MICHIGAN STATE UNIVERSITY

6. & 7. Teams: Technical Specification / Schedule Web Based Bond Issuing Tool

Team 1: Auto Owners Insurance
CSE 498, Collaborative Design

Patrick Colera
Dan D'Arcangelis
Dan Flannery
David Ripley

Department of Computer Science and Engineering
Michigan State University

Fall 2005

Project Overview

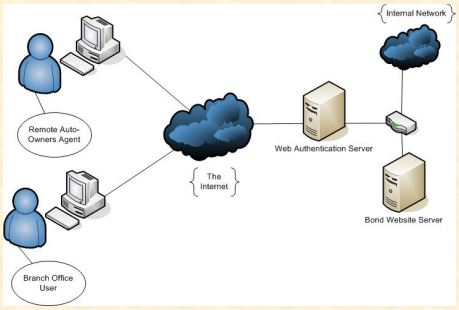
Team 1: Auto-Owners Insurance

- Web based tool for issuing bonds
- Used by independent field agents and branch users
- The system must:
  - Get bond application info, check for errors
  - Render a decision to approve, decline, or suspend
  - Create PDF for print
  - Create XML to send to Auto-Owners
- Automating a currently manual process

2

Architecture Illustrated

Team 1: Auto-Owners Insurance



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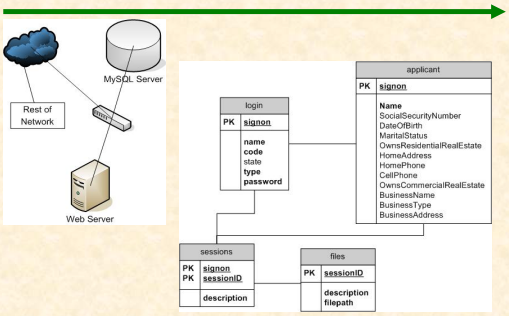
Architecture Illustrated

Team 1: Auto-Owners Insurance



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Architecture Components

Team 1: Auto-Owners Insurance

- Platforms
  - Apache
  - Tomcat
  - Windows XP (Development Machine)
- Software / Technologies
  - Java
  - JSP
  - XML
  - FOP
  - MySQL

5

Architecture Risks

Team 1: Auto-Owners Insurance

- Learn Java
  - We haven't worked much in Java
- XML
  - Another new technology
- FOP
  - Need to understand this
  - Turn an XML file into a PDF file for print

6

Project Schedule

Team 1: Auto-Owners Insurance

1. Prototype
   a) Goal: Complete Notary Bond into system
   b) Date: 9-29-05
2. Notary Bond portion of system
   a) Goal: Add in the other states notary bonds
   b) Date: 10-6-05
3. Testing Notary Bonds
   a) Goal: See above
   b) Date: 10-13-05
4. Probate Bond
   a) Goal: Add Probate Bonds
   b) Date: 10-20-05

7

Project Schedule

Team 1: Auto-Owners Insurance

1. Testing Probate Bond
   a) Goal: Test Probate Bond
   b) Date: 11-3-05
2. Vehicle Dealer Bond
   a) Goal: Add vehicle dealer bonds to the system
   b) Date: 11-10-05
3. Testing Vehicle Dealer Bond
   a) Goal: Test Vehicle Dealer Bond
   b) Date: 11-17-05
4. License and Permit
   a) Goal: Add the last type of bond to the system
   b) Date: 11-24-05

8

Project Schedule

Team 1: Auto-Owners Insurance

1. Testing License and Permit
   a) Goal: Test the last part
   b) Date: 12-1-05
2. Finish up (Final Testing)
   a) Goal: Make sure everything works
   b) Date: 12-1-05 - 12-4-05
3. Release
   a) Goal: Project Completed
   b) Date: 12-5-05

9

MICHIGAN STATE UNIVERSITY

6. & 7. Teams: Technical Specification / Schedule Boeing's Flight Visualization Program

