Platform
 - Built on an AI-powered Web Application
- Whirlpool
 - Improve Cooking Experience
 - By Tracking and Planning Recipes
 - Through an Immersive Mobile App
- **Take Note of What is Not Here x2**

Understandable
by End User



Functional Specifications Cont.

- Team Amazon:

- Functionality

- Improve the security of AWS



- Major Feature

- Automatically Identify Security Risks with AI



- Minor Feature

- Show Graphs on a Web Dashboard



Functional 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!**

Project Plan

✓ 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 Standalone Web Application
 - Follows Amazon Branding Standards
 - Breadcrumb Navigation
- Urban Science
 - Web Home Page Has Interactive Map
 - Visualizations and Graphs to Improve Information Sales
 - Full Information Shown in Modal Popup
 - Hamburger Menu Used for Site Navigation
- Whirlpool
 - Android and iOS Devices
 - Identical User Experience Across Platforms
 - Temperature Selection with Carousel View
- **Take Note of What is Not Here**

Mostly
Understandable
by End User

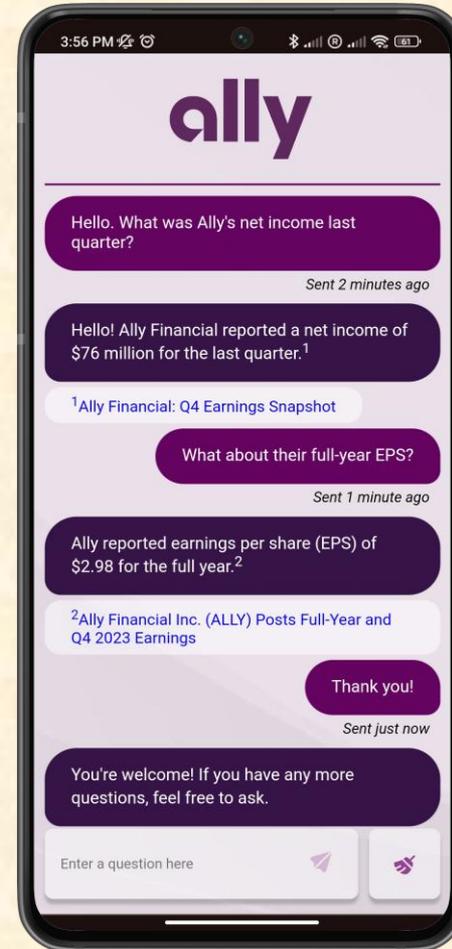


Screen Mockups

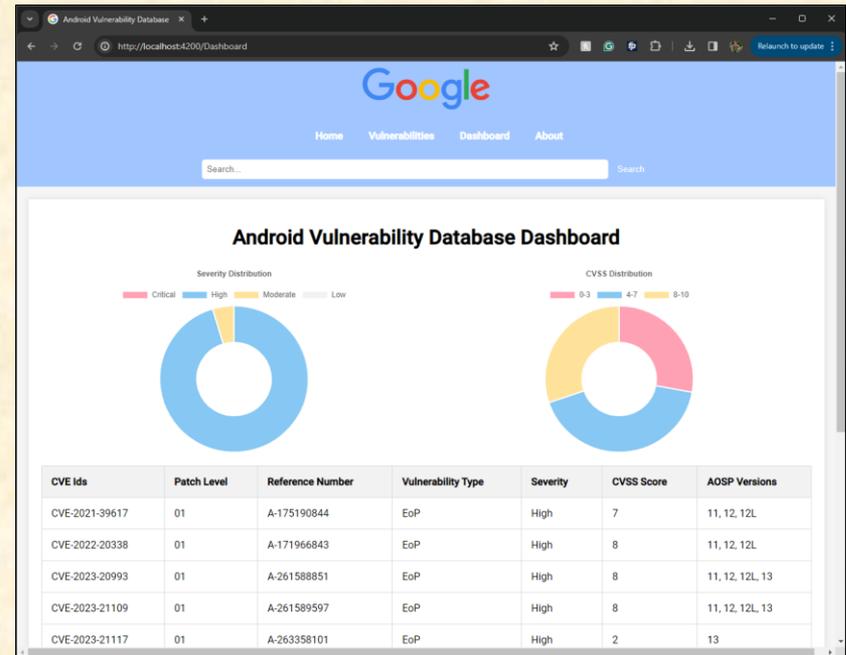
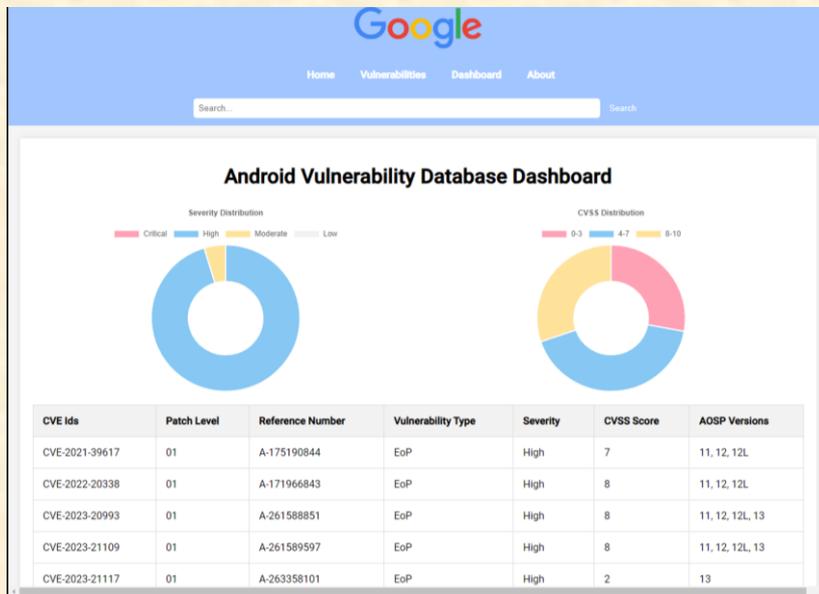
- User Interface Only
 - Shows Layout, Buttons, Pull-Downs, Etc...
 - Non-Functional
 - No Back End
- Helpful for Developing
 - Functional Specifications
 - Look-and-Feel
 - Use Cases
- Can Create with...
 - PowerPoint (Developer View)
 - Photoshop
 - Figma
 - Etc...
- Embed Mockups in Platform Frames
 - **Web Browsers** and Mobile Devices
 - Eliminate Shadows
 - See mockuphone.com
- NOT Screen Captures of Other Software



