

MICHIGAN STATE

U N I V E R S I T Y

01/09: Project Plan

The Capstone Experience

Dr. Wayne Dyksen
Department of Computer Science and Engineering
Michigan State University
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*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?
- Includes
 - List of Objectives
 - Use Cases
- Not Necessarily Complete
- Understandable by End User
- Initial Problem Statement
- Usually Refined



Functional Specifications Examples

- Amazon
 - Simplify Dataset Acquisition
 - Reduce Repetitiveness of Data Acquisition
 - Enable Faster Model Development
 - Ford
 - Improve the "Owner's Manual Experience"
 - Using Augmented Reality Mobile Application
 - Learning A-Z
 - Teach Kids the Parts of Speech
 - Of Different Words
 - Using a Web & Mobile Game
- Understandable
by End User



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

- Bosch
 - Process Recorded Video Data
 - Automatically Label Target Objects
 - “Target Object Present”
 - “Host Vehicle Changing Lanes”
 - “Target Object Cutting into Host Lane”
 - Develop User-Friendly Front-End
- Evolutio
 - Alert Rangers of Threats in Real Time
 - Process any Video Codec in Real Time
 - Develop Modular APIs
 - Leverage Existing Libraries and Technology Stacks
- United Airlines Safety
 - Develop Mobile and VR Headset Applications
 - Implement Many Aircraft and Defect Types
 - Provide Many Use Scenarios for Training
 - Users Can Move Around the Plane and Mark Defects
 - Create an Instructor Portal to Manage Simulations

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?

