

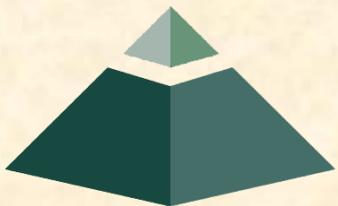
MICHIGAN STATE

U N I V E R S I T Y

01/10: Project Plan

The Capstone Experience

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Spring 2019



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

Project Plan

➤ Functional Specifications

➤ Design Specifications

➤ Technical Specifications

• Risks and Prototypes

• Schedule and Teamwork

} Future Meetings



Project Plan

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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

- Amazon
 - Provide Customer Support
 - Utilize Collaborative Browser Sharing
- MSUFCU
 - Provide Budgeting Assistance
 - Utilize Chatbot Technologies
- Union Pacific
 - Build Game Hosting System
 - Target Railroad Training Games

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!

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Design Specifications

- What's the user experience (UX)?
 - How does a user use it?
 - How does it look and feel?
- 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

- Evolutio
 - Build a User-Friendly Web Application
 - Support Export and Import of Configurations
 - Provide Environment Migration Utility
 - Support Both New and Existing Environments
 - Explore Use of Natural Language Processing
- Michigan State University ITS
 - Organize Groups Based on Calendars
 - Find Available Meeting Times
 - Support Various Messaging Platforms
 - Provide Cloud Storage for Collaboration
 - Build Infrastructure Using Amazon Web Services
 - Deliver Production Ready System
- United Airlines
 - Web and Apple iOS Apps
 - Enable Course Request by Location
 - Track Instructor Times and Student Attendance
 - Provide Class List of Students
 - Optimize Course Scheduling
 - Number of Classes Per Location
 - Instructor Travel and Overtime
 - Fixed Courses
 - Implement Various Roles

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

APTIV | Guest

Dashboard > Products > V2X > V2X FCA

V2X FCA

Project Status: Finalized

Project Registration → TARA → Mitigation Remediation → Vulnerability Assessment → Penetration Assessment → Final Approval → 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

Project Modules

- Project Information
- TARA
- Mitigation Remediation
- Vulnerability Assessment
- Penetration Assessment
- Final Approval

Task Status

Donut chart showing task status distribution:

