MICHIGAN STATE UNIVERSITY

01/11: 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
- Starting With
  - Shared Vision?
  - No Formal Documents?
  - Minimal Documents?
  - Incomplete Problem Statement?
- Understandable by End User
- Initial Problem Statement
- Usually Refined

Functional Specifications

- Auto-Owners
  - Manage Continuing Education and Certification
  - For Auto-Owners Associates Throughout the Enterprise
  - Customize and Extend Moodle LMS
- GE Aviation
  - Display Weather Maps
  - For Aviation Industry
  - On Mobile Devices
    - Apple iPad
    - Google Android Tablets
- Plex Systems
  - Design Labels
  - For Manufacturing Companies
  - To Label Products For End-Customers

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 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

- Dow
  - Web-Based Dashboard
  - Display Water Data, Basin Names and Stressed Areas
  - View by Sites or Geographical Regions
  - Filter by Water Stressed Basins
  - Drill Down by Water Intake Type
- Meijer
  - HTML5-Based Web App
  - Support Touchscreen Tablets
  - Various User Levels
- TechSmith
  - Table of Contents and Hotspots
  - User Settable Bookmarks
  - Timed Text Captions Displayed During Playback
  - Support For Panning and Zooming
  - Varied Playback Speeds with Audio Pitch Adjustment

Mostly Understandable by End User

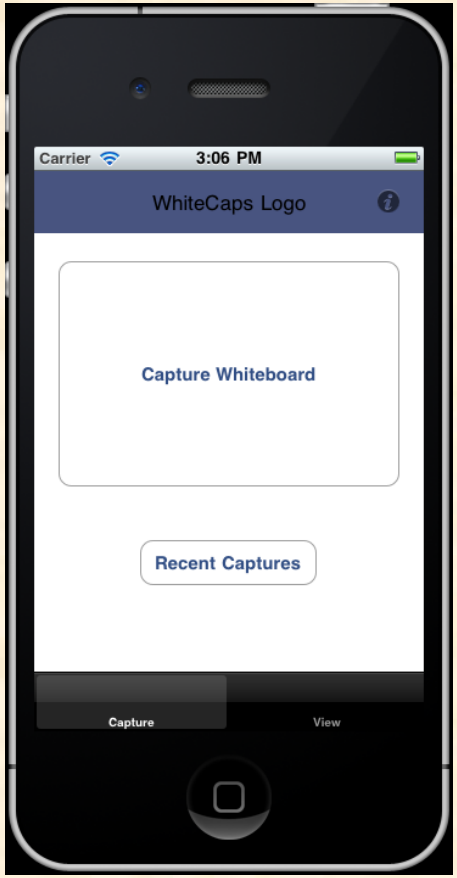
Screen Mockups

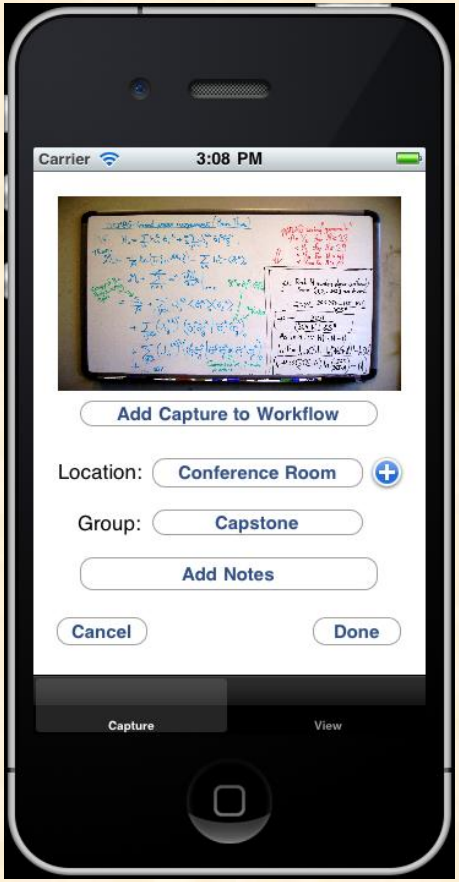
- User Interface Only
  - Shows Layout, Buttons, Pull-Downs, Etc…
  - Non-Functional
  - No Back End
- Helpful for Developing
  - Functional Specifications
  - Look-and-Feel
  - Use Cases
- Can Create with…
  - Pencil and Paper
  - PowerPoint (Developer View)
  - Etc…