Login Page

User Id

Password

Remember Me

Submit

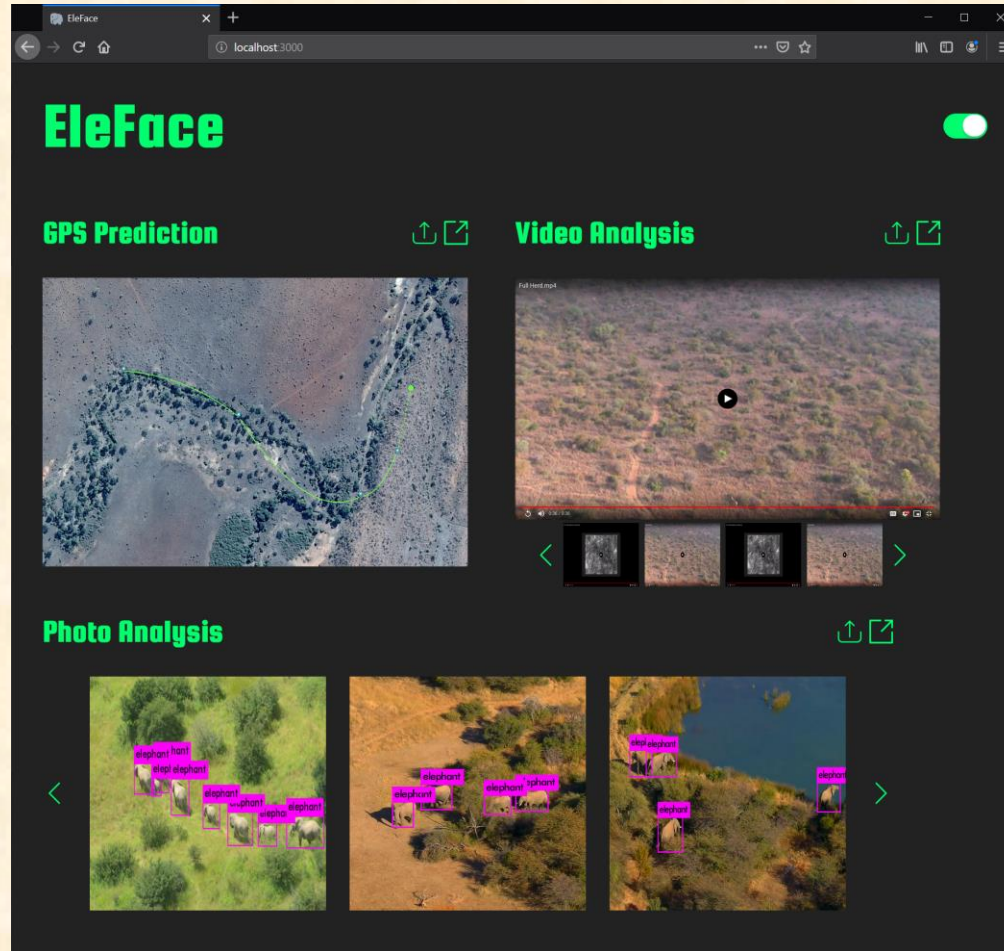


Landing Page

Welcome to Our App

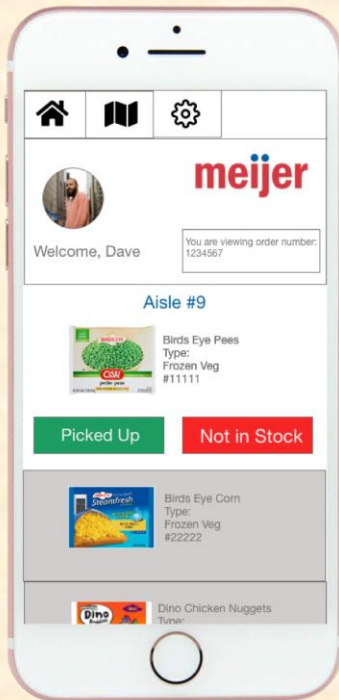


Screen Mockup Example

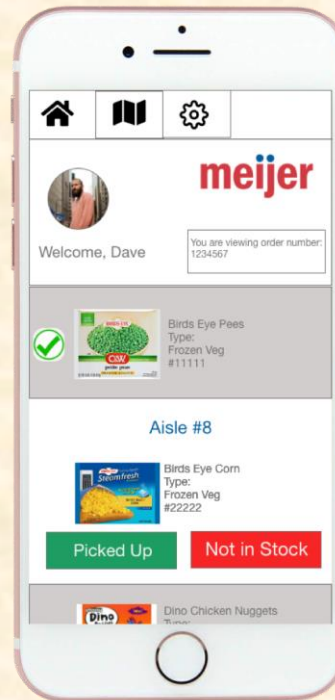


Screen Mockups Example