- Resolved: 35%
- In Progress: 12%
- New: 8%
- Closed: 45%

Pending Requests

Request	Date
No current Pending Requests	

Tasks

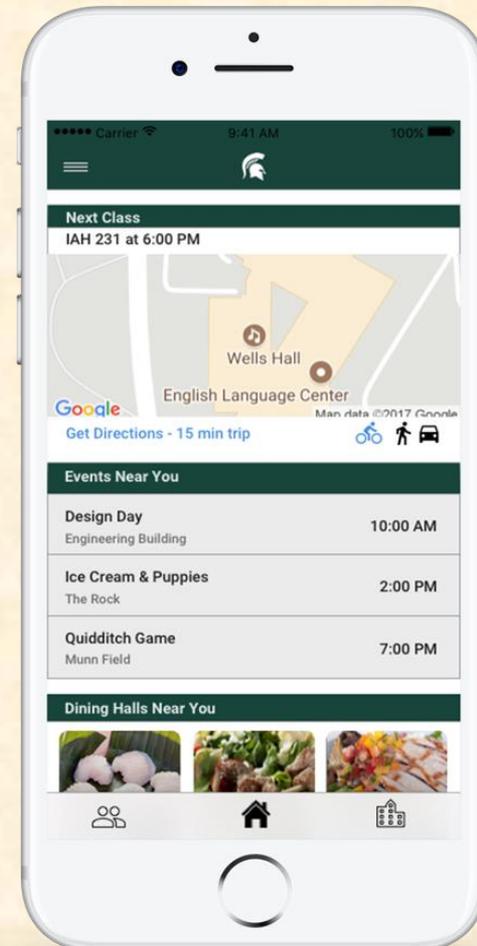
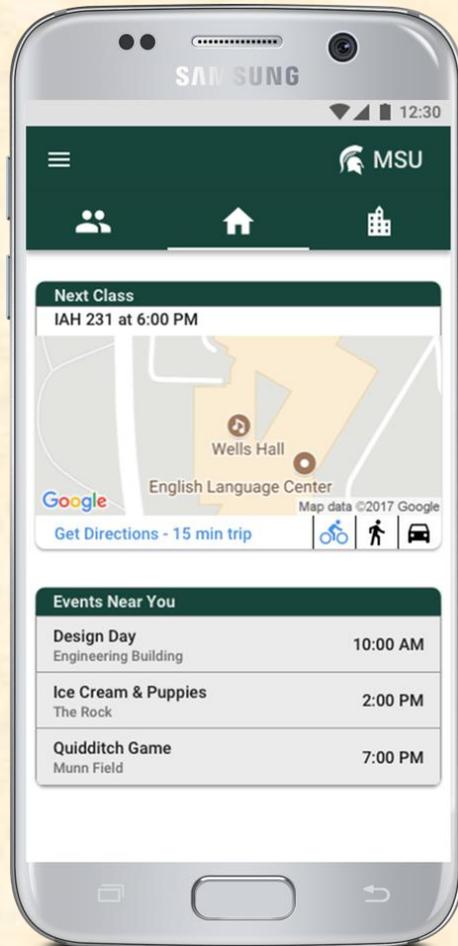
#	Title	Priority
2	Set up V2X test bench	High
8	V2X.CAN.5 Normal...	Medium
3	V2X.OS.2 Process P...	Medium
4	V2X.OS.3 Password...	Medium
13	Update Attack Plan	Low