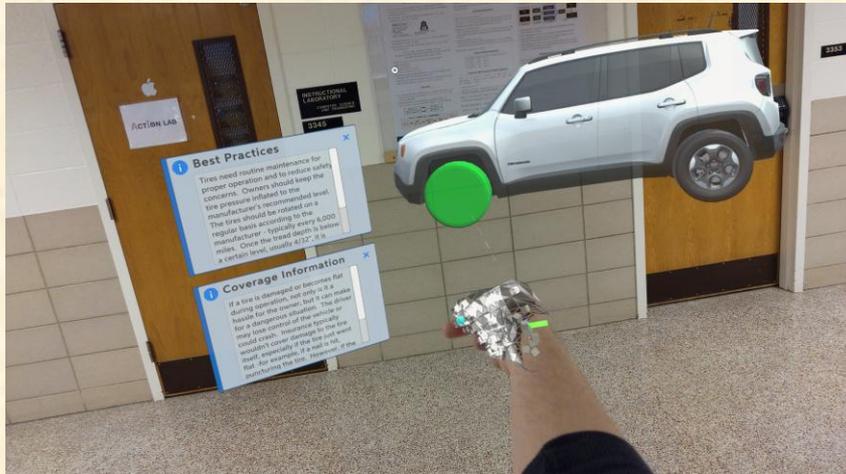
Embedded Mockup: Mobile App



Embedded Mockup: Web App



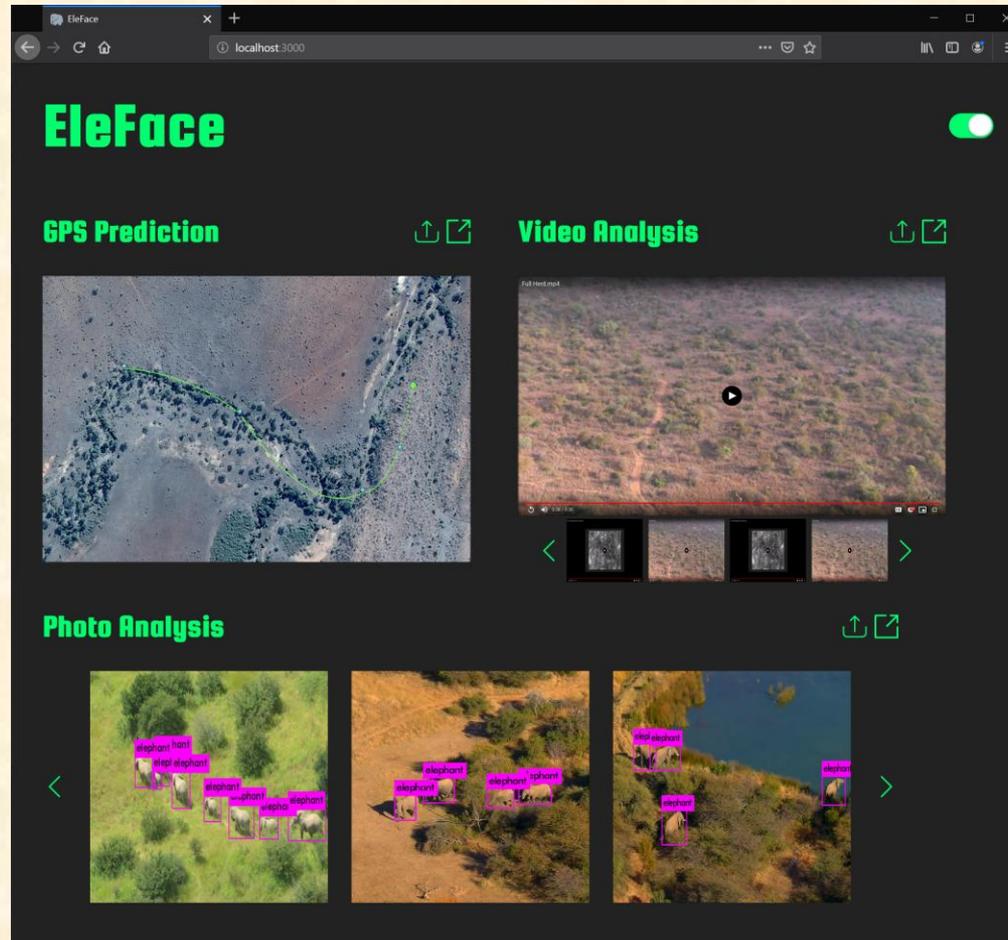
Non-Embedded AR/VR App



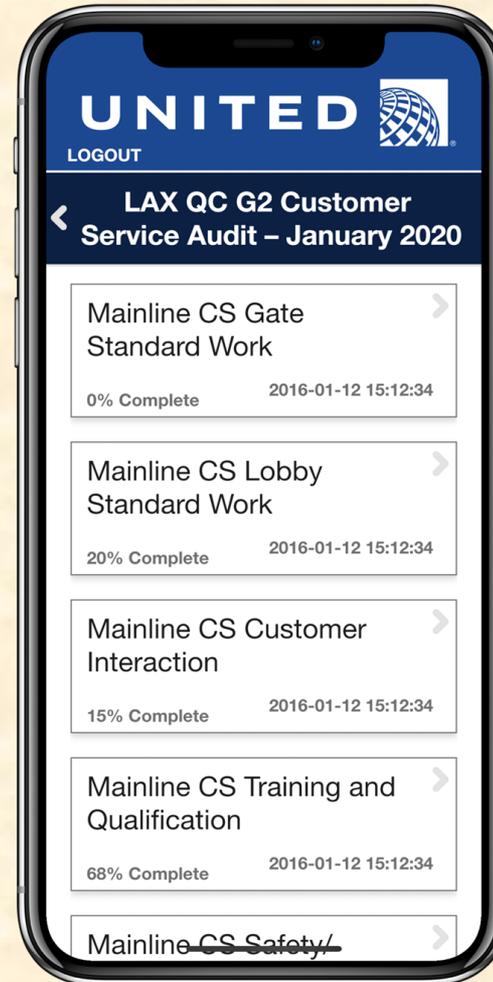
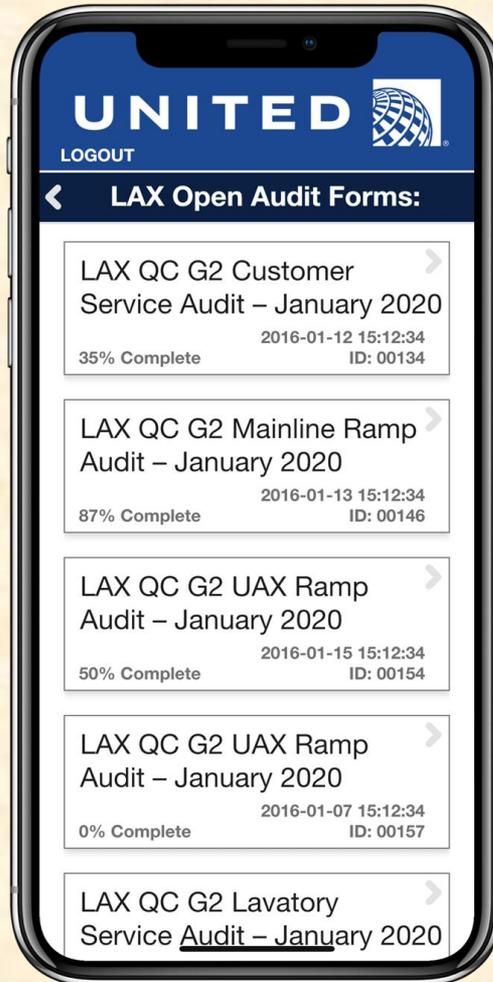
Screen Mockups