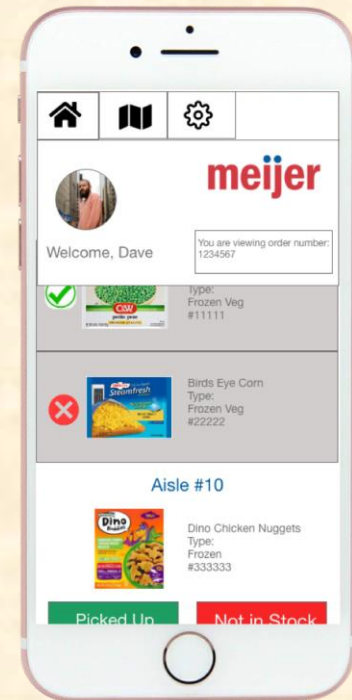
1



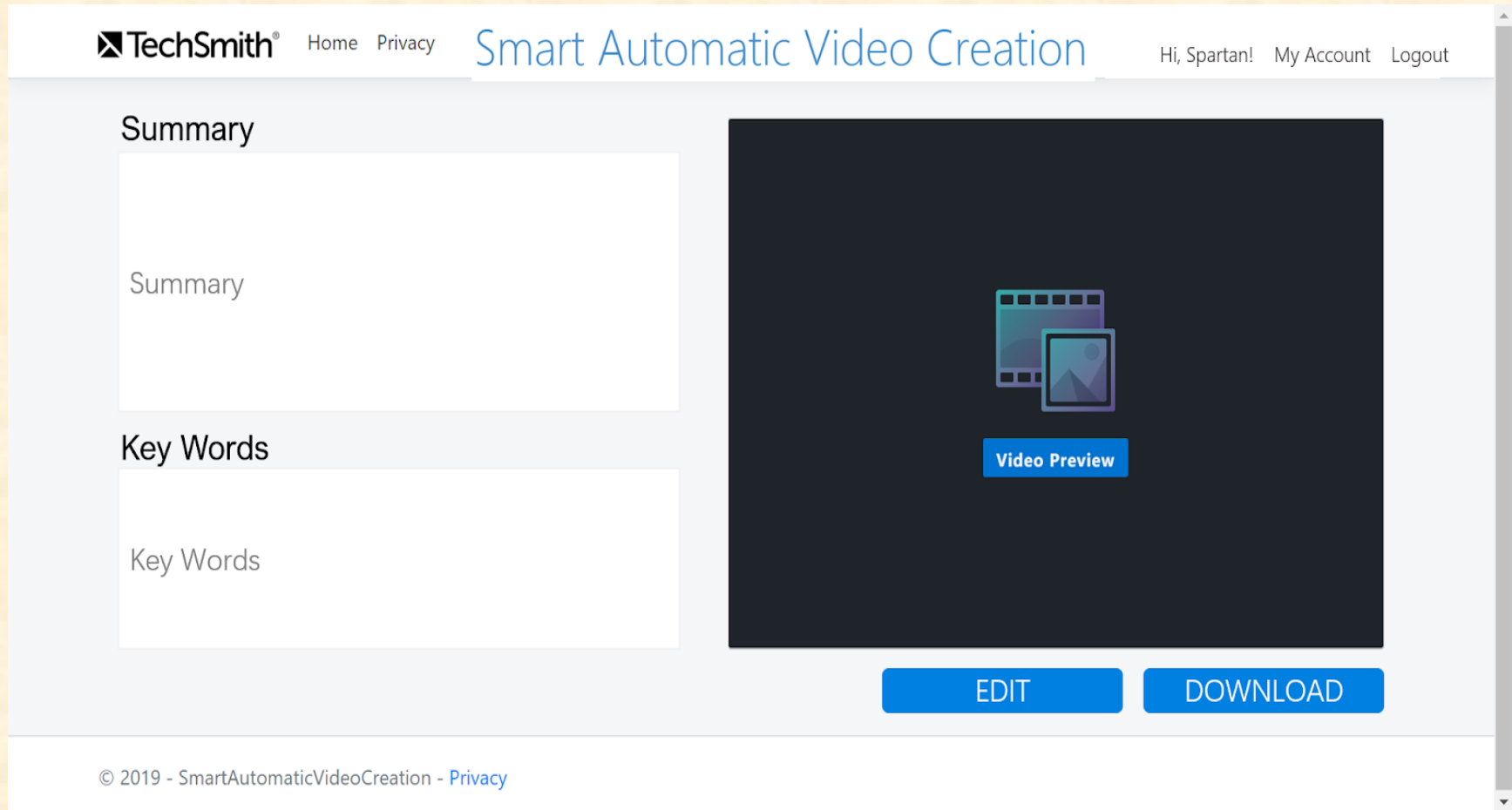
2



3



Screen Mockups Example



Design Specifications Interactions With Your Client

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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