⊕ View all tasks

Screen Mockups Example



Screen Mockups Example



Design Specifications Interactions With Your Client

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Project Plan

✓ Functional Specifications

✓ Design Specifications

➤ **Technical Specifications**

• Risks and Prototypes

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} Future Meetings



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



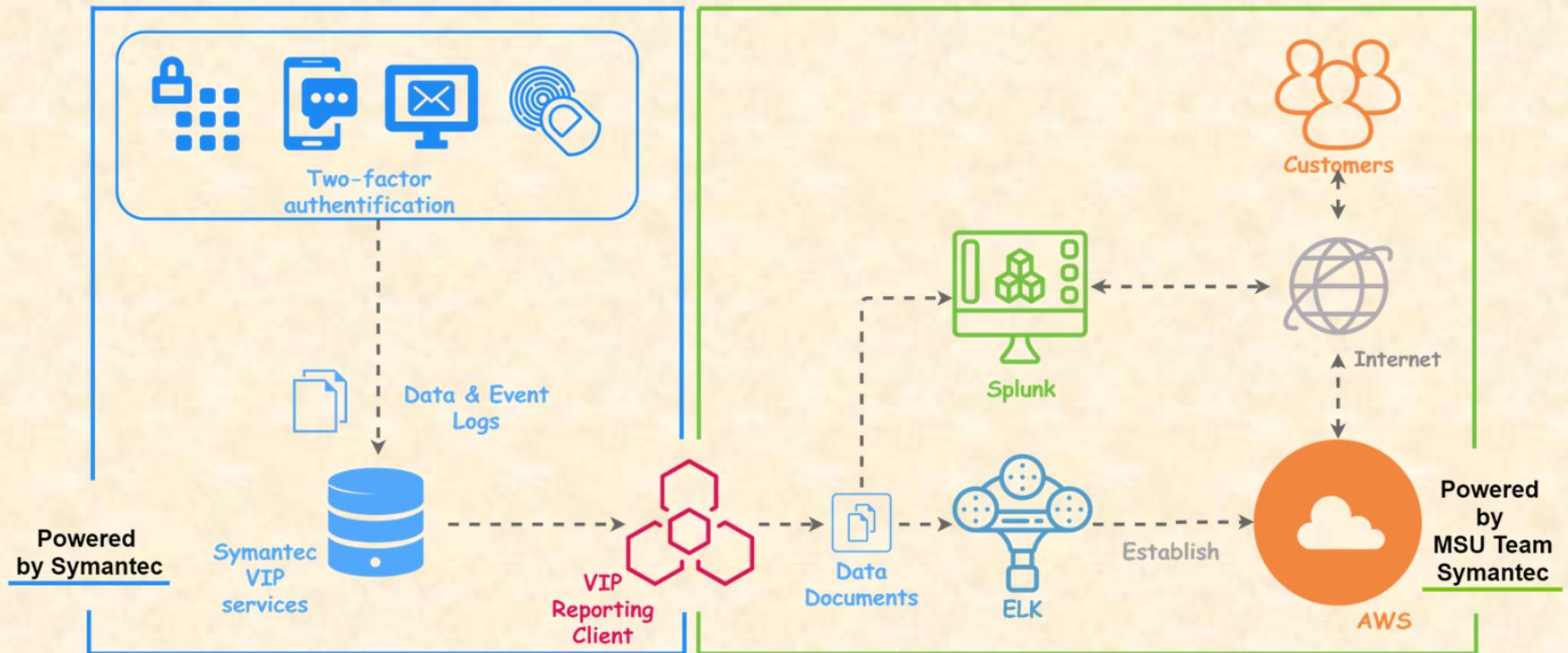
Technical Specifications

- Ford
 - OAuth 2.0
 - Amazon Cognito
 - Apple iOS and Google Android
 - CSS / HTML / JavaScript / PHP
 - Snipe-IT
 - Raspberry Pi
 - Apache Kafka
 - Amazon Web Services (AWS) Kinesis
 - RGB Light Strip
 - 12V Actuated Lock
- Mozilla / Firefox
 - Fluent
 - DTD / .properties Files
 - JavaScript / Wasm (Web Assembly)
 - XUL / XBL / HTML
 - Rust
 - Mercurial
 - IRCCloud (IRC)
 - Bugzilla
 - Phabricator
 - Windows /macOS /Linux
- Proofpoint
 - Cuckoo (Malware Sandboxing)
 - Suricata (Intrusion Detection System)
 - Steganography
 - Malware Machine Learning
 - Operating Systems and Compilers
 - Reverse Engineering
 - CSS / HTML / JavaScript / PHP
 - Python
 - MySQL