Team 2: The Boeing Company
CSE 498, Collaborative Design

Jayson Vincent
Rob Rutherford
Chul Park
Brian Hasselbeck

Department of Computer Science and Engineering
Michigan State University

Fall 2005

Project Overview

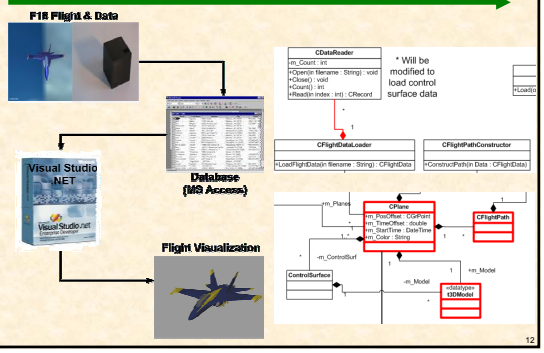
Team 2: Boeing

- *Purpose:* Take flight data from a database and create a 3D visualization of it
- We are building on legacy code from last semester
- Add control surfaces to the plane model
  - Animate control surfaces based on input data
- Needs to be easily extendable
  - Standard model format to allow user to easily create additional plane models and additional control surfaces, without touching the code.
  - Modular program design so future MSU teams, as well as teams at other universities, can easily work with it.
- Additional features as time allows (optional)
  - Improve data interpolation to create a more realistic flight
  - Allow interoperability with Visual Basic 6 (COM / ActiveX)

11

Architecture Illustrated

Team 2: Boeing



12

Architecture Components

- Platforms
  - Windows Server 2003
  - Windows XP Pro
- Software / Technologies
  - Managed C++ in VS.NET 2005
  - Access Database
  - Visio
  - MS Project
  - 3D Studio / Blender
  - IIS 6.0 Web server, Nvu webpage builder
  - Subversion

Team 2: Boeing

13

Architecture Risks

- Find a suitable 3D model format
- Reliable test data
- Learn 3D modeling software
- Understanding legacy code and MC++
- Interoperate with VB6

Team 2: Boeing

14

Project Schedule

1. Researching Model Format
   a) Goal: Find a suitable 3D model format
   b) Date: September 22
2. Understanding legacy code
   a) Goal: Can add new components
   b) Date: September 22
3. Status update with Boeing
   a) Goal: Progress update
   b) Date: September 27
4. Prototype specification
   a) Goal: Know what we need in a prototype
   b) Date: September 29

Team 2: Boeing

15

Project Schedule

5. Prototype
   a) Goal: Demonstrate loading and moving surfaces
   b) Date: October 10
6. Status update with Boeing
   a) Goal: Progress update
   b) Date: October 11
7. Status update with Boeing
   a) Goal: Progress update
   b) Date: October 25
8. First version of final program
   a) Goal: First release of working code
   b) Date: October 27

Team 2: Boeing

16

Project Schedule

9. Status update with Boeing
   a) Goal: Progress update, discuss additional features
   b) Date: November 8
10. Final version of program
    a) Goal: Complete deliverable (incl. Documentation, User Manual, Installation program)
    b) Date: November 10
11. Additional features implemented
    a) Goal: Implement additional features
    b) Date: December 1
12. Final presentation
    a) Goal: Project video & presentation
    b) Date: December 5

Team 2: Boeing

17

MICHIGAN STATE UNIVERSITY

6. & 7. Teams: Technical Specification / Schedule CFD Mesh Generator Project

Team 3: DaimlerChrysler

CSE 498, Collaborative Design

Eric Larese
Matt Koshay
Ali Saeed
Drew McCombs

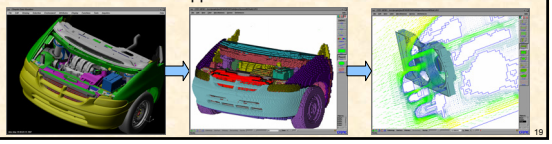
Department of Computer Science and Engineering
Michigan State University

Fall 2005

Project Overview

Team 3: DaimlerChrysler

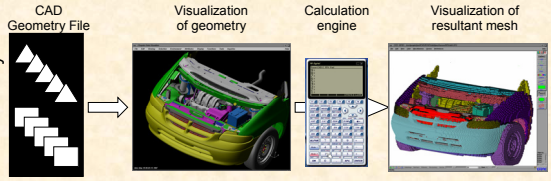
- Creation of stand alone, cross platform, CFD Mesh Generator Application
  - Import multiple CAD - generated mesh files
  - Display 3D visual representation of meshes
  - Facilitate navigation of 3D geometry
  - Interface with core Calculation Engine to produce resultant mesh
  - Visualization/Exportation of resultant mesh format (optional)
  - Creation of application User Manual



