

MICHIGAN STATE

U N I V E R S I T Y

01/14: Project Plan

The Capstone Experience

Dr. Wayne Dyksen
Department of Computer Science and Engineering
Michigan State University
Spring 2015



*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 the problem?
 - What’s your solution?
- Short List of Features
- Not Necessarily Complete
- Understandable by End User
- Initial Problem Statement
- Usually Refined



Functional Specifications

- Amazon
 - Unlock Value of Amazon's Seller Forums Boards
 - 65,000 Questions Per Year
 - 2,100,000 Replies Per Year
 - By Identifying and Classifying Conversations
- Boeing
 - Transform Boeing Business Developer's Business Processes
 - From Multiple Paper-Based Systems to Unified Tablet-Based System
 - Like Pilot's Electronic Flight Bag
- MSUFCU
 - Educate MSU Students
 - On Personal Financial Matters
 - Using Web Technologies

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

- How does a user use it?
How does it look and feel?
- Includes
 - Business Process Flow
 - 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

- Amazon
 - Provide Searchable Breakdown of Topics by Day or Week
 - Track Volume of Topics and Identify Trends
 - Send Alerts When Specific Topic Volume Spikes
 - Visualize Forum Volume by Topics and Terms Over Time
- Meijer
 - Lookup Product Via Barcode
 - Determine Product Availability At
 - Local Store (Other Shelves, Backroom, Truck)
 - Other Stores Nearby
 - Distribution Centers
 - Provide Visual Feedback to Meijer Associate
 - Track Location of Meijer Associate in Store
 - Generate Aggregated Analytics on Usage
- TechSmith
 - Develop Microsoft Office/Office 365 Apps
 - Collect and Send Tin Can API Statements
 - ❖ “I know this.”
 - ❖ “I learned this.”
 - ❖ “I experienced this.”
 - Present Knowledge Views to User
 - Leverage Learning Activity
 - To Entire Enterprise
 - By Exposing Views of Learning Activity
 - Using Microsoft “Office Graph”

Mostly
Understandable
by End User



Screen Mockups

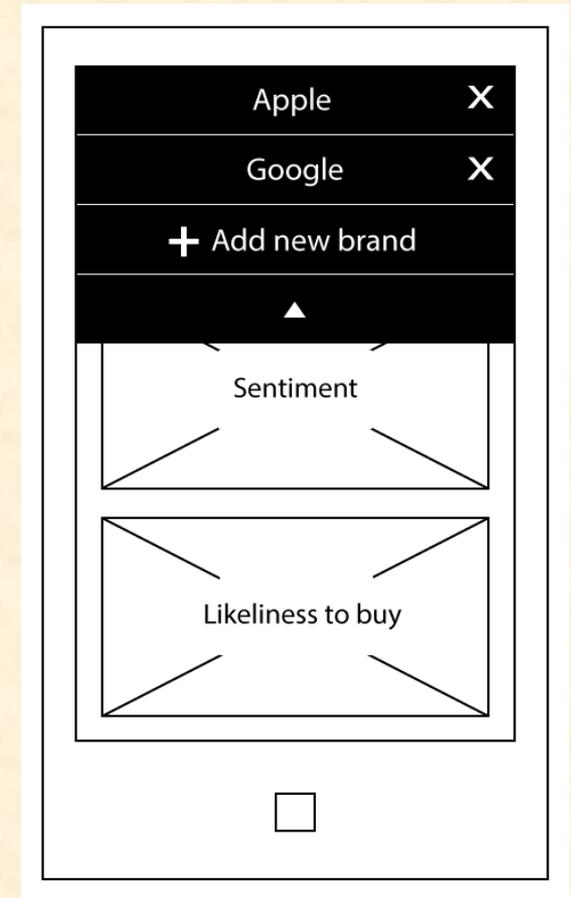
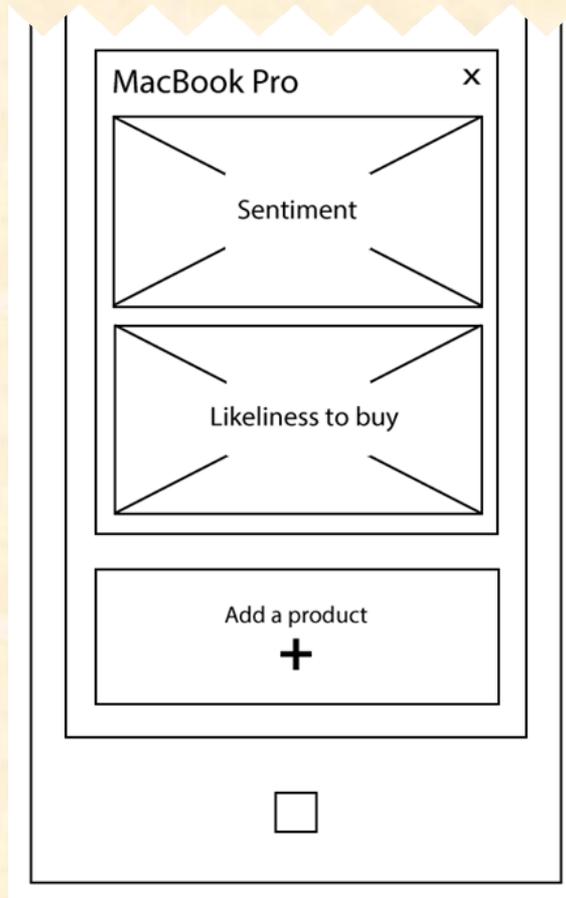
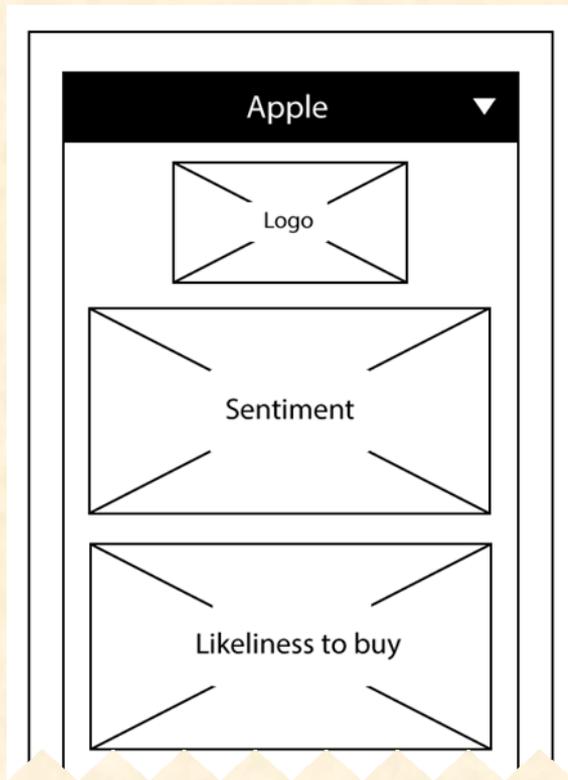
- User Interface Only
 - Shows Layout, Buttons, Pull-Downs, Etc...
 - Non-Functional
 - No Back End
- Helpful for Developing
 - Functional Specifications
 - Look-and-Feel
 - Use Cases
- Can Create with...
 - Pencil and Paper
 - PowerPoint (Developer View)
 - Photoshop
 - Etc...