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

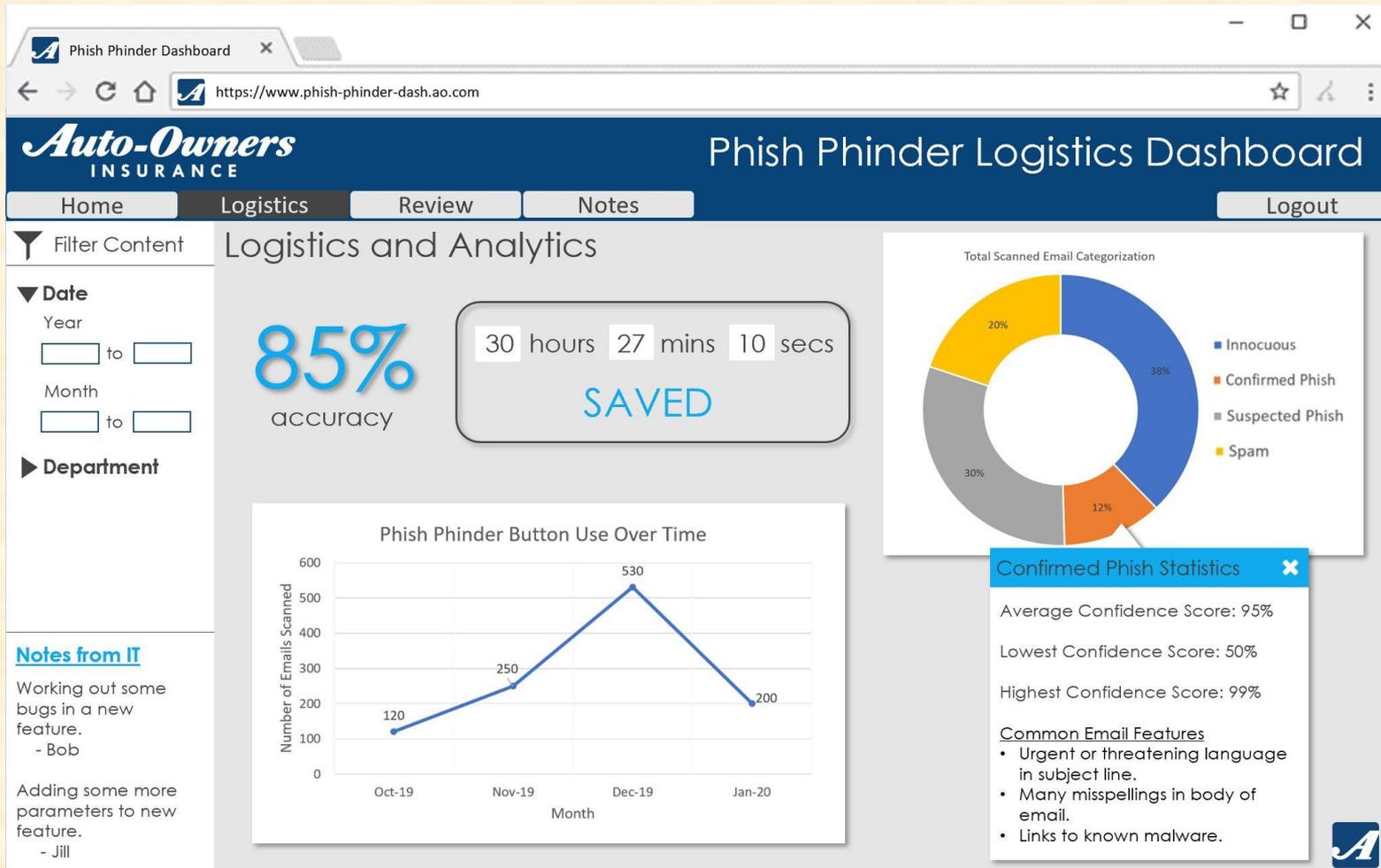
Screen Mockup Example



Screen Mockups Example



Screen Mockups Example



Design Specifications Interactions With Your Client

- Derived With/From Client
- Documented For Client
- Presented to Client
- 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



