

MICHIGAN STATE
UNIVERSITY

Project Plan

Fleet Auction Distribution and Sale Optimizer

[The Capstone Experience](#)

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

Project Overview

- Chrysler sells fleets of vehicles that get returned to auction sites
- Dealers come to bid on cars at auction sites across the country (15 or so nation wide)
- Our task is to optimize where vehicles are sent
- Factors include climate, market saturation, transportation logistics, etc...



Functional Specifications

- List/Filter/Search Auction sites based on certain criteria
- Suggest optimized distribution of cars to user
- Allow user to adjust factors used for optimization
- Allow user to create and analyze custom transportation packages
- Report summary of accepted transportation plans



Design Specifications

- Using Google maps interface to display macro information (current market state)
- Incremental depth of detail for information for viewing and editing optimized packages
- Table styled summary of details of session decisions
- Dynamic web form interface for editing system settings



Screen Mockups

The screen mockup is divided into three main sections: **Current Stats**, **Suggested Changes**, and **Summary**.

- Current Stats:** Shows "Detroit -> Orlando" and "Kansas City -> Atlanta". A "Create Custom..." button is also present.
- Suggested Changes:** A "Sort by (\$, make, model...)" dropdown is at the top. Below it are three suggestions:
 - 2009 Dodge Avenger (+\$800) with an unchecked checkbox.
 - 2010 