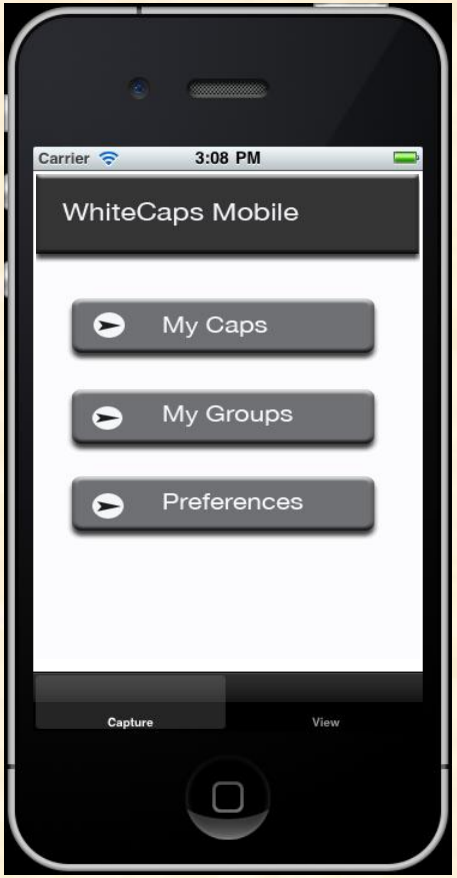
Screen Mockups

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

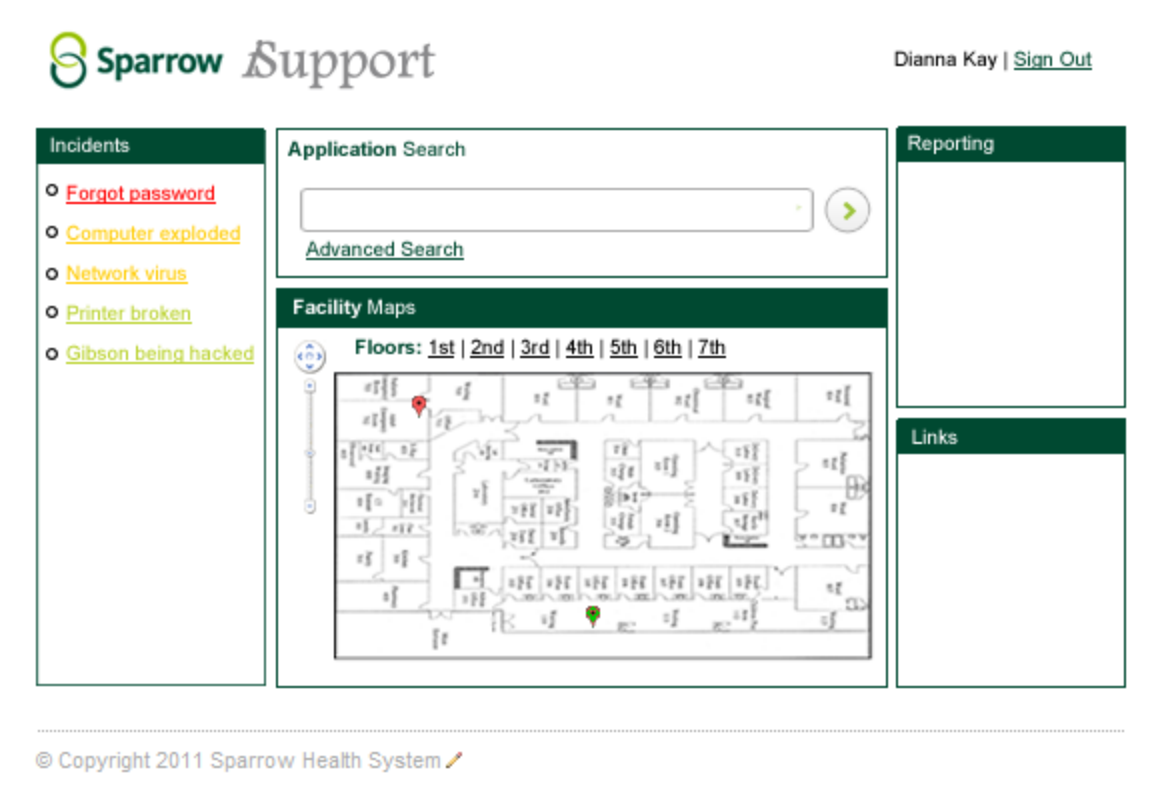
Screen Mockups Example







Screen Mockup Example



Design Specifications
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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

