# MICHIGAN STATE
## U N I V E R S I T Y

# 01/08: Project Plan

## The Capstone Experience

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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 the problem?
  - What's your solution?

- ## Short List of Features

- ## Not Necessarily Complete

- ## Understandable by End User

- ## Initial Problem Statement

- ## Usually Refined

# Functional Specifications

- Auto-Owners
  - Collect Updated Policyholder Information
  - By Underwriting Field Service Representatives
  - Using Mobile Devices
- GM
  - Simulate Vehicles Moving Along a Route
  - For Testing GM Location-Based Apps
  - Accessible Via Web Service API
- MSUFCU
  - Provide Financial Educational Tools and Resources
  - For University Students
  - Via Mobile Devices

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 fee?
- 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

- Boeing
  - Based on FlightGear Flight Simulator
  - Support Networked Multiplayer Mode
  - Observe Flight Traffic Monitors
  - Collect Key Performance Statistics
- Ford
  - Support Laptops, Tablets and Smartphones
  - Approve, Reject or Send Back Requests
  - Drill Down Through Item-Related Business Logic
  - Connect to Various Existing Back-End Systems
  - Handle QR Code Input
- TechSmith
  - Models the Classroom
  - Teacher Dashboard and Student Dashboard
  - Notifications for Key Events
  - Assignment "Progress" Mechanism
  - Provide Usage Statistics