19

Application Flow

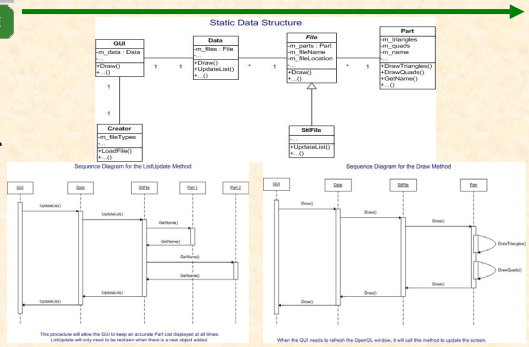
Team 3: DaimlerChrysler



20

Architecture Illustrated

Team 3: DaimlerChrysler



21

Architecture Components

Team 3: DaimlerChrysler

- Server Systems / Software
  - Systems: Windows XP / Unix
  - Software: MS Visual Studio.NET / Office
- Development Systems / Software
  - GUI Development: GTK toolkit
  - 3D Visualization: OpenGL / GLUT
  - Application Development: MS Visual Studio.NET/C++

22

Architecture Risks

Team 3: DaimlerChrysler

- Risk 1
  - Performance (Finite Element Mesh Sizes)
- Risk 2
  - Calculation Module Functionality
- Risk 3
  - Portability

23

Project Schedule

Team 3: DaimlerChrysler

1. Data Architecture
   a) Goal: Completion of Data Structure Architecture
   b) Date: September 23, 2005
2. First Implementation
   a) Goal: Rudimentary application created
   b) Date: September 30, 2005
3. Complete Prototype
   a) Goal: Complete file parsing and initial visualization
   b) Date: October 7, 2005
4. Batch Loading
   a) Goal: Display of all batch loaded files
   b) Date: October 14, 2005

24

Project Schedule

Team 3: DaimlerChrysler

5. 3D Navigation
   a) Goal: Completion of robust navigation of loaded mesh file
   b) Date: October 21, 2005
6. Mesh Manipulation
   a) Goal: Display resultant mesh generated by calculation engine
   b) Date: October 28, 2005
7. Finalization of functionality
   a) Goal: Aggregate application to date, final component review
   b) Date: November 4, 2005
8. Functionality Cut-off
   a) Goal: Completion of application functionality
   b) Date: November 11, 2005

25

Project Schedule

Team 3: DaimlerChrysler

9. Project Completion
   a) Goal: Rigorously test application, complete user manual, and prepare a final application release
   b) Date: November 18, 2005 – Completion
10. Update Release
   a) Release Service Pack 1
   b) December 1, 2005

26

MICHIGAN STATE UNIVERSITY

6. & 7. Teams: Technical Specification / Schedule Integrated Automotive Interface

Team 4: Team Ford
CSE 498, Collaborative Design

Taraz Buck
Niharika Joglekar
Jeff Morris
Chae Williams

Department of Computer Science and Engineering
Michigan State University

Fall 2005

Project Overview

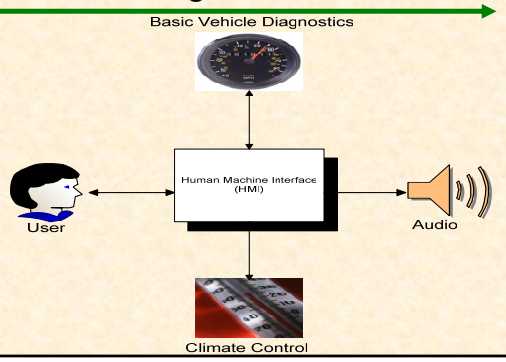
Team 4: Ford Motor Company

- Problem:
  - Create an HMI
    - Operator comfort
    - Ease of use
    - Incorporation of a lot of information
- Solution:
  - Touch Screen
  - Voice
  - Extendible plug-in architecture.