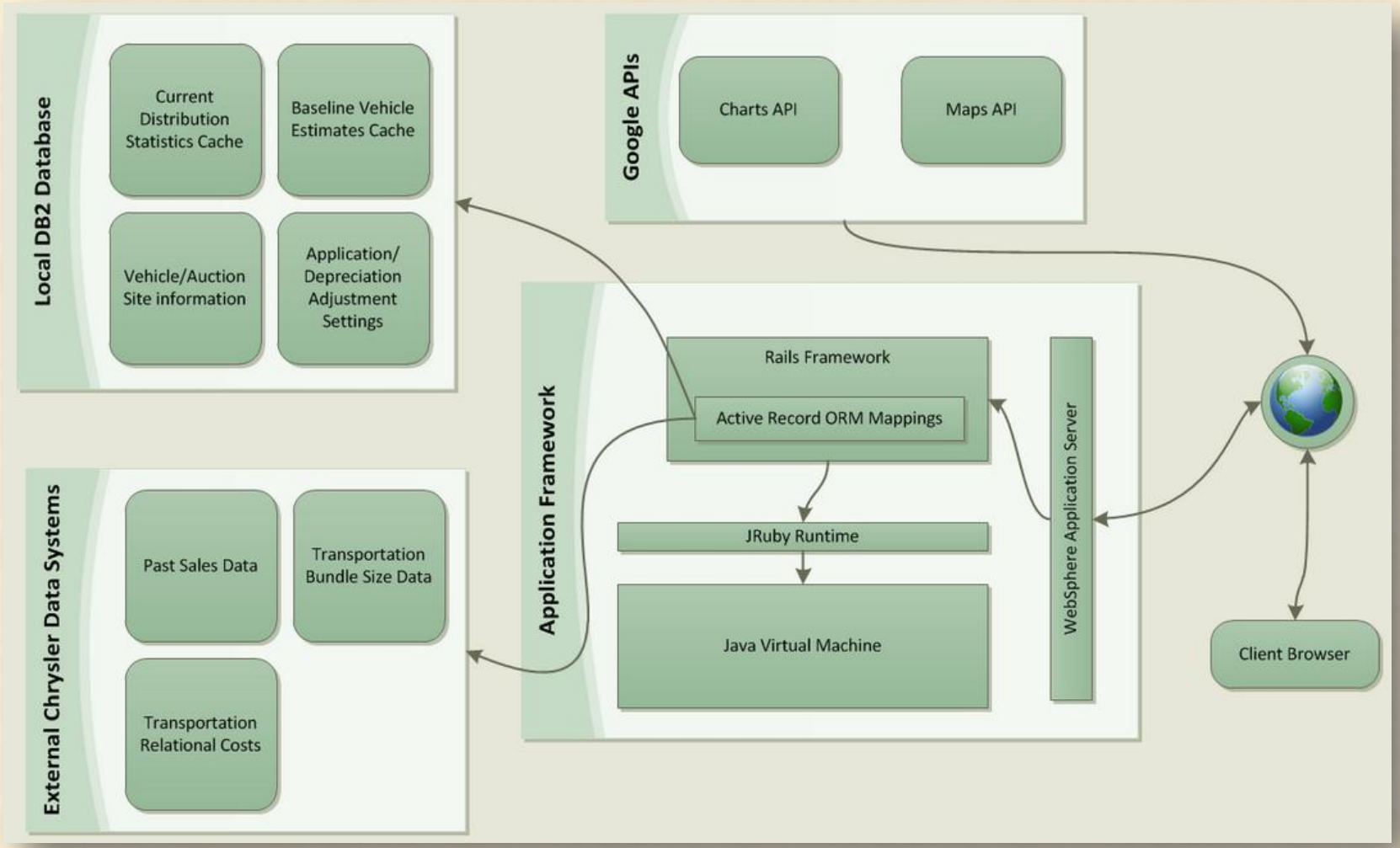
- Includes Things Like…
  - Object Models and Class Diagrams
  - UML Diagrams
  - Pseudo Code
  - Function Prototypes
  - Schedule
  - Test Plan
  - Risk Analysis
  - Etc…
- Probably Not Understandable by End User
- Usually Refined