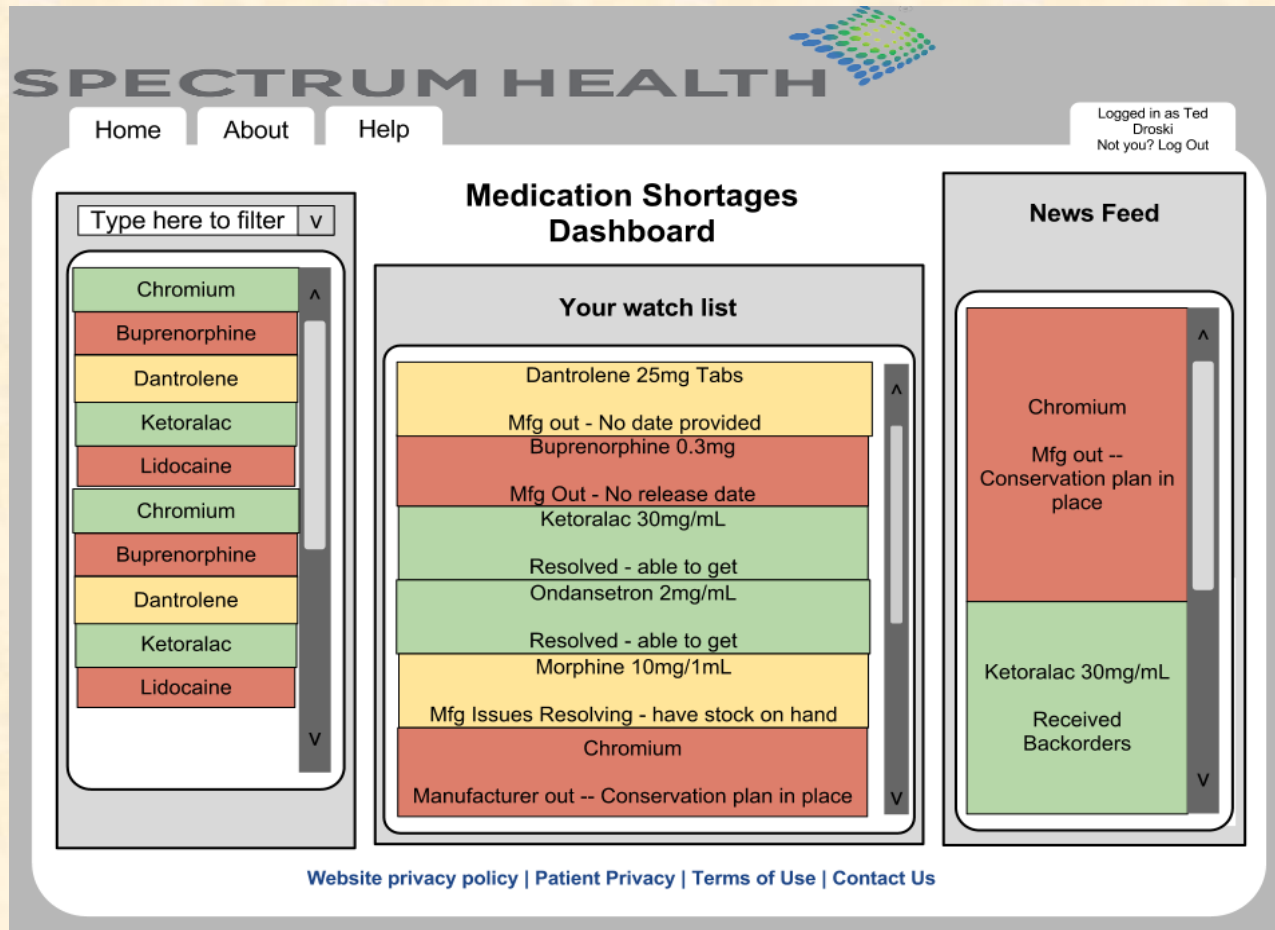Mostly
Understandable
by End User

# 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
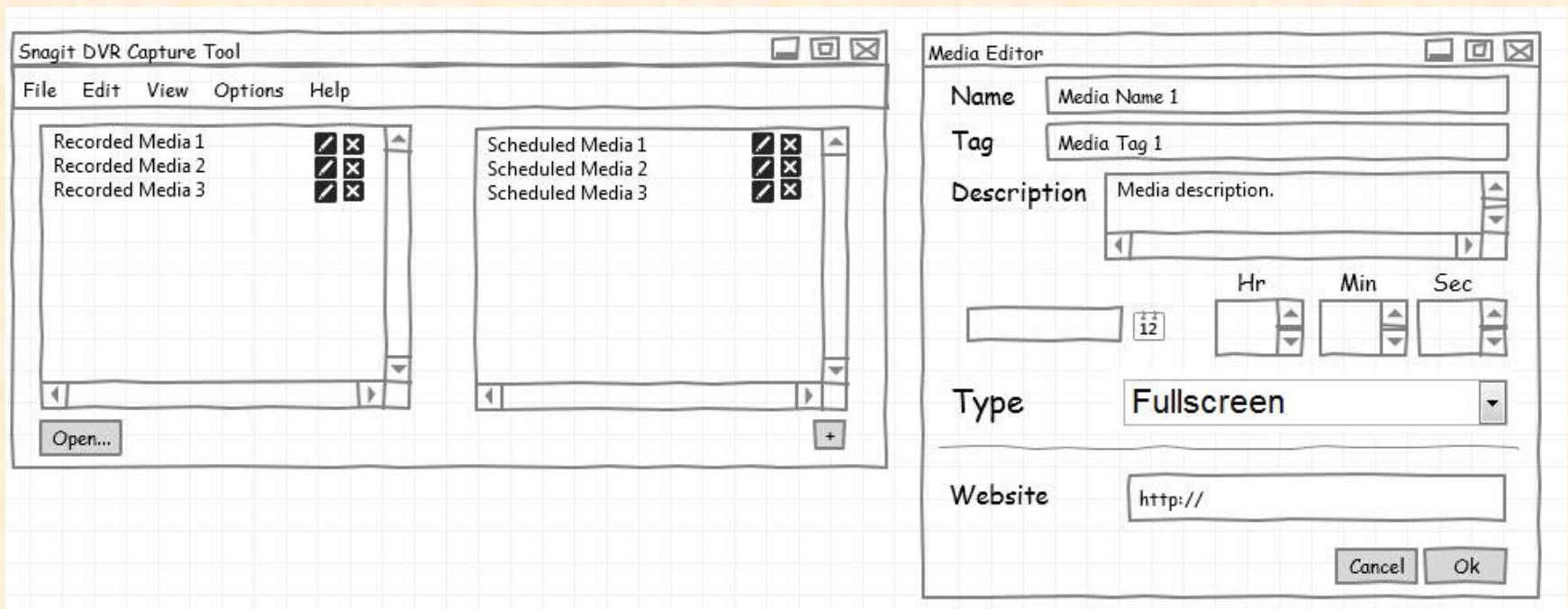  - PowerPoint (Developer View)
  - Photoshop
  - Etc...