28

General diagram

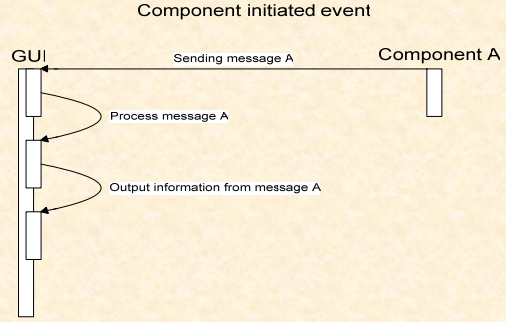
Team 4: Ford Motor Company



29

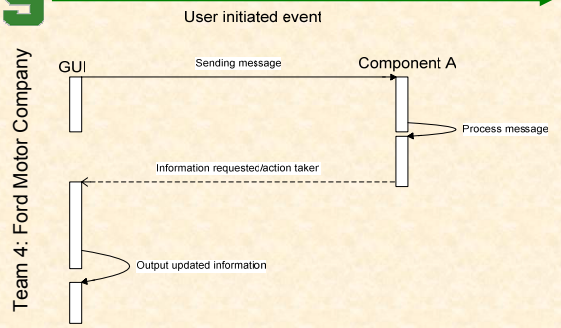
Architecture Illustrated

Team 4: Ford Motor Company



30

Architecture Illustrated



Team 4: Ford Motor Company

31

Architecture Components

- Platforms
  - Windows Server 2003
  - Windows XP
- Software / Technologies
  - Java
  - Microsoft Speech.NET

Team 4: Ford Motor Company

32

Architecture Risks

- Java programming language
  - Designing objects differs from C++
- Integration of speech libraries
  - Speech.NET access in Java
- Hardware availability and implementation
  - Specifics of touch screen usage
- Combining vision and audition
  - Significance of improvement, if any
- Testing simulation
  - Creating good and useful test cases

Team 4: Ford Motor Company

33

Project Schedule

- **Milestone 1** ……. October 10th
- Create **simulation environment**
- **Basic GUI** interface
- Basic functionality of **voice technology and touch screen**
  - Test correct responses
  - Basic voice recognition and synthesis
- Revise Technical Specification Document

- **Milestone 2** …. ……. October 31st
- Complete phase 1 of debugging
- Complete phase 1 of usability/performance testing
- Design updates
- **Advanced GUI** interface
- **User Profiles**
- Integrate **required components** – i.e. audio, climate control & trip computer
- Revise Technical Specification Document

Team 4: Ford Motor Company

34

Project Schedule

- **Milestone 3** …… November 21st
- Complete phase 2 debugging
- Complete phase 2 of usability/performance testing
- **Finalize GUI** interface
- Integrate of **optional components**
- Documentation of phase 1 usability/performance testing
- Revision of Technical Specification document

- **Milestone 4** …… December 5th
- Documentation of phase 2 usability/performance testing
- Minor updates to interface
- **Final version** of Technical Specification document

Team 4: Ford Motor Company

35

MICHIGAN STATE UNIVERSITY

6. & 7. Teams: Technical Specification / Schedule Peer-to-Peer Networking

Team 5: Microsoft

CSE 498, Collaborative Design

Ali Abdollahi
Brent Holtsclaw
Tyler Baldwin
Tom Stimmell
David Smith

Department of Computer Science and Engineering
Michigan State University

Fall 2005

Project Overview

- Our team will be delivering a fully functional content sharing and discovery application

- Simple Sharing
- Distributed Sharing
- Intelligent Load Balancing
- Keyword Search

Team 5: Microsoft

37

Architecture Components

- Platforms
  - Windows XP
- Software / Technologies
  - Windows Peer-to-Peer Framework
  - Windows Peer-to-Peer SDK
  - C#: Visual Studio 2005

Team 5: Microsoft

38

Architecture Components

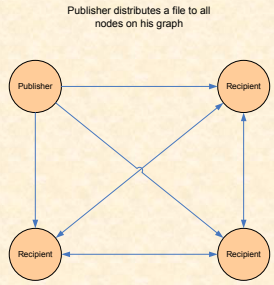
- Microsoft Windows Peer-to-Peer SDK
  - PRNP server-less peer name discovery protocol
    - IPv6
  - Graphing API
  - Grouping API
- Microsoft Windows Platform SDK

