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

09/04: Project Plan

The Capstone Experience

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Fall 2019

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 Use of Amazon Sellers API
  - Used by Amazon Third-Party Sellers

- Evolutio
  - Provide Facial Recognition of Elephants
  - Predictively Track Elephants
  - Aid Combatting Elephant Poaching

- Proofpoint
  - Protect Users from Computer Security Terrorists
  - Detect and Analyze State Sponsored Security Threats

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 fee?
  - 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

- GM
  - Categorize Network Flows
  - Classify Communication Type
  - Learn Normal Traffic
  - Identify Anomalies
  - Establish Traffic Patterns
- Michigan State University ITS
  - Collect User Interests and Backgrounds
  - Club and Organization Suggestions
  - Provide Information on How to Connect
  - Register and Administer Clubs
  - Register for Clubs and Organizations
- Yello
  - Match Data to Standardized List in Real-Time
  - Persist to a Database
  - Provide UI for Entering Data

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

dyksen

User Id

hello world

Password

☑ Remember Me

Submit

Landing Page

Welcome to Our App

Screen Mockup Example

Screen Mockups Example

Screen Mockups Example
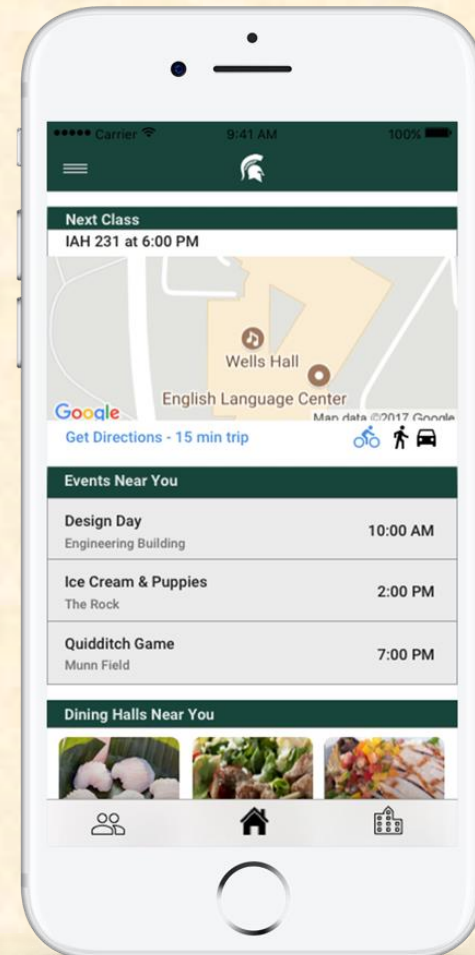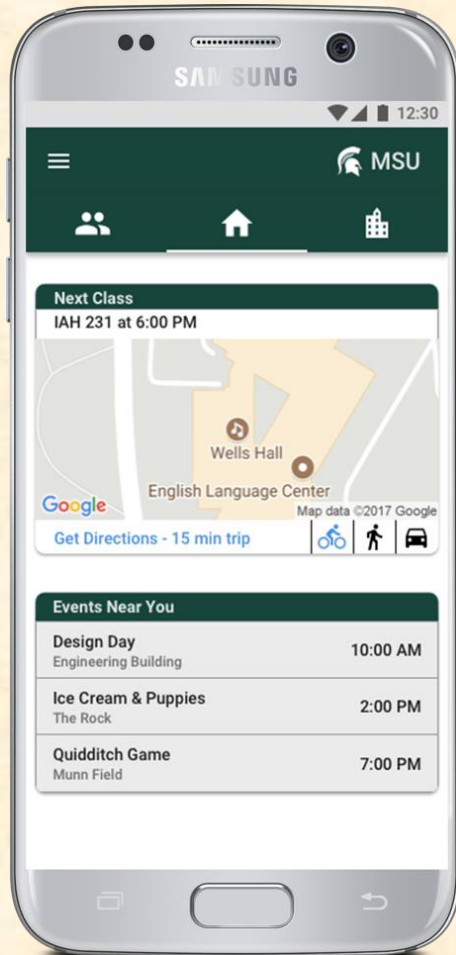
Design Specifications Interactions With Your Client