Technical Specifications

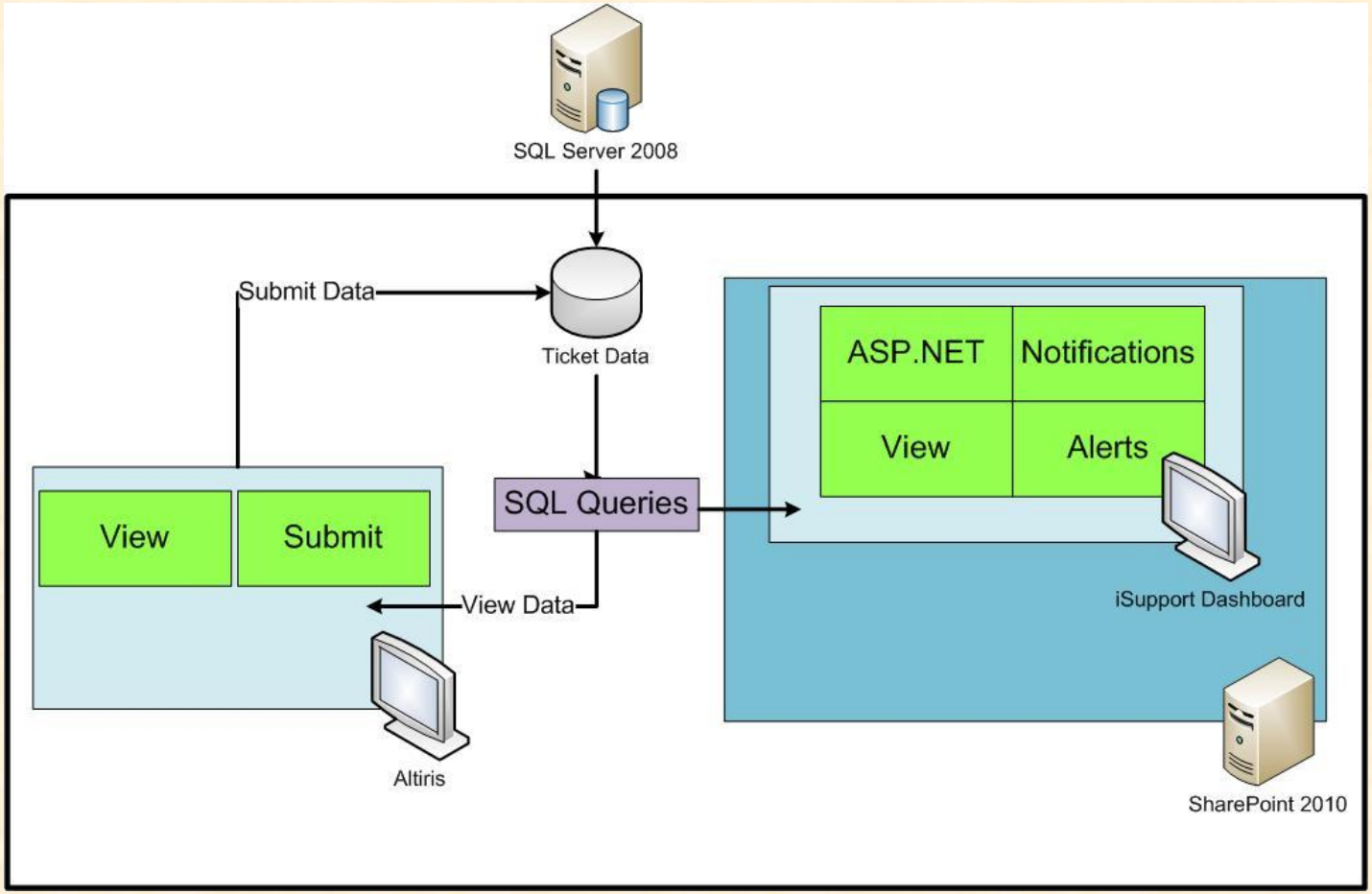
- Boeing
  - C++, Python
  - Jenkins, QT Creator
  - Open Scene Graph (OSG)
  - Blender (3D Modeling)
  - Secure Internetworking, Encryption
- Motorola Mobility
  - Android Development (Java)
  - Java (Servlets, JEE, JSE)
  - Web Development (RESTful, XML, JSON, JavaScript, jQuery)
  - Database (iBatis, Hibernate, MySQL)
  - Hbase, Hadoop
- Urban Science
  - Microsoft C#/.NET, ASP.NET
  - JavaScript
  - CSS, HTML5
  - 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