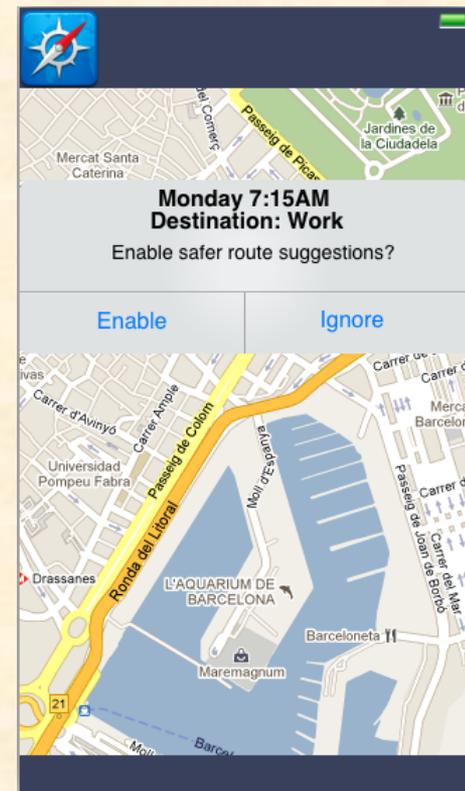
Screen Mockups

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

Screen Mockup Example



Screen Mockups Example



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 Specification

- 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
 - Production Environments
 - Development Environments
 - SDK's (Software Development Kits)
 - Network Topology
 - Database Schema
 - Continued...