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Project Plan

- ✓ Functional Specifications

- ✓ Design Specifications

- ➢ Technical Specifications

Technical Specifications

- 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

- 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

- Dow
  - Unity Game Engine
  - Apple iOS / Swift
  - Google Android / Java
  - ARKit / ARCore / Vuforia
  - App Center / TestFlight
  - Microsoft Azure
- Mozilla / Firefox
  - JavaScript
  - C++
  - Mercurial
  - IRC
  - Bugzilla
  - Phabricator
  - Windows / macOS / Linux
- United Airlines
  - MS SQL Server Database
  - Node.js
  - Angular
  - ASP.NET Core
  - C#
  - Swift

Probably <u>Not</u>
Understandable
by End User

System Architecture Example
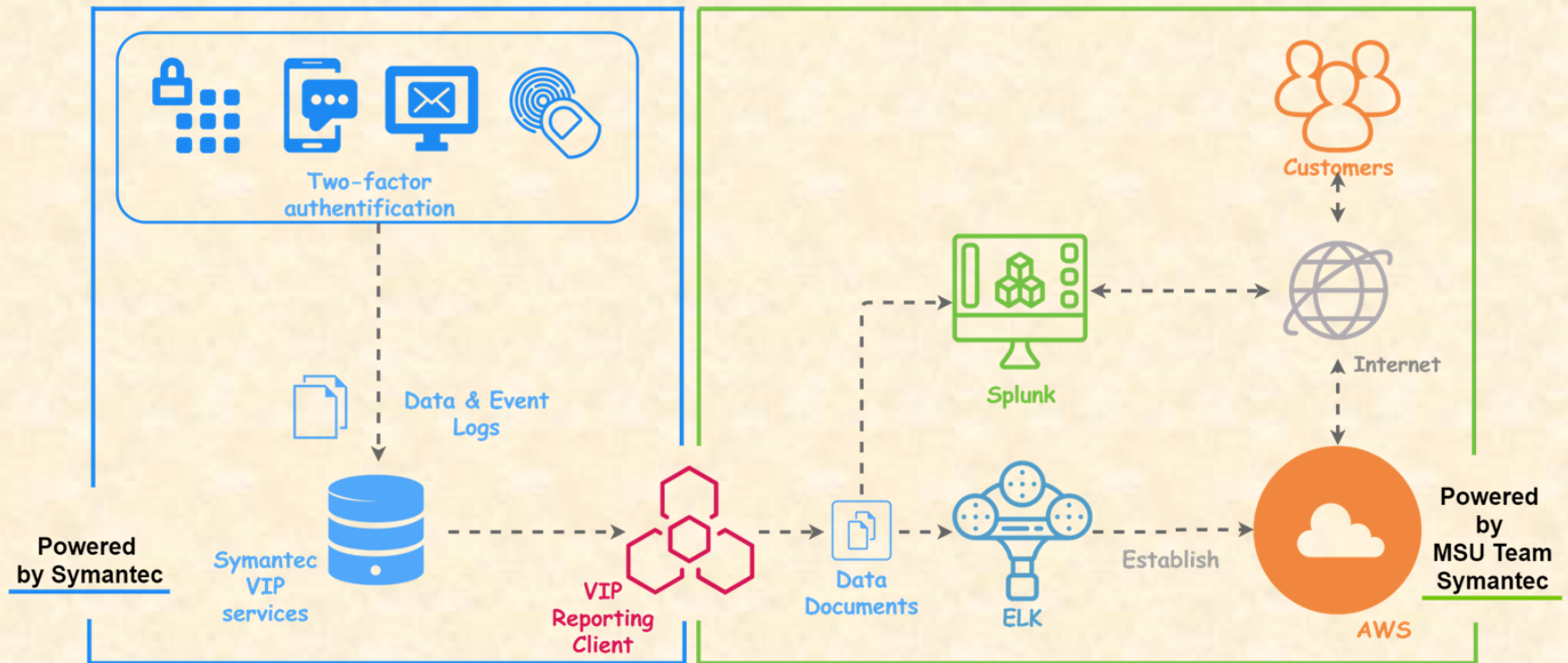
System Architecture Example
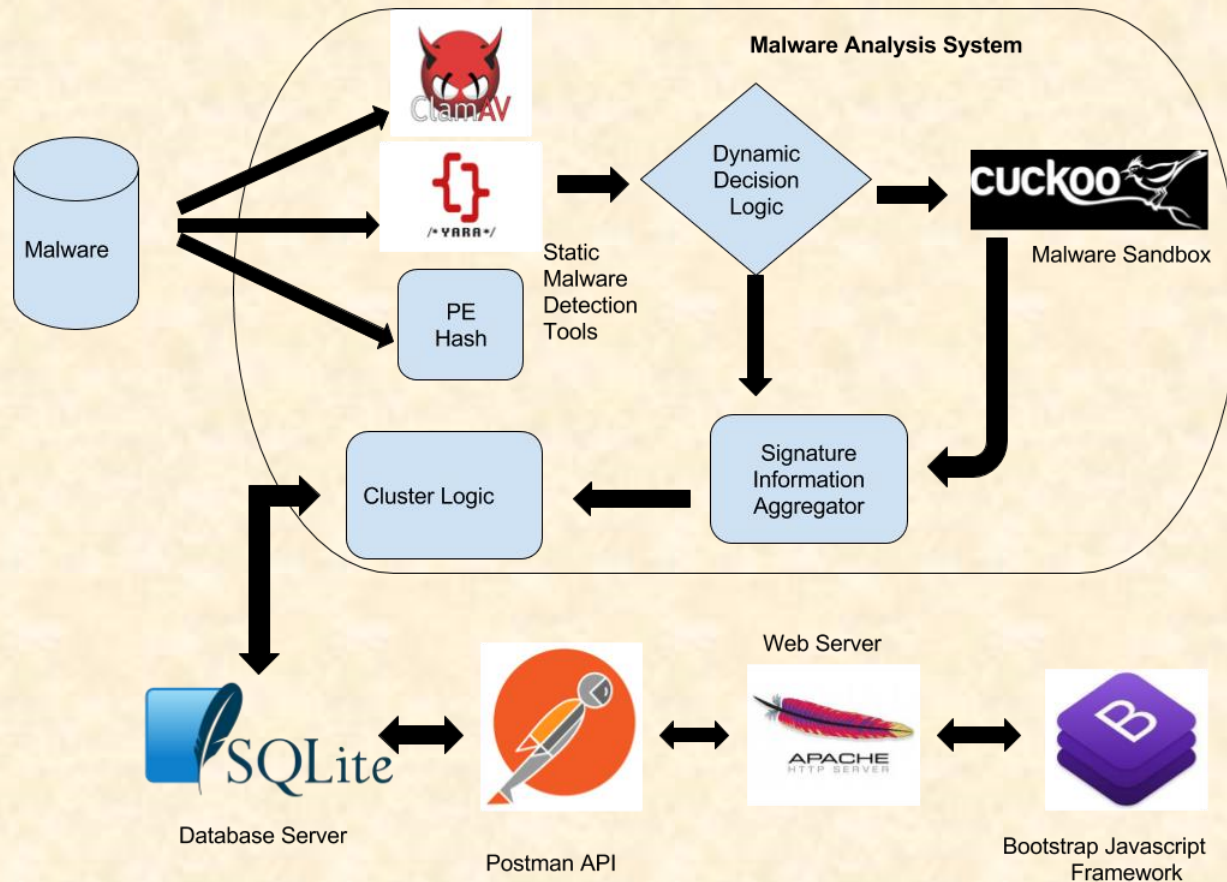
System Architecture Example
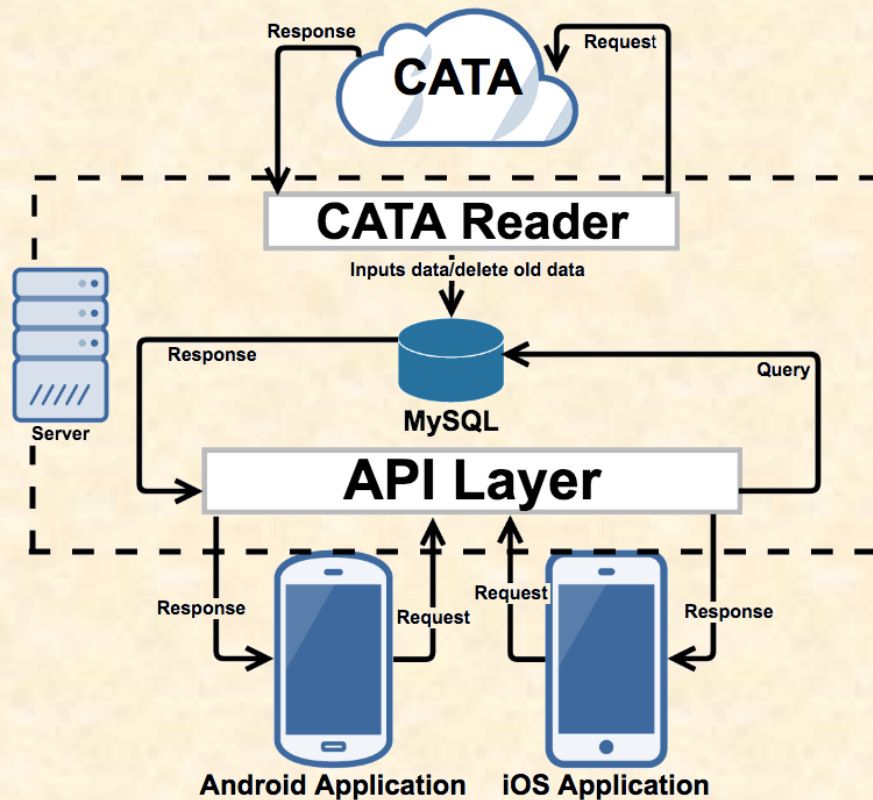
Approach