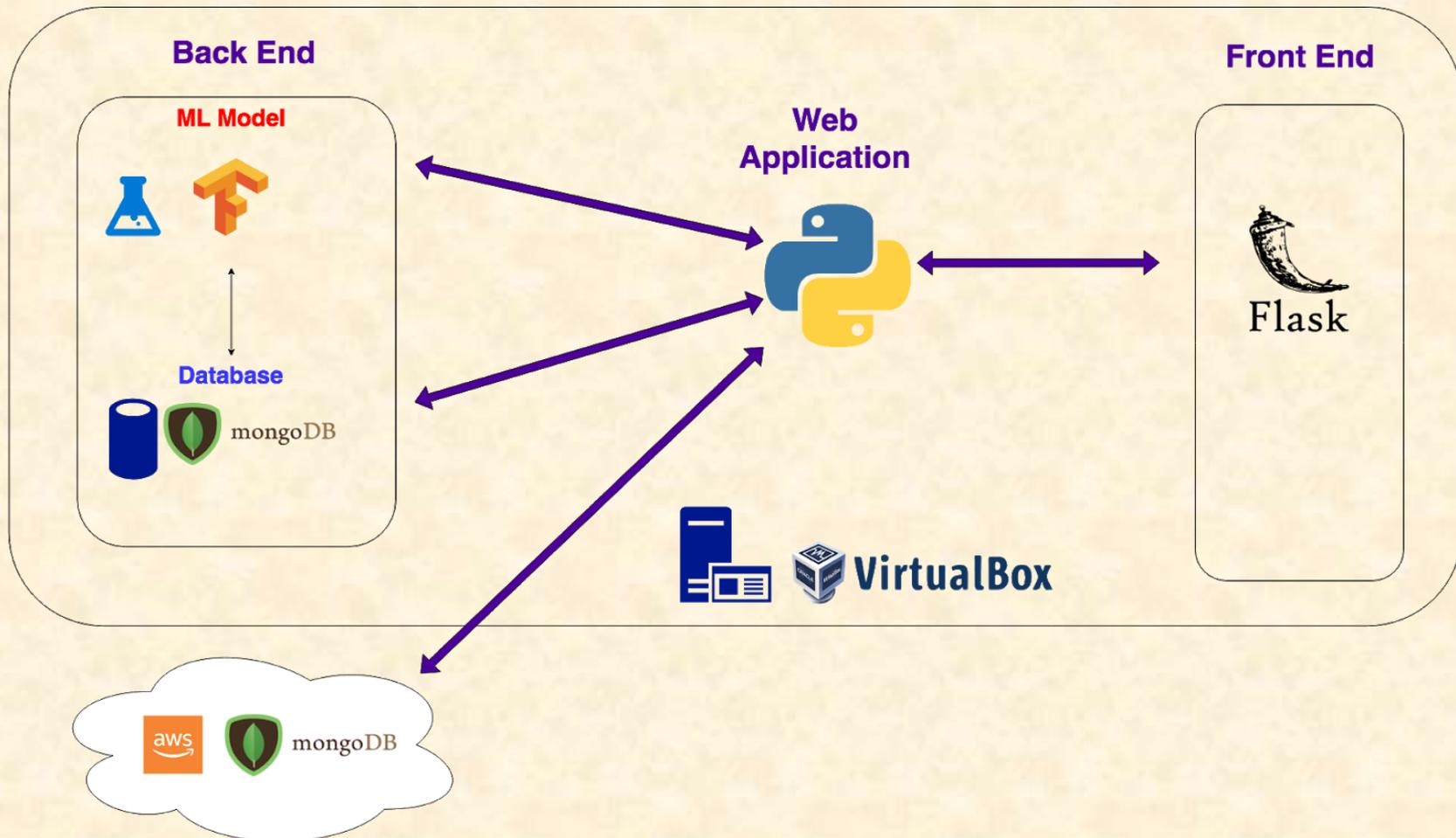
Technical Specifications Examples

- Amazon
 - AWS Cloud Platform
 - JavaScript Framework
 - Machine Learning
- TechSmith
 - Microsoft Azure
 - Angular
 - Ffmpeg
- Whirlpool
 - Python
 - Flutter
 - Deep Learning