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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

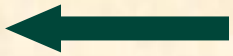
How To's

(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  "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
    - 01/23: Status Reports
    - 01/30: Project Plan Presentations
    - 02/20: Alpha Presentations
    - 04/02: Beta Presentations
    - 04/23: Project Videos
    - 04/25: All Deliverables
    - 04/26: Design Day Setup
    - 04/27: 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

- 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 30
  - A Little Over 2 Weeks
- In Class Formal Presentations
  - January 30 – February 8
  - 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/2012-01/projects/<sponsor>/images/originals/sponsor-logo.png
  www.capstone.cse.msu.edu/2012-01/projects/auto-owners/images/originals/sponsor-logo.png

Project Plan

✓Functional Specifications

✓Design Specifications

✓Technical Specifications

- Risks
- Prototypes
- Schedule

} Future Meetings

What's next?

- Team Photos
  - Informal: After Meeting Today
  - Formal: After Each Project Plan Presentation
- Setup
  - Team Machines
    - Dell Server (Ask Meredith)
    - Apple iMac, MacBook Pro
  - Team Software
    - Web Server
    - Code Repository
    - SDK's
    - Etc.
- Think About Team Status Report

What's next?

- Team Status Report
  - PowerPoint Template
  - Due Midnight, Sunday, January 22
  - Email to Dr. D.
    - Subject: Team <Company Name>: Status Report
      Subject: Team Auto-Owners: Status Report
    - Attachment: team-<company-name>-status-report-presentation.ppt
      Attachment: team-urban-science-statue-report-presentation.ppt
- Dr. D. Will Combine Into Single PowerPoint
  - To Speed Things Up During Meeting
  - Do NOT Modify Master Slide Page
- Each Team Presents
  - Using Dr. D.'s Laptop
  - At Most 5 Minutes (Rehearse Timing)
  - Single or Multiple Presenters (Your Choice)

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01/18: Risks and Prototypes

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