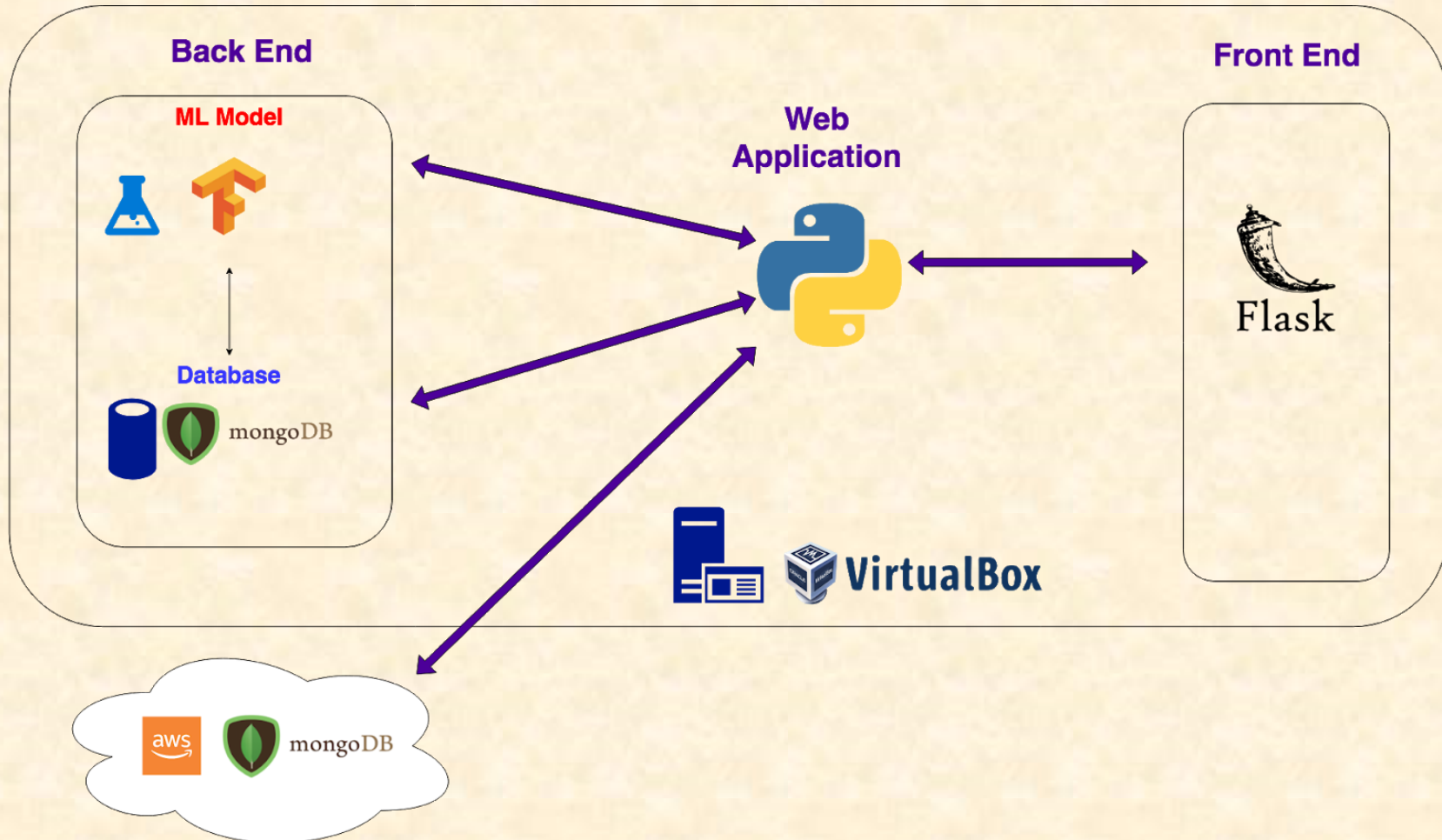
Technical Specifications Examples

- Herman Miller
 - Apple iOS / Swift
 - Android / Kotlin
 - Python
 - Machine Learning (TensorFlow)
 - Natural Language Processing (NLTK / Natural Language Toolkit)
 - Google Charts API
 - Amazon Web Services
- Mozilla / Firefox
 - JavaScript
 - HTML
 - C++
 - Mercurial
 - Windows / Mac / Linux / Android
- Place Technology
 - HTML / CSS / JavaScript
 - Salesforce Lightning and Apex
 - Amazon Web Services or Heroku
 - MEAN Stack
 - ELK Stack