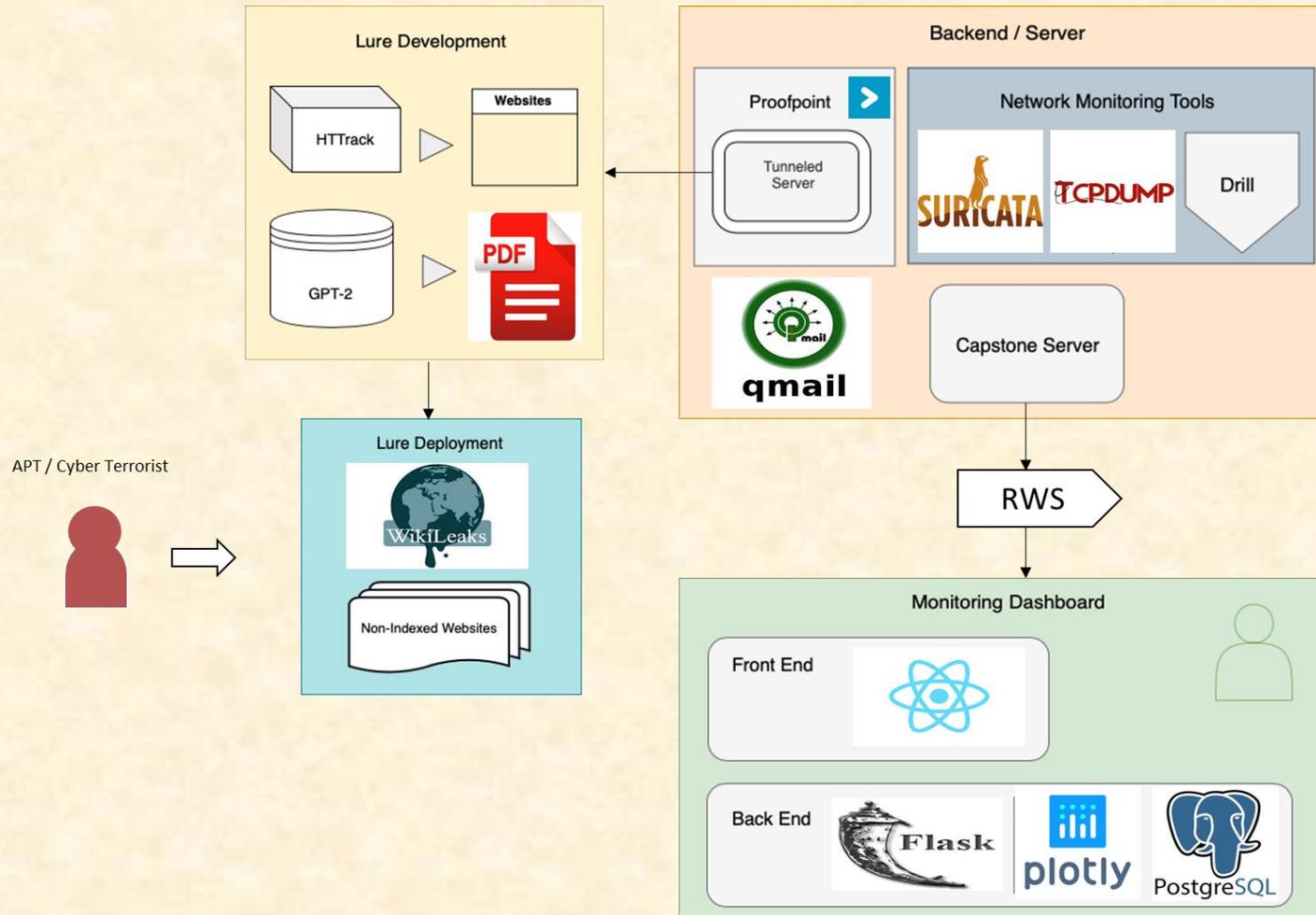
Probably Not
Understandable
by End User



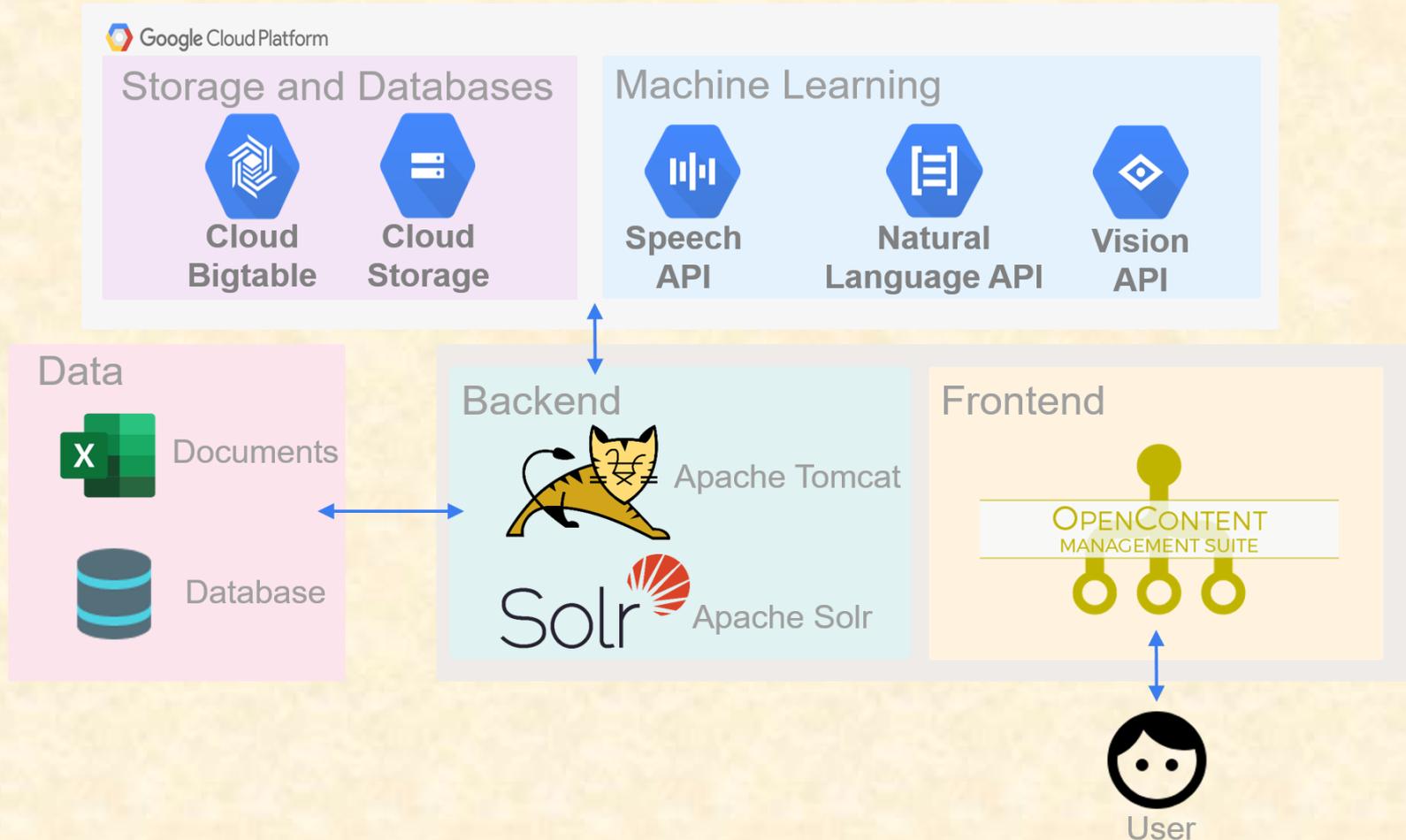
System Architecture Example



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

- Executive Summary (See Example Documents)
- 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
 - Project Sponsor
 - Team
 - TMs
- Schedules > Major Milestones
 - 09/17: Project Plan Presentations
 - 10/10: Alpha Presentations
 - 11/14: Beta Presentations
 - 12/01: Project Videos
 - 12/04 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 11 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, Monday, September 16th
 - ~1.5 Weeks
 - Slide Decks Submitted Through Teams
 - Documents Sent Directly to TMs
- Split-Hands Formal Presentations
 - September 17 – September 24
 - PowerPoint Template Provided
 - Email Instructors ASAP if Conflict



Resources on the Web

- Other Links > Downloads
Project Plan Examples
 - From the Last Academic Year
 - Will be uploaded to the downloads page
 - Use to create a skeleton and see some examples
- High Resolution Sponsor Logo
 - Link Sent by Dr. D
 - Folder project-sponsor-logos
 - High Resolution png With Transparent Background



Project Plan

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



Questions?

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Office 365 on Windows

- Optimal
 - Download Template
 - Edit Template Using Only Office 365 On Windows
 - The Version of Office on the Windows VM is Acceptable
- Possible
 - Download Template
 - Make Copy of Template
 - Edit Copy of Template Using Teams PowerPoint Editor
 - Edit Original Template Using Office 365 On Windows
 - Copy-and-Paste From Copy to Original Template
- DO NOT Use
 - Web Version of Office
 - Microsoft Team's Version of Office
 - Mac Version of Office
 - Mac Version of Office and Export to Windows Version



What's ahead?

[1 of 3]

- Upcoming Meetings

- ~~09/03, Tu: Risks and Prototypes~~

- ~~09/05, Th: Project Plan~~

- 09/10, Tu: Team Status Report Presentations

- 09/12, Th: Schedule and Teamwork (Luke)

- 09/20, Fr: Team Photos (10:00 a.m. – 4:00 p.m.)

- 09/17, Tu: Team Project Plan Presentations

- 09/19, Th: Team Project Plan Presentations

- 09/24, Th: Team Project Plan Presentations

10% of
Team Grade



What's ahead?

[2 of 3]

- Split-Hands Meetings
 - Used On Presentation Days
 - 09/10: Team Status Report Presentations
 - 09/17,19,24: Team Project Plan Presentations
 - Three Locations
 - Luke: 115 International Center
 - Griffin: 1281 Anthony
 - Sam: 1130 STEM
 - Find the rooms in advance.
 - Attendance Taken As Usual Including Lateness



What's ahead?

[3 of 3]

- 09/10: Team Status Report Presentations
 - Less Than a Week From Today ←Note
 - Split-Hands Meeting
 - Slide Deck Template Posted on Downloads Page
 - **Must Use Windows Version of Office 365** ←Note
 - Read Submission Instructions Carefully
 - Due by 11:59 p.m. ET, Monday, 09/09
 - Upload Two Times to Microsoft Teams
 - To General Channel File Space
Folder “Team Status Report Presentation Slide Decks”
 - To Capstone Team’s Private Channel
 - Aggregated Slide Decks by TM
 - On TM’s Laptop Used by All Teams
 - One or More Presenters Per Team
 - Random Order



Misc. Notes

- Talk With your TM About Adapters for Presentations
 - We Will Order Any Adapters That You Might Need
- Please Remember That Photos Will Be Posted On The Capstone Website

Misc. Notes – Photo Schedule

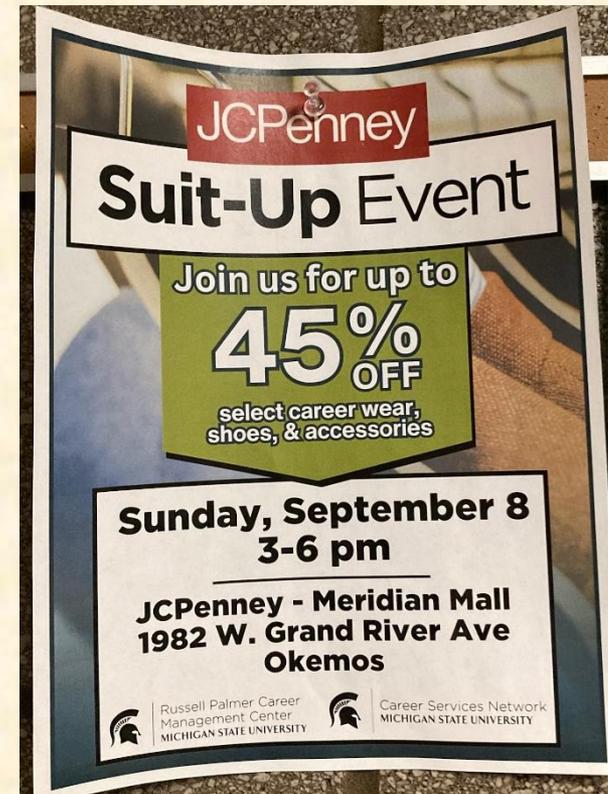
Time	Team
10:00	Whirlpool
10:10	Launch
10:20	Magna VNNG
10:30	Amazon
10:40	Magna TDD4ES
10:50	Urban Science
11:00	DRIVEN-4
11:10	Stryker IST
11:20	MSU CSE
11:30	Union Pacific
11:40	Kohl's
11:50	Volkswagen
12:00	RPM
12:10	Roosevelt Innovations
12:20	GM RIS
12:30	BREAK
12:40	BREAK
12:50	BREAK
1:00	BREAK