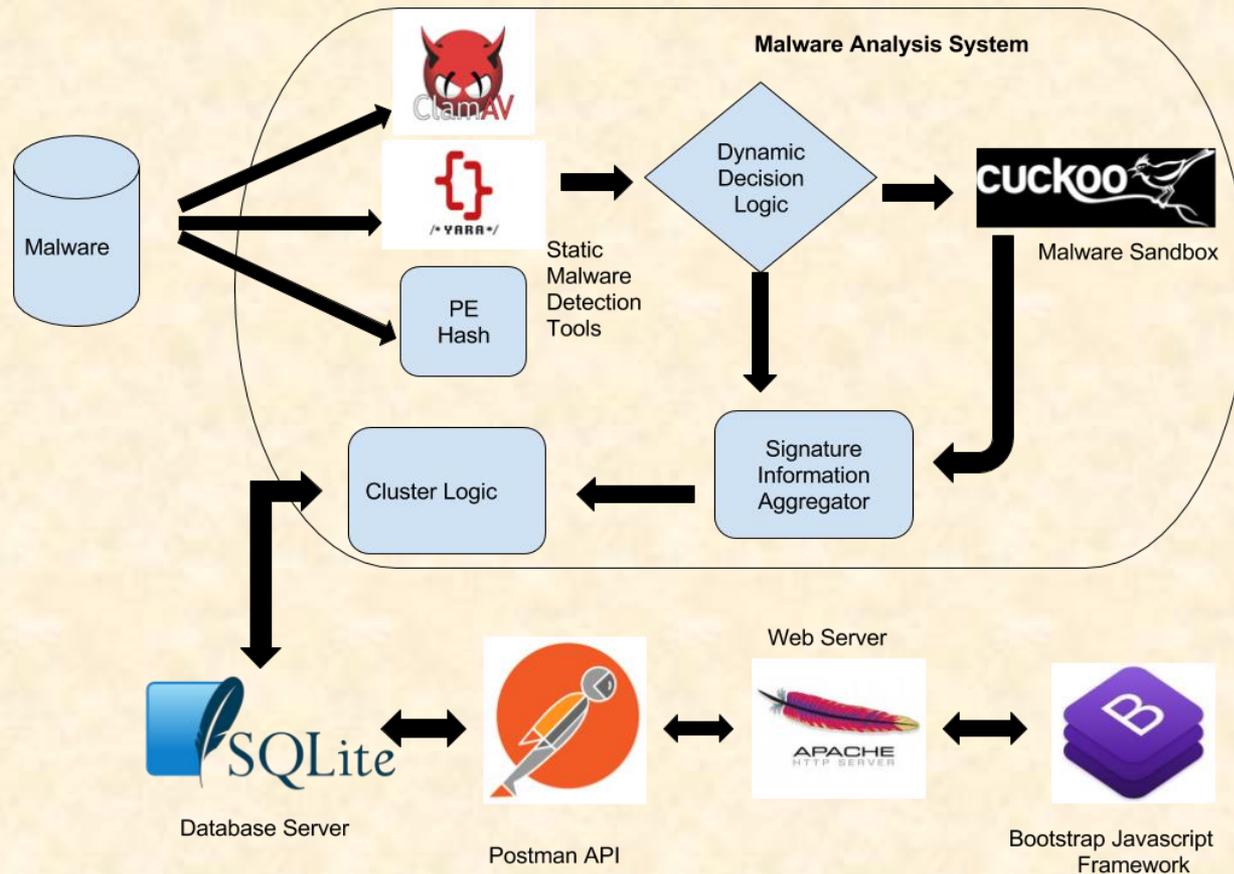
Probably Not
Understandable
by End User



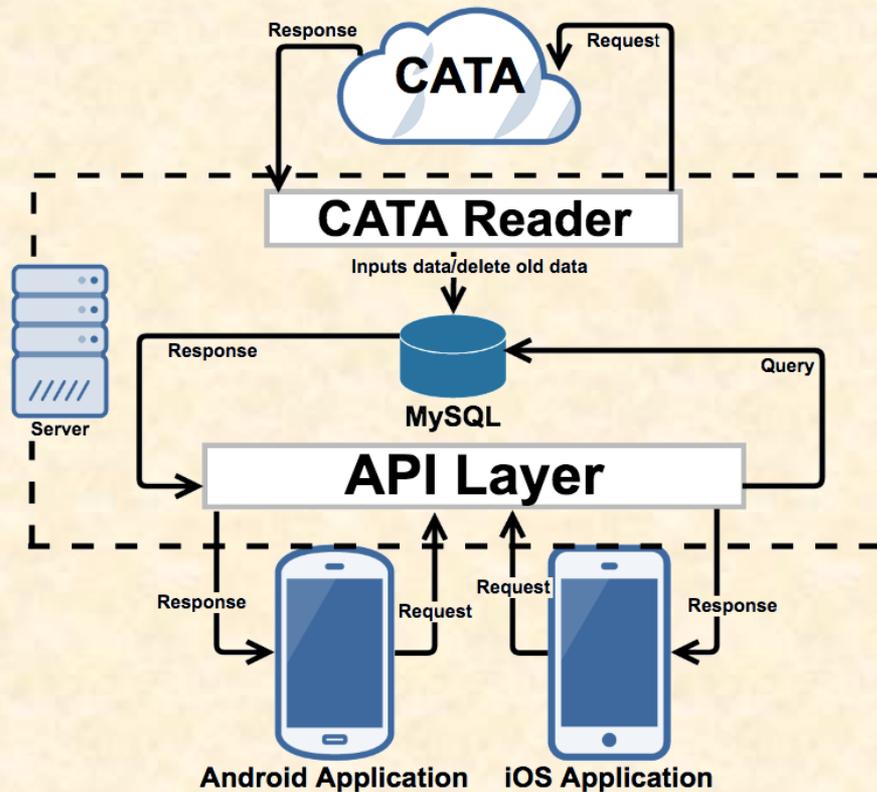
System Architecture Example



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

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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
 - Schedules > Major Milestones
 - 01/17: Status Report Presentations
 - 01/29: Project Plan Presentations
 - 02/19: Alpha Presentations
 - 04/02: Beta Presentations
 - 04/23: Project Videos
 - 04/24: All Deliverables
 - 04/25: Design Day Setup
 - 04/26: Design Day
 - 05/02: 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
 - 12:01 a.m., Thursday, January 29 (Think Monday night.)
 - ~ 2.5 Weeks
- In Class Formal Presentations  Get on it, now!
 - January 29 – February 7
 - PowerPoint Template Provided



Resources on the Web

- Other Links > Downloads

Project Plan Examples

- Spring 2018

- Team Herman Miller
- Team Proofpoint

- Fall 2018

- Team Herman Miller
- Team Proofpoint

- High Resolution Sponsor Logo

www.capstone.cse.msu.edu/2019-01/projects/<sponsor>/images/originals/sponsor-logo.png

<http://www.capstone.cse.msu.edu/2019-01/projects/auto-owners/images/originals/sponsor-logo.png>



Project Plan

✓ Functional Specifications

✓ Design Specifications

✓ Technical Specifications

• Risks and Prototypes

• Schedule and Teamwork

} Future Meetings



What's ahead?

[1 of 3]

- Team Photos
 - Informal
 - After Meeting Today: Teams Amazon – Michigan State University HPCC
 - After Meeting Monday: Teams Michigan State University ITS – Volkswagen
 - Formal
 - After Each Project Plan Presentation
 - Dress code for presenting teams is business casual.
- 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
 - Web Server
 - Code Repository
 - SDK's
 - Etc.

Required.



Use Windows 10 VM.



What's ahead?