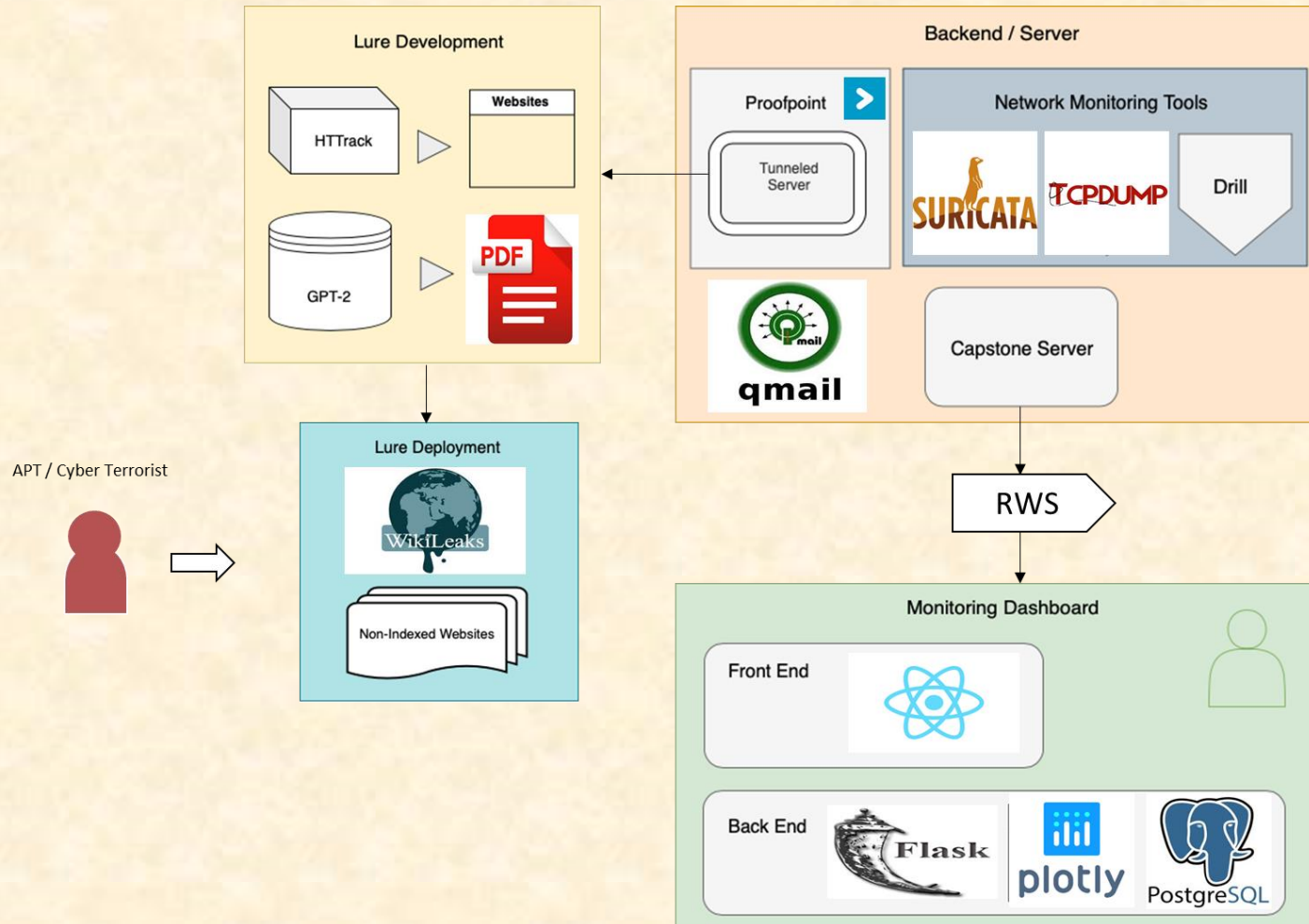
Probably Not
Understandable
by End User



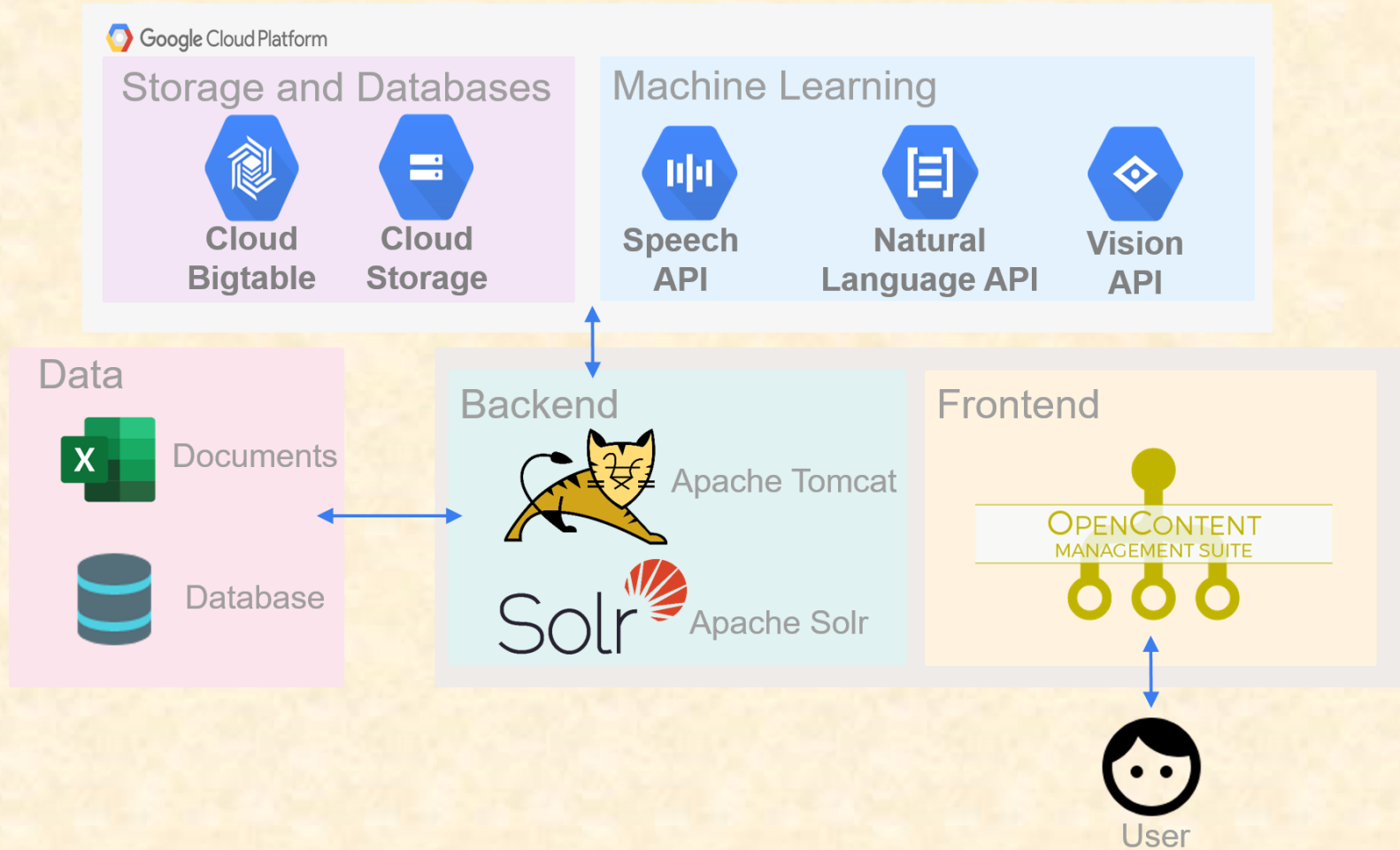
System Architecture Example



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
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Cannot be emphasized enough!

Project Plan Summary

- 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
 - 01/16: Status Report Presentations
 - 01/28: Project Plan Presentations
 - 02/18: Alpha Presentations
 - 03/31: Beta Presentations
 - 04/21: Project Videos
 - 04/23: All Deliverables
 - 04/23: Design Day Setup
 - 04/24: Design Day
 - 04/30: Project Videos
 - 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

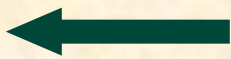
Client May Specify...

- 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., Monday, January 27
 - ~ 2.5 Weeks
- In Class Formal Presentations  Get on it, now!
 - January 28 – February 6
 - PowerPoint Template Provided



Resources on the Web

- Other Links > Downloads

Project Plan Examples

- Fall 2018

- Team Herman Miller
- Team Proofpoint

- Fall 2019

- Team Technology Services Group
- Team United Airlines