Team 5: Microsoft

39

Design Illustrated

Simple Sharing

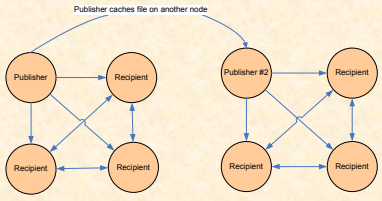


Team 5: Microsoft

40

Design Illustrated

Distributed Sharing

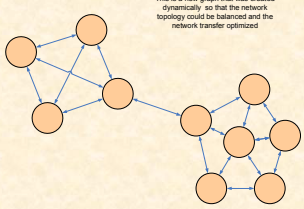


Team 5: Microsoft

41

Design Illustrated

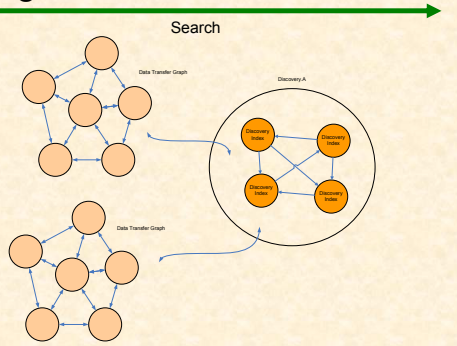
Load Balancing



Team 5: Microsoft

42

Design Illustrated



Team 5: Microsoft

43

Design Components

- Direct TCP connections for sharing files.
- Network statistics for determining optimal load balance and usage
- Server-less content discovery
  - Files have to be resolved without a central lookup server
- Information retrieval system
  - Being able to match user queries to files based on file content as well as name matching.

Team 5: Microsoft

44

Design Risks

- Runtime Testing and scalability
  - Dealing with distributed computing algorithms
  - Test Bed
- Security algorithms
  - Using the Peer-to-Peer Grouping framework effectively
- Programming in C#
  - The team has a C# learning curve to overcome
- Data retrieval algorithms
  - Data association and pattern recognition

Team 5: Microsoft

45

Project Schedule

1. Simple Sharing
   a) Get a simple client that can share files
   b) Publish the entire file
   c) Find other files with known names
   d) Date: 9-31-05

Team 5: Microsoft

46

Project Schedule

2. Distributed Sharing
   a) Have clients that can share files in chunks
   b) Intelligent way for partitioning a file into reasonable chunks
   c) Distributing these chunks among peers in a way that will ensure the entire file is maintained and can be shared
   d) Date: 10-14-05

Team 5: Microsoft

47

Project Schedule

3. Intelligent Load Balancing
   a) Have clients intelligently distribute file chunks
   b) Have clients redistribute the chunks in a way that will optimize network and other resource usage.
   c) Date: 11-1-05

Team 5: Microsoft

48

Project Schedule

4. Keyword Based Search
   a) Scalable search for content based on keywords
   b) Have a way of representing files that can easily be searched based on content
   c) Making sure the search algorithm is complete (all files can be found)
   a) Date: 12-1-05

Team 5: Microsoft

49

MICHIGAN STATE UNIVERSITY

6. & 7. Teams: Technical Specification / Schedule Device Configuration System

Team 6: Motorola
CSE 498, Collaborative Design

Jason Ruthkoski
Justin Hoffman
Steve Ford
Jae Eun Shin

Department of Computer Science and Engineering
Michigan State University

Fall 2005

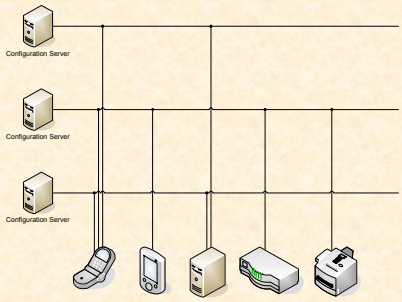
Project Overview

- The management of heterogeneous devices has become complex
- Solution: a server which can re-configure any supported device in response to particular events