# Screen Mockups

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

# Screen Mockups Example

# Screen Mockup Example

# Design Specifications Interactions With Your Client

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# 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
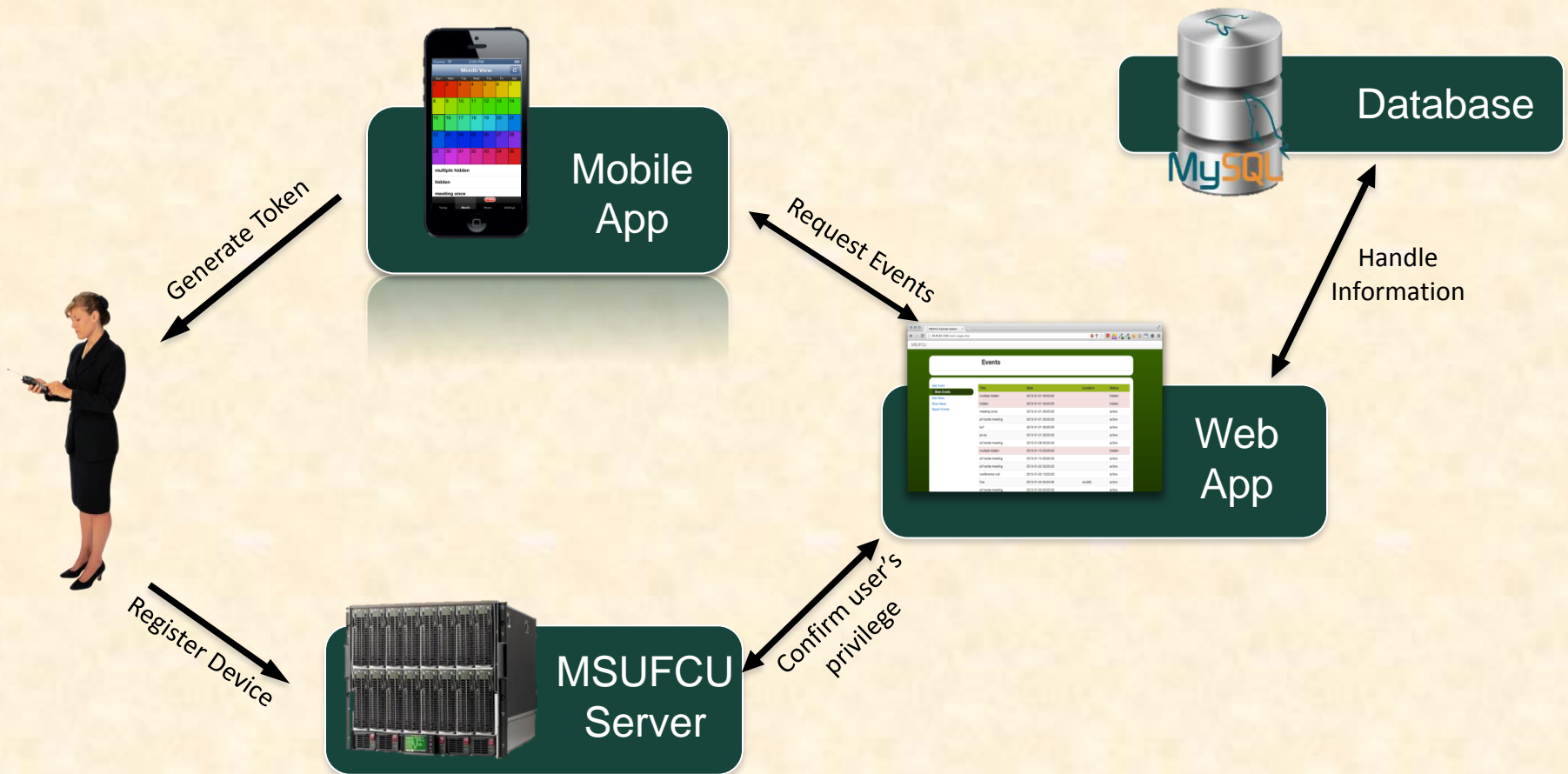- Usually Refined