12:30	BREAK
12:40	BREAK
12:50	BREAK
1:00	BREAK
1:10	Anthropocene Institute
1:20	Meijer
1:30	Magna MADO
1:40	Ally
1:50	MSUFCU
2:00	Magna WFG4ADAS
2:10	Auto-Owners
2:20	TechSmith
2:30	GM WHMS
2:40	Henry Ford RSVP
2:50	Vectra
3:00	Henry Ford RSE
3:10	WK Kellogg's Co
3:20	AbbVie
3:30	HAP



Misc. Notes – Business Dress

- Sunday, September 8th
- Sale on Business and Business Casual Dress at JCPenny at Meridian Mall
 - 3pm-6pm



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 4) and on budget (\$0).
- The time limit for your presentation is 12 minutes, which will be strictly enforced. Practice your presentation to ensure that you will finish within the allotted time.
- Each team will present using their own laptop. You will be provided with a wireless presenter. Ask your TM for adapters to connect the laptop that you will be using to the audio/visual equipment in your presentation room. Test in advance in the room in which you will presenting with the laptop that your team will be using.
- We will meet in “split-hands” meetings. Luke’s teams will meet in 115 International Center, Griffin’s teams will meet in 1281 Anthony, and Sam’s teams will meet in 1130 STEM.
- All team members of the presenting teams are required to dress business casual on the day of their presentation. Business casual does not include jeans, 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, Tuesday, September 17.
- The presentation schedule will be posted on our [Weekly Schedule](#) page in the evening of Monday, September 16.



READ ME

[2 of 2]

- **Creating and Editing**

- Read and follow the instructions in “Editing Documents and Presentations Using Office 365” of our [course syllabus](#).
- 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., Monday, September 16.
- 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-kohls-project-plan-presentation.pptx” and “team-wk-kellogg-co-project-plan-presentation.pptx”. Set File Explorer or Finder to show all file extensions to ensure that there are no blanks before the “.pptx” extension as in “team-amazon .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., Monday, September 16. 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., Monday, September 16. 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.



MICHIGAN STATE
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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]

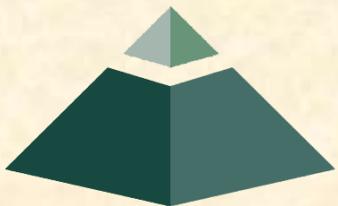
[Team Member 4 16pt]

[Team Member 5 16pt]

[Team Member 6 16pt]

Department of Computer Science and Engineering
Michigan State University

Fall 2024



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

Project Sponsor Overview

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

Describe your project sponsor in 60 seconds or less

Add some interesting artwork about your sponsor. Look on your sponsor's website.

Delete this textbox.



Project 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.



Project 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>.
- Do not submit screen mockups with platform frames that have shadows. If you start with a platform frame with a shadow, remove the shadow with software like paint.net or Adobe photoshop.



Screen Mockups: Web Interface

The screenshot shows a web dashboard for 'APTIV' with a user profile for 'Josh M. Cybersecurity Engineer'. The main content area is titled 'V2X FCA' and shows a 'Project Status: Finalized' with a progress bar containing steps: Project Registration, TARA, Mitigation Remediation, Vulnerability Assessment, Penetration Assessment, Final Approval, and 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)

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

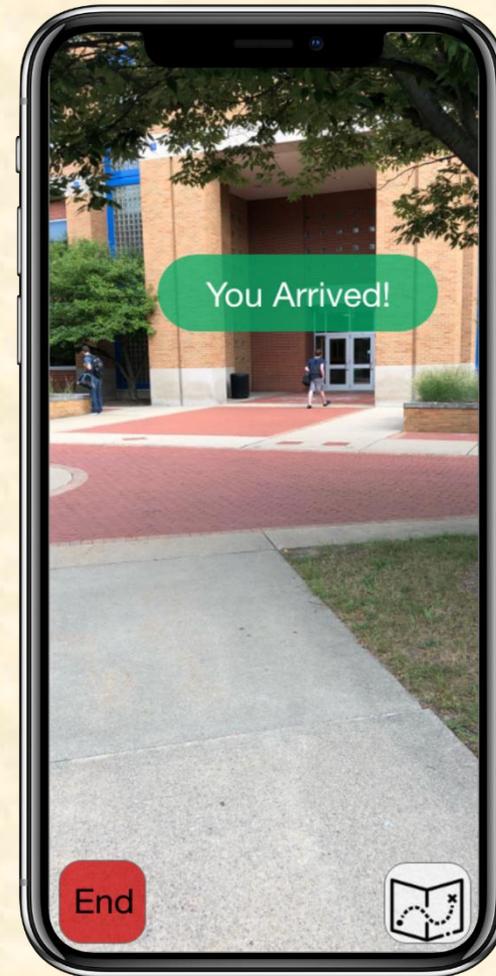
[View all tasks](#)

Project Modules: Project Information, TARA, Mitigation Remediation, Vulnerability Assessment, Penetration Assessment, Final Approval.

Task Status: Donut chart showing: Resolved (35%), Closed (45%), In Progress (12%), New (8%).

Pending Requests: No current Pending Requests.

Screen Mockup: iOS Application



Project Technical Specifications

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

List the technical components of your project.

Delete this textbox.



Project 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.