Team 6: Motorola

51

Network Layout



Team 6: Motorola

52

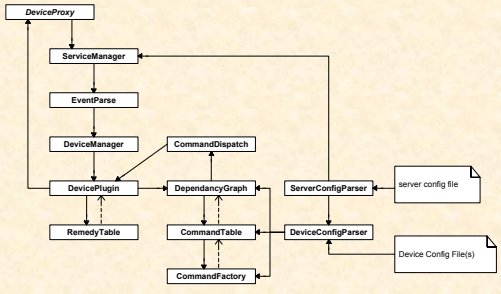
High Level Requirements

- A particular configuration server will capture a subset of events from the managed device
- In response to supported events, a remedy (in the form of a command) will be dispatched to the device
- The configuration server must be able to execute pre-requisite commands in the proper order
- The device will then enter into the desired state

Team 6: Motorola

53

Architecture Illustrated



Team 6: Motorola

54

Architecture Components

- Platforms
  - Windows Server 2003
  - Windows XP Pro
- Software / Technologies
  - Java
  - XML
  - RMI
  - Cisco
  - CVS

Team 6: Motorola

55

Architecture Risks

- Understanding device we will be working with
- Meeting milestones on time
- System Network Management Protocol (SNMP)
- Asynchronous vs. synchronous event handling
- Designing system so it is extendable
- ANT

Team 6: Motorola

56

Project Schedule

- We are working on Kabe's Schedule
  - Around 4 or 5 milestones
  - Generally given around 2-3 weeks to complete each one
  - Milestones handed out as project matures
- Milestone 1
  - Goal: Core Architecture/Messaging Working
  - Date: 9/16
- Milestone 2
  - Goal: Compete Core, Demo for Kabe
  - Date: 9/30

Team 6: Motorola

57

Project Purpose

- Automatically configure many different devices
- The solution should be extendable to configure any sort of device (including cell phones/ PDA's, etc)
- Our code will be reused in future Motorola projects

Team 6: Motorola

58

MICHIGAN STATE UNIVERSITY

6. & 7. Teams: Technical Specification / Schedule Mystery Shop Program

Team 7: Two Men And A Truck

CSE 498, Collaborative Design

Thomas Gudritz
Ee Foong Lee
Thi Nguyen
Ryan Ross

Department of Computer Science and Engineering
Michigan State University

Fall 2005

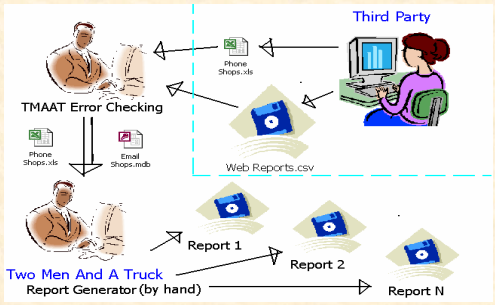
Project Overview

- **TWO MEN AND A TRUCK®** conducts quarterly mystery shops for each of their franchise locations. There are two types of mystery shops: Phone and e-mail.
- The shops are conducted by a third-party company and the results are provided to Two Men And A Truck® in a database format.
- When Two Men And A Truck® receives the data there are numerous tasks and steps taken in order to generate many reports.
- We are building an ASP.NET/C# application designed to streamline and automate this entire process into a web-based system.

Team 7: Two Men And A Truck

60

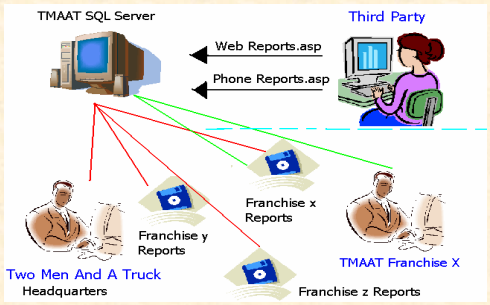
Current Architecture



Team 7: Two Men And A Truck

61

Goal Architecture



Team 7: Two Men And A Truck

62

Architecture Components

- Platforms
  - Windows Server 2003
  - IIS 6
  - Windows XP Pro
- Software / Technologies
  - ASP.NET / C#
  - XML
  - Visual Studio 2005
  - SQL Server 2000
  - NPersist

Team 7: Two Men And A Truck

63

Architecture Risks

- Getting the database files to cooperate with the report generator.
- Automating error-free input at the user level.
- Importing all old databases and reports.
- Confidentiality & accuracy: Multiple locations or franchises for one owner.
- Learning new languages, i.e. SQL, C#, ASP.NET
- Accurate database management, tables and data in sync in real time.