- High Resolution Sponsor Logo

www.capstone.cse.msu.edu/2020-01/projects/<sponsor>/images/originals/sponsor-logo.png

<http://www.capstone.cse.msu.edu/2020-01/projects/auto-owners/images/originals/sponsor-logo.png>



Project Plan

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



What's ahead?

[1 of 3]

- Team Photos

- Friday, January 17, 9:00 a.m. – 1:00 p.m.
- Dress code is business casual.
- TAs will make schedule.

- Setup

- Team Machines

- Dell Server If Needed (Ask TAs)
- Apple iMacs (with Windows 10 VM)

- Team Software

- Microsoft Office
 - ❖ Word and PowerPoint
 - ❖ Microsoft Windows Version ← **Required. Use Windows 10 VM.**
- Web Server
- Code Repository
- SDK's
- Etc.



What's ahead?

[2 of 3]

- All-Hands Meetings
 - ~~01/07: Capstone Overview~~
 - ~~01/09: Project Plan~~
 - 01/14: Risks and Prototypes
 - 01/16: Team Status Report Presentations
 - 01/21: Schedule and Teamwork
 - 01/23: Team Status Report Presentations
 - 01/28: Team Project Plan Presentations
 - 01/30: Team Project Plan Presentations
 - 02/04: Team Project Plan Presentations
 - 02/06: Team Project Plan Presentations



What's ahead?