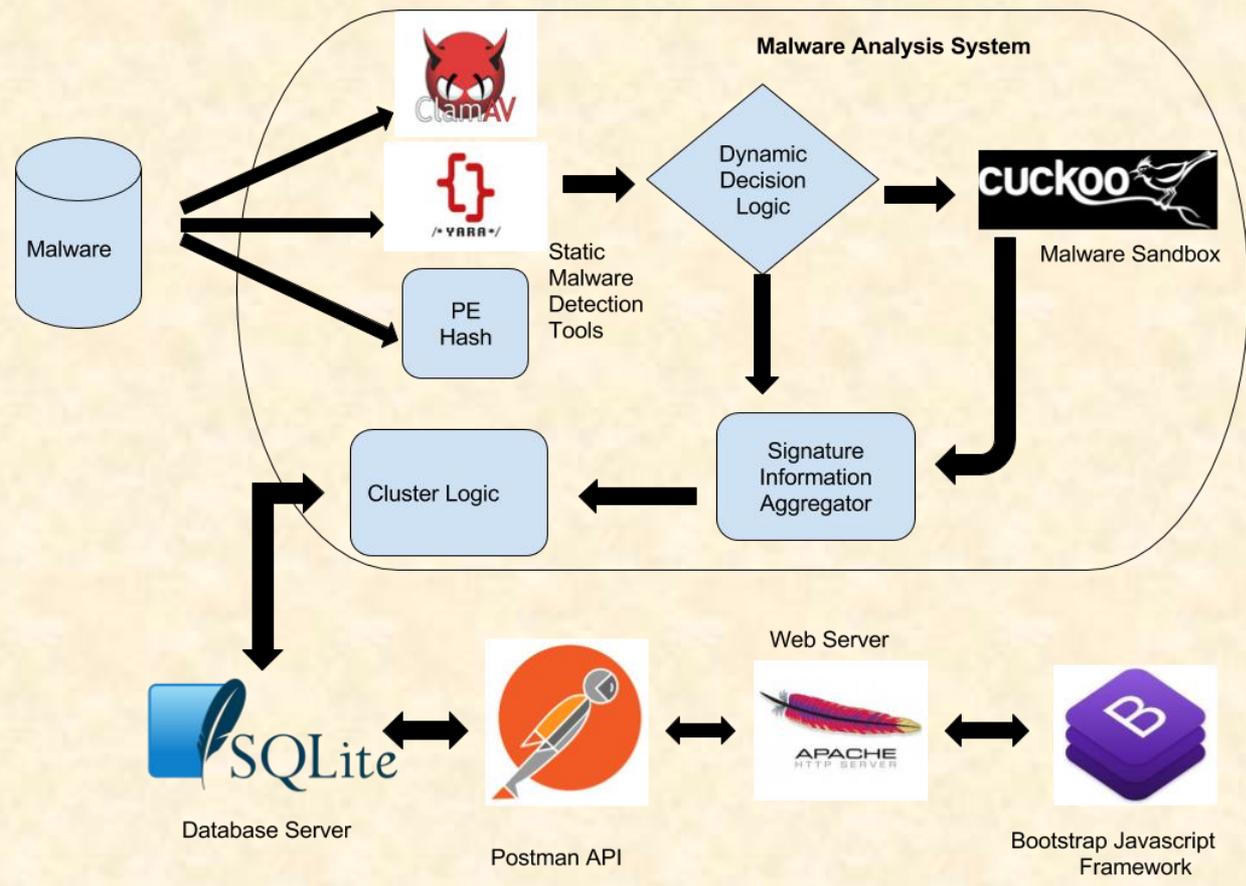
System Architecture Slide Notes

- 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.
 - 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).