Team 7: Two Men And A Truck

64

Project Schedule

1. Meet with Two Men And A Truck
   a) Establish project specs and generate ideas to streamline process
   b) September 12th
2. Schedule and Organization
   a) Schedule order of operations and presentation slides
   b) September 19th
3. Prototype
   a) Working prototype up and running
   b) September 26th
4. Present progress to TMAAT
   a) Meet with TMAAT to present/critique progress
   b) October 3rd

Team 7: Two Men And A Truck

65

Project Schedule

5. Finalizing front end user interface
   a) Database and web interface in sync
   b) October 10th
6. Report generating
   a) Accurately generate reports given any number of arguments
   b) October 17th
7. Franchise security
   a) Member access to correct reports
   b) October 24th
8. Meeting with TMAAT
   a) Demonstration of working programs
   b) November 2nd

Team 7: Two Men And A Truck

66

Team 7: Two Men And A Truck

Project Schedule

9. User manual draft
   a) Drafting of user manual
   b) November 9th
10. Complete user manual
   a) Final proofing of user manual
   b) November 16th
11. Project documentation and movie
   a) Documentary of our successful project
   b) November 23rd
12. Final presentation
   a) Demonstration of our final product
   b) December 5th

67

MICHIGAN STATE UNIVERSITY

6. & 7. Teams: Technical Specification / Schedule On-Board Locomotive Wireless Network

Team 8: Union Pacific Railroad

CSE 498, Collaborative Design

Tyler Tom
Chien Se
Dave Wilson
Bill Vassas

Department of Computer Science and Engineering
Michigan State University

Fall 2005

Team 8: Union Pacific Railroad

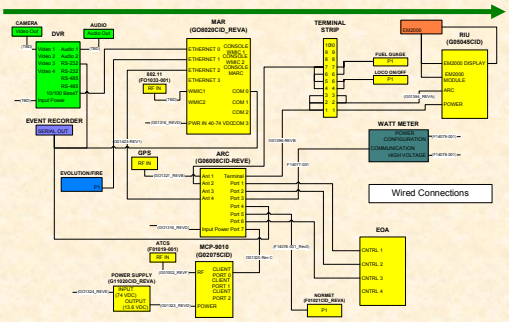
Project Overview

- To create a viable wireless solution for Union Pacific Railroad to replace their current data networks in use on-board their locomotive fleet
- Since we do not have 1) a train and 2) their equipment we must emulate the network environment as closely as possible
- Union Pacific has expressed interest in a non 802.11 solution, thus research into multiple wireless technologies is required
- Multiple data network technologies on-board locomotive complicate solution
- Security and manageability are paramount and must be kept at the forefront of any solution

69

Team 8: Union Pacific Railroad

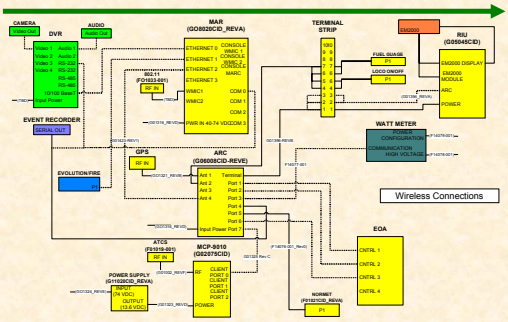
Architecture Illustrated



70

Team 8: Union Pacific Railroad

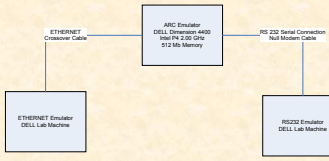
Architecture Illustrated cont.



71

Team 8: Union Pacific Railroad

Architecture Illustrated cont.