[3 of 3]

- Team Status Report Presentations
 - [PowerPoint Template](#)
 - Due 11:59 p.m., Wednesday, January 15
< One Week
 - Email to Dr. D.
 - Subject: Team [Team Name]: Status Report Presentation
Subject: Team Auto-Owners: Status Report Presentation
 - Attachment: team-[team-name]-status-report-presentation.pptx
Attachment: team-urban-science-status-report-presentation.pptx
- Dr. D. Will Combine Into Single PowerPoint
 - To Speed Things Up During Meeting
 - Do NOT Modify Master Slide
 - Must Use Windows Version of Microsoft Office
- Each Team Presents
 - Using TA's Laptop
 - At Most 4.5 Minutes (Rehearse Timing)
 - Single or Multiple Presenters (Your Choice)
- Split All-Hands Meetings
 - Ryan's Teams, Anthony 1297
 - James' Teams, Anthony 1300

← Get on it now!



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U N I V E R S I T Y

Status Report Presentation

Team [Team Name]

The Capstone Experience

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Status Report Instructions

- Use the Microsoft Windows version of PowerPoint.
- Required Template
 - Do not edit the master slides.
 - Do not change the organization or number of slides.
 - Make your presentation fit within these four slides.
- Content
 - For the slide titles, replace [Team Name] with your company name as in “Team Auto-Owners” and [Project Title] by the project title posted online.
 - All presentations will be posted on the course web site so do not include company confidential information or anything that your client would not want posted.
 - Delete this slide from the presentation.
- Presenting
 - The order of the presentations during our meeting will be team numerical order.
 - The time limit for your presentation is 4.5 minutes, which will be strictly enforced. Practice your presentation to ensure that you will finish within the allotted time.
- Submission by Email ← **Read this carefully.**
 - All presentations are due via email to me and to your client by 11:59 p.m., Wednesday, January 15. Send your presentation to your client in a separate email; do not cc me.
 - For subject, use “Team [Team Name]: Status Report Presentation” as in “Team Urban Science: Status Report Presentation”.
 - Attach the PowerPoint source file named “team-[team-name]-status-report-presentation.pptx” as in team-auto-owners-status-report-presentation.pptx. Use all lower case and replace blanks by dashes in your filename.
 - Include some (professional) text in the body to avoid being sent to my junk folder and to practice being a professional.



Team [Team Name]

Status Report

[1 of 4]

[Project Title]

- Project Overview

- Description Point 1
- Description Point 2
- Description Point 3
- Description Point 4

Status Information:

Think clicking “Status” on an Amazon order.

- You bought this on January 7. Helpful?
- We’re going to send this to you. Satisfied?
- People who bought this also bought.... We good?

Where the \$*(%(\$* is my order?

Delete this textbox.

- Project Plan Document

- Status Point 1
- Status Point 2
- Status Point 3
- Status Point 4

Include status information.

What’s the status of your project plan document?

Have you started it?

How much have you written?

What percentage complete is it?

Delete this textbox and the brace to the left.



Team [Team Name]

Status Report

[2 of 4]

[Project Title]

- Server Systems / Software
 - Description & Status Point 1
 - Description & Status Point 2
 - Description & Status Point 3
- Development Systems / Software
 - Description & Status Point 1
 - Description & Status Point 2
 - Description & Status Point 3

Include status information.
Are all systems up and running?
Have you tested everything?
**Delete this textbox and the
brace to the left.**



Team [Team Name]

Status Report

[3 of 4]

[Project Title]

- Client Contact

- Status Point 1
- Status Point 2

- Team Meetings

- Status Point 1
- Status Point 2

- Team Organization

- Description Point 1
- Description Point 2

Include status information.

Have you talked with/met with your client?

Have you scheduled a weekly conference call? When?

Have you scheduled an in-person meeting? When?

How many times has your team met so far?

Have you scheduled team meetings? How often?

Delete this textbox and the brace to the left.



Team [Team Name]

Status Report

[4 of 4]

[Project Title]

Risks

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

List only “real” risks. For example, learning a new computer languages is **not** a risk.

Give “useful” explanation of how you are going to mitigate each risk. For example, “we will learn how to do it” is **not** a useful explanation.

Delete this textbox.