- 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

- 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)
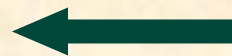 - Develop In Parallel When Possible But...
    - Complete Functional First
    - Complete Design Second
    - Complete Technical Third
  - Refine As Needed
  - Assign Sections to Team Members
  - Share with Client
    - Ask For (Specific) Feedback
    - Highlight What's New
    - Tricky Balance
      - ❖ Not Enough?
      - ❖ Too Much?

"Is this what you had in mind?"

How To's

- Schedule
  - Dictated by Course
- Schedules > Major Milestones
  - 09/11: Status Report Presentations
  - 09/23: Project Plan Presentations
  - 10/14: Alpha Presentations
  - 11/18: Beta Presentations
  - 12/02: Project Videos
  - 12/04: All Deliverables
  - 12/05: Design Day Setup
  - 12/06: Design Day
  - 12/09: 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

- "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.)
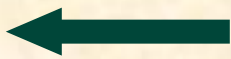
Interactions With Client

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., Sunday, September 22
  - ~ 2.5 Weeks
- In Class Formal Presentations ⬅ Get on it, now!
  - September 11 – October 2
  - PowerPoint Template Provided

Resources on the Web

- **Other Links > Downloads**
Project Plan Examples
  - Spring 2018
    - o Team Herman Miller
    - o Team Proofpoint
  - Fall 2018
    - o Team Herman Miller
    - o Team Proofpoint
- High Resolution Sponsor Logo
  www.capstone.cse.msu.edu/2019-08/projects/<sponsor>/images/originals/sponsor-logo.png
  http://www.capstone.cse.msu.edu/2019-08/projects/auto-owners/images/originals/sponsor-logo.png

Project Plan

✓Functional Specifications

✓Design Specifications

✓Technical Specifications

What's ahead?

- Team Photos
  - Thursday, September 19, 2:00 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?

- All-Hands Meetings
  - ~~08/28: Capstone Overview~~
  - ~~09/04: Capstone Overview~~
    - ~~Project Plan~~
  - 09/09: Risks and Prototypes
  - 09/11: Team Status Report Presentations
  - 09/16: Resume Writing and Interviewing
  - 09/18: Career Days
  - 09/23: Team Project Plan Presentations
  - 09/25: Team Project Plan Presentations
  - 09/30: Team Project Plan Presentations
  - 10/02: Team Project Plan Presentations

What's ahead? [3 of 3]

- Team Status Report Presentations
  - [PowerPoint Template](#)
  - Due 11:59 p.m., Tuesday, September 10
    < One Week   **← Get on it now!**
  - 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 TAs's Laptop
  - At Most 5.0 Minutes (Rehearse Timing)
  - Single or Multiple Presenters (Your Choice)

Status Report Presentation

Team [Team Name]

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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 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., Tuesday, September 10. Send your presentation to your client in a <u>separate</u> email; do <u>not</u> 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

[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 <u>status</u> information.
What's the <u>status</u> 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

[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

[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

[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.