- Simplified network to emulate complex network on-board the locomotive
- Communication Emulation Programs designed to allow nodes to emulate devices on the network
- Test messages and traffic footprints for devices on the network to be delivered from Union Pacific to allow accurate emulation of devices

72

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Architecture Components

- Platforms
  - 3 node test network
  - Each machine running Linux (Fedora Core 4)
  - 2 links simulated via serial cable and Ethernet cable
- Software / Technologies
  - C/C++ for communication emulation programs and management software back end
  - Web Interface for front end of management software
  - Wireless hardware TBD at this time
  - 3, possibly 4 wireless devices to be created depending

73

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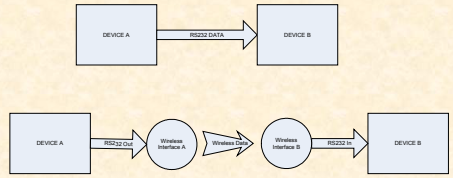
Architecture Illustrated cont.



New network links in any wireless solution will resemble something along these lines

74

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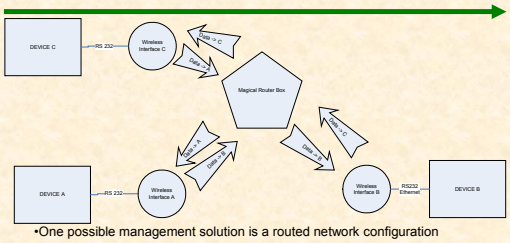
Architecture Illustrated cont.



- One possible management solution is a routed network configuration
- Routed network configuration provides us with plug and play esque capabilities for adding or removing systems from the network
- Helps alleviate RF attenuation issues by acting as a repeater thus allowing the possible usage of lower powered wireless hardware (keeping any humans in the area from having to wear lead suits)

75

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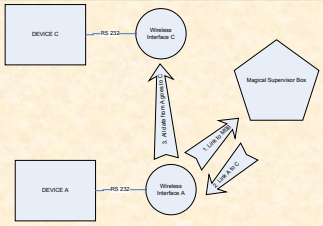

- Other possible management solution is the "supervisor"
- In this solution all interfaces are initially configured to talk to the MSB
- MSB allows configuration of wireless interfaces to make direct connections to other wireless interfaces (I.E. ad-hoc)

76

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Architecture Decisions

- Decision on network topology and management solution dependant upon wireless technology chosen
- Current wireless technologies under consideration
  - Bluetooth
  - Aerocomm 900MHz data communication equipment
  - Ultra Wideband (UWB)
  - 802.11

77

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Architecture Security

- All solutions must be secure
- 802.11 provides built in security via WPA2, utilizing AES encryption
- All non-802.11 solutions will need to have a front end encryptor//decryptor
- Encryptor//decryptor will be software based

78

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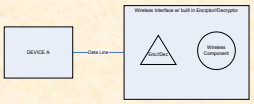
Architecture Security cont.

- Non-802.11 wireless interfaces will most likely be prototyped on a computer in software (possibly to be moved to hardware in the future)
- Encryptor//decryptor will be software based and integral part of data flow



79

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Architecture Risks

- Not finding a suitable wireless technology
- Physics of operational environment
- Overhead of encryptor//decryptor affecting network performance
- Router based management solution may act as a choke point//bottle neck on network, also may not be viable depending on wireless technology
- "Supervisor" management solution may not be viable depending on wireless technology
- Cost of solution may outweigh benefits of moving to wireless
- Protocol wrapping of RS232 and Ethernet to wireless protocol

80

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Project Schedule

1. Feasibility//Technology Study
   a) Goal: Gain understanding of how various wireless technologies work and would be implemented
   b) Date: Friday, 23 September 2005
2. Communication Emulation Programs
   a) Goal: Programs will allow emulation of devices on the locomotive network
   b) Date: Friday, 30 September 2005
3. Prototype devices for one transfer technology
   a) Goal: Create operational prototype wireless device
   b) Date: ?? Monday, 10 October 2005
4. Prototype link for one transfer technology
   a) Goal: Create operational link out of prototypes
   b) Date: ?? Friday, 14 October 2005

81

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Project Schedule

5. Prototype device of remaining transfer technology
   a) Goal: Create prototype device for remaining transfer technology
   b) Date: ?? Friday, 21 October 2005
6. Prototype link of remaining transfer technology
   a) Goal: Create prototype link for remaining transfer technology
   b) Date: ?? Tuesday, 25 October 2005
7. Full network testing
   a) Goal: Operational testing on test network
   b) Date: ??Friday, 28 October
8. Optimization
   a) Goal: Further optimization of interfaces
   b) Date: ??

82