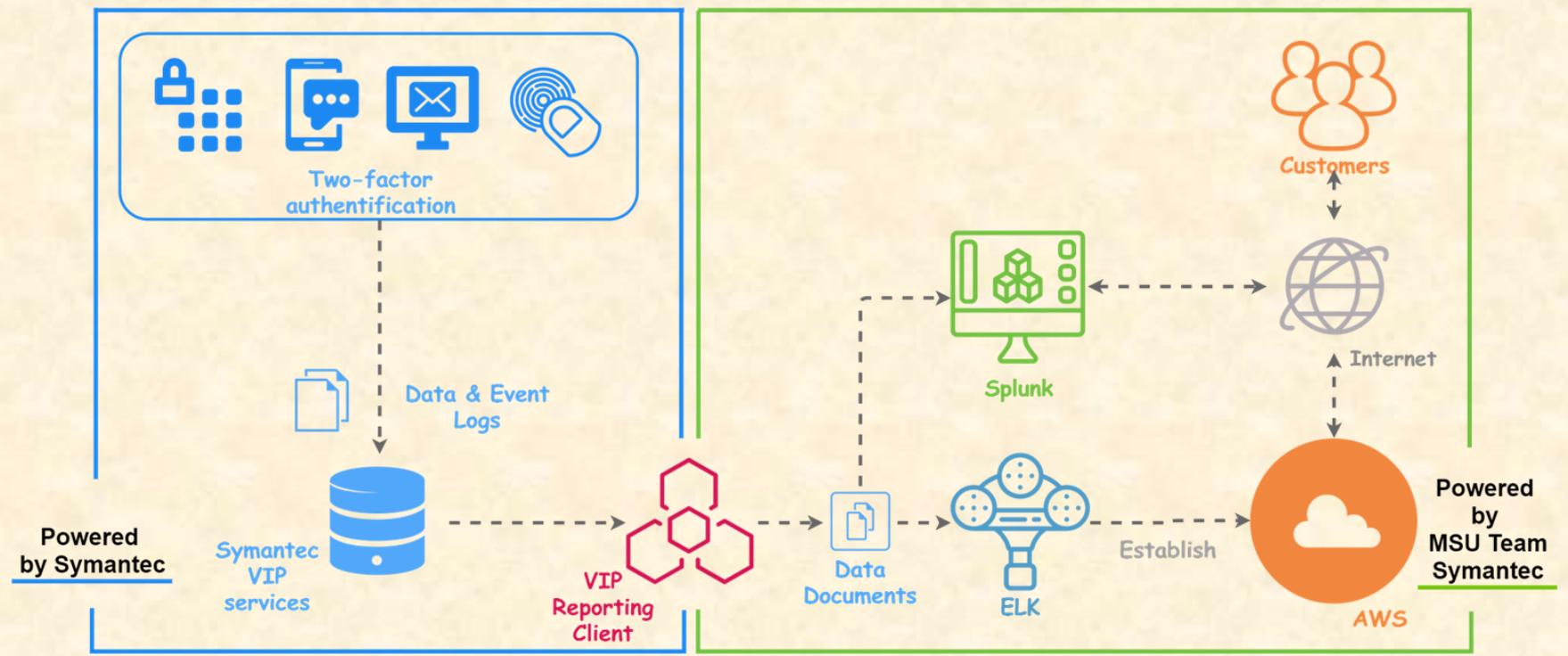
**Read this
carefully.**



System Architecture Slide Notes

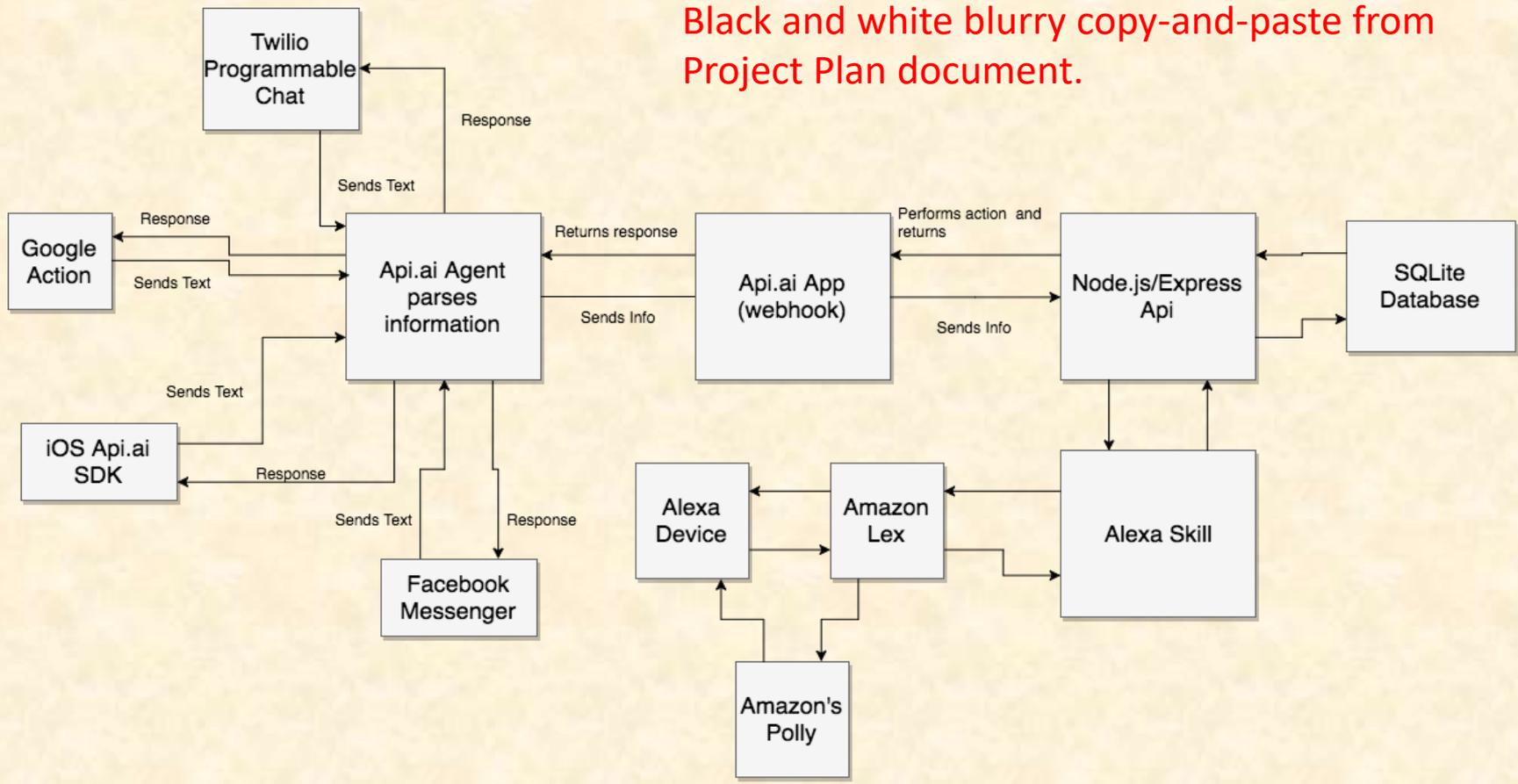


System Architecture Slide Notes

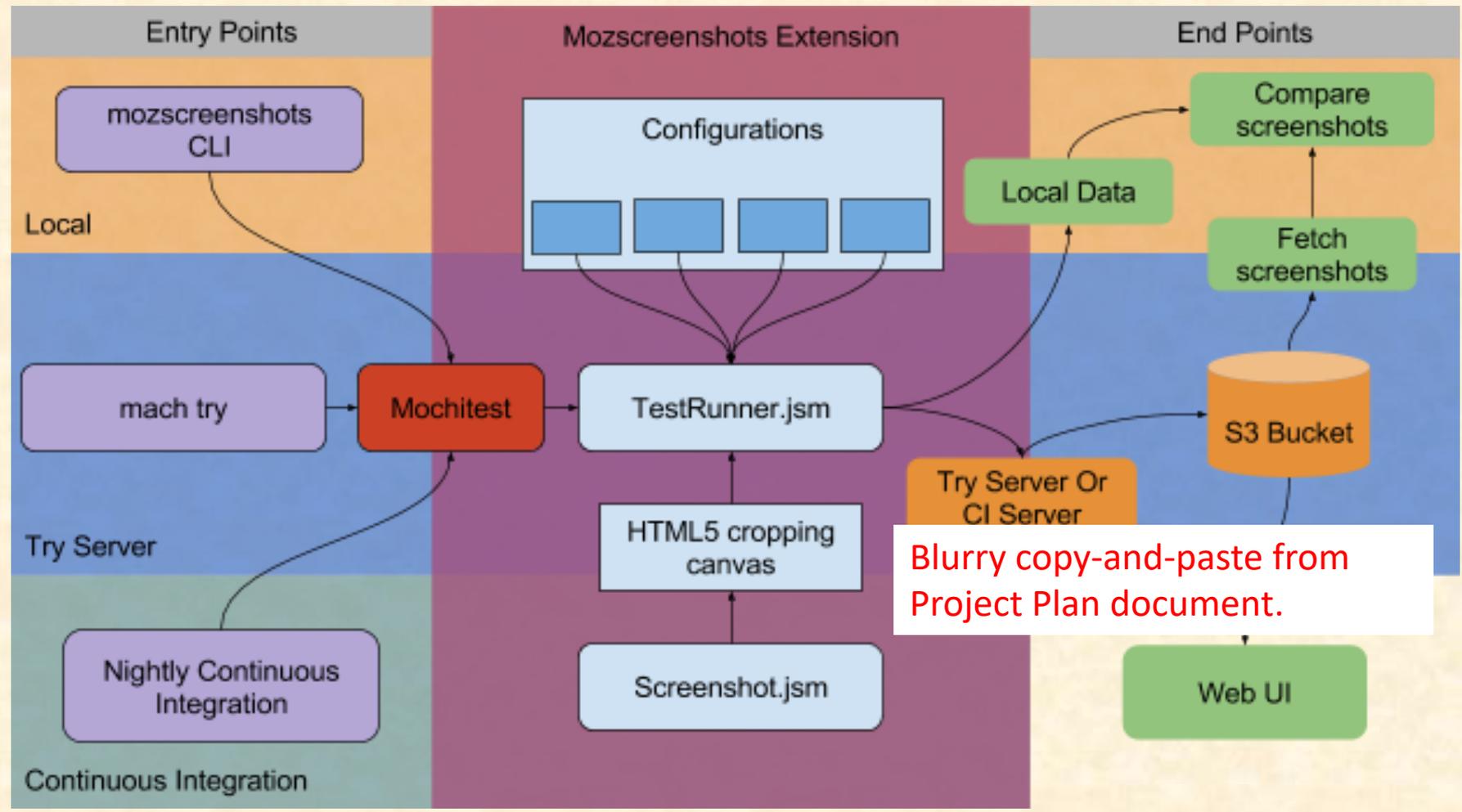


System Architecture Slide Notes

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



System Architecture Slide Notes



Blurry copy-and-paste from Project Plan document.



Project 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...



Project Risks

Do NOT modify the title of this slide in any way.
List your project risks on this one slide in bullet points.

Delete this textbox.

- 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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