Technical Specification

- 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



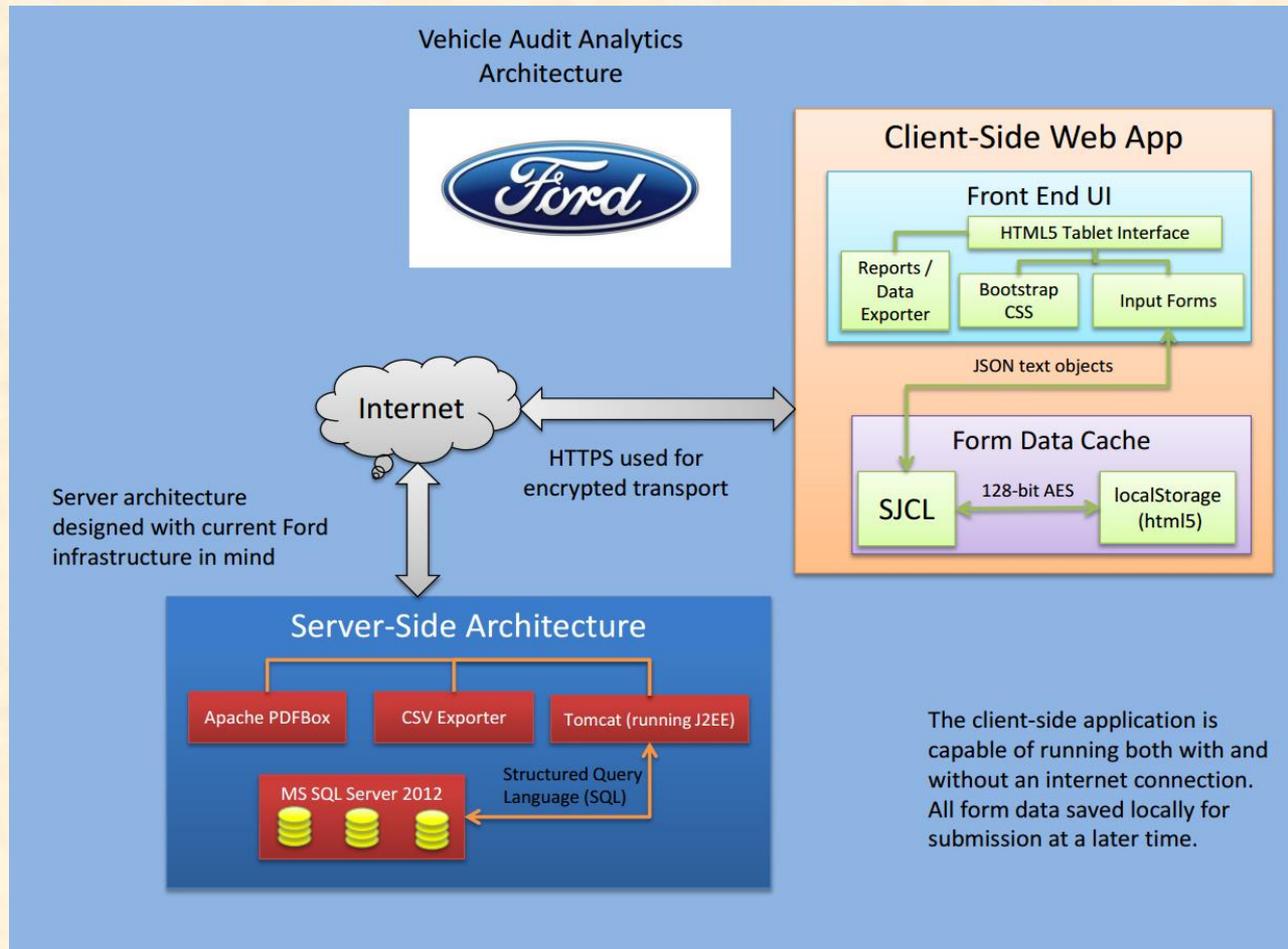
Technical Specifications

- Ford
 - Bluetooth Low Energy (BLE) Beacons
 - iPhone and Android Development (Objective-C, Java)
 - Web Development (CSS, HTML, PHP, JavaScript)
 - Java 2 Platform Enterprise Edition (J2EE)
 - Microsoft SQL Server
- Spectrum Health
 - Web Development (CSS, HTML, PHP, JavaScript)
 - Google AngularJS
 - RedHat Linux and JBoss
 - Microsoft ASP.net
 - Microsoft Internet Information Services (IIS) 7.0
 - REST and SOAP Web Service Layers
 - iBeacon
- Whirlpool
 - Web Development (CSS, HTML, PHP, JavaScript)
 - JavaScript Object Notation (JSON)
 - Responsive Design (Xamarin, C#)
 - RESTful Web Services
 - Whirlpool Cloud Services
 - Microsoft Visual Studio
 - Microsoft SQL Server