[2 of 3]

- All-Hands Meetings
- ~~01/08: Capstone Overview~~
- ~~01/10: Capstone Overview~~
 - ~~Project Plan~~
 - Team Photos: Teams Amazon – Michigan State University HPCC
- 01/15: Risks and Prototypes
 - Team Photos: Teams Michigan State University ITS – Volkswagen
- 01/17: Team Status Report Presentations
- 01/22: Schedule and Teamwork
- 01/24: Team Status Report Presentations
- 01/29: Team Project Plan Presentations
- 01/31: Team Project Plan Presentations
- 02/05: Team Project Plan Presentations
- 02/07: Team Project Plan Presentations



What's ahead?

[3 of 3]

- Team Status Report Presentations
 - PowerPoint Template
 - Due 12:01 a.m., Thursday, January 17
(Think Wednesday night.)
 - One Week ← Get on it now!
 - Email to Dr. D.
 - Subject: Team <Company Name>: Status Report Presentation
Subject: Team Auto-Owners: Status Report Presentation
 - Attachment: team-[team-name]-status-report-presentation.ppt
Attachment: team-urban-science-status-report-presentation.ppt
- 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 Dr. D.'s Laptop
 - At Most 3.0 Minutes (Rehearse Timing)
 - Single or Multiple Presenters (Your Choice)



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Status Report Presentation

Team [Team Name]

The Capstone Experience

Dr. Wayne Dyksen

Department of Computer Science and Engineering

Michigan State University

Spring 2019



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

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 3 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 12:01 a.m., Thursday, January 17. (Think Wednesday night.) 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.



Team [Team Name]

Status Report

[1 of 4]

[Project Title]

- Project Overview

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

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