# Technical Specifications

- Meijer
  - CSS / HTML5
  - Microsoft Azure Services
  - Mobile Development Methodologies
  - Social Media
- Quicken Loans
  - Impinj Speedway
    - R420 RFID Reader
    - Connect RFID Management Software
  - RFIDeas RDR-6081AKU NFC Badge Reader
  - .Net Integration
    - With RFID Hardware
    - Into Database
  - Microsoft SQL Server
- Spectrum Health
  - CSS / HTML5
  - JavaScript / AngularJS
  - ASP.net MVC
  - Microsoft Internet Information Services (IIS) 7.0
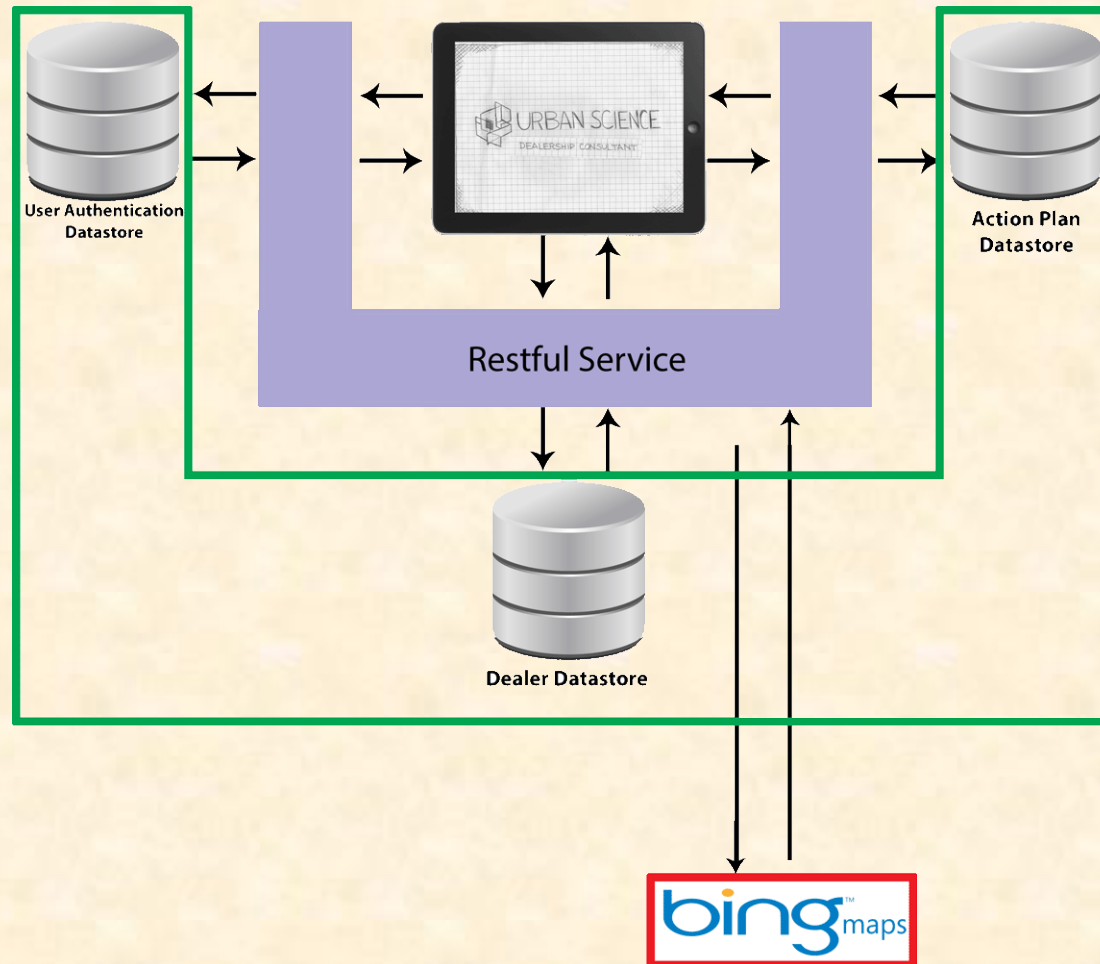  - Microsoft  SQL Server
  - REST Service Layer

Probably <u>Not</u> 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

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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

- 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

- 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?

- Schedule
  - Dictated by Course
  - See Major Milestones
    - 09/11: Status Report Presentations
    - 09/16: Project Plan Presentations
    - 10/14: Alpha Presentations
    - 11/11: Beta Presentations
    - 12/02: Project Videos
    - 12/04: All Deliverables
    - 12/05: Design Day Setup
    - 12/06: 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

- "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

- 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
  - Noon, Monday, January 27
  - 2 Weeks ⟵ Panic!
- In Class Formal Presentations
  - January 27 – February 5
  - PowerPoint Template Provided

# Resources on the Web

- Other Links > Downloads
  - Team Auto-Owners
  - Team Meijer
  - Team Spectrum Health
- Other Links > Online Resources
  - W3 Schools
  - iPhone Programming
  - Apache Subversion
  - Etc…
- High Resolution Sponsor Logo
  www.capstone.cse.msu.edu/2013-08/projects/<sponsor>/images/originals/sponsor-logo.png
  www.capstone.cse.msu.edu/2013-08/projects/auto-owners/images/originals/sponsor-logo.png