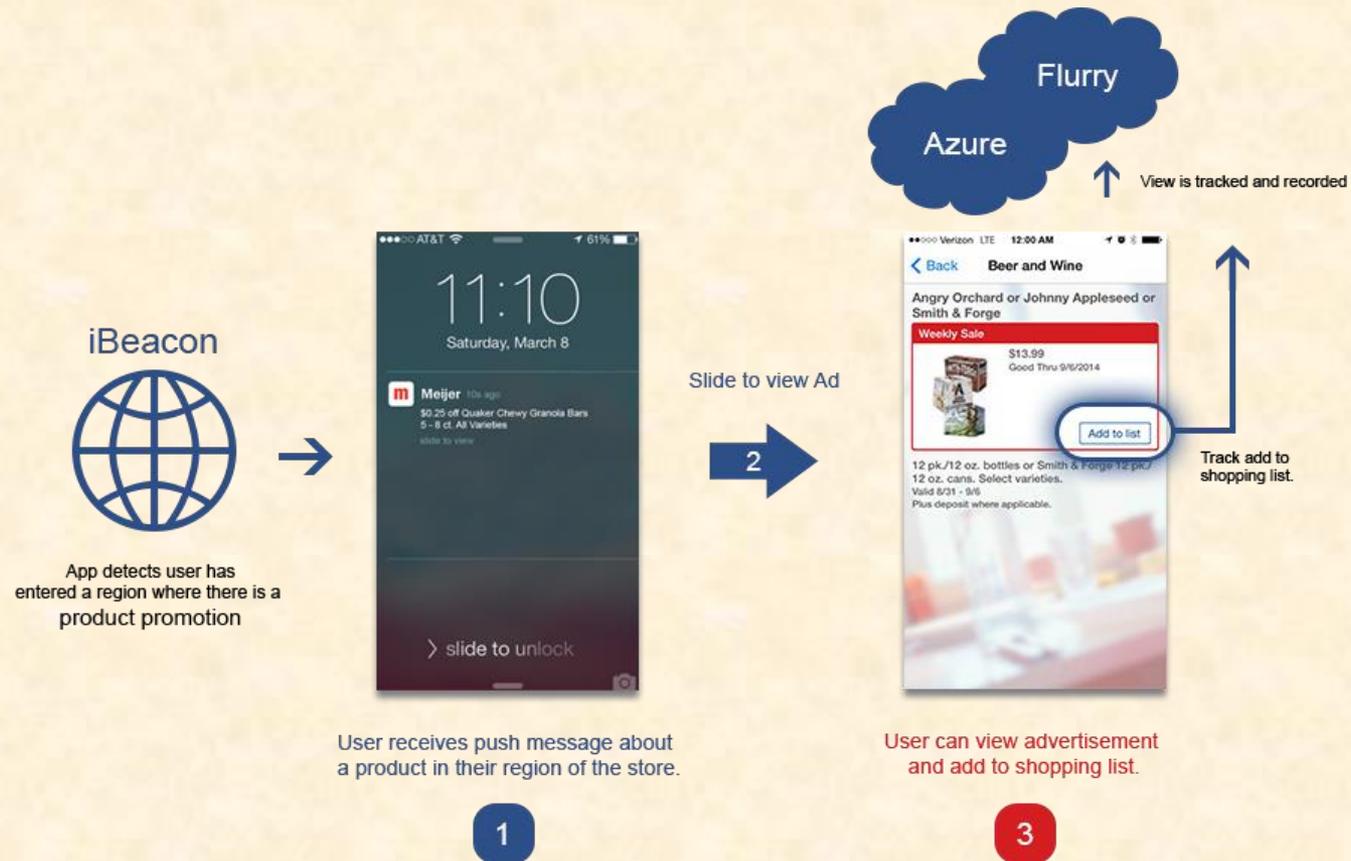
Probably Not
Understandable
by End User



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

- 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
 - See Major Milestones
 - 01/26: Team Status Report Presentations
 - 02/02: Team Project Plan Presentations
 - 02/23: Team Alpha Presentations
 - 04/06: Team Beta Presentations
 - 04/27: Project Videos
 - 04/29: All Deliverables
 - 04/30: Design Day Setup
 - 05/01: Design Day
 - 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
 - Installed by Malcolm
 - Requires Windows 7 or 8 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
 - 4:00 a.m., Sunday, February 2
 - ~ 2.5 Weeks  Panic!
- In Class Formal Presentations
 - February 2 – February 11
 - PowerPoint Template Provided



Resources on the Web

- Other Links > Downloads
Project Plan Examples

- Team Meijer
- Team Quicken Loans
- Team Spectrum Health

- Other Links > Online Resources

- Apple Developer
- W3 Schools
- iPhone Programming
- Apache Subversion
- Etc...

- High Resolution Sponsor Logo

www.capstone.cse.msu.edu/2015-01/projects/<sponsor>/images/originals/sponsor-logo.png

www.capstone.cse.msu.edu/2015-01/projects/auto-owners/images/originals/sponsor-logo.png



Project Plan

✓ Functional Specifications

✓ Design Specifications

✓ Technical Specifications

• Risks

• Prototypes

• Schedule

} Future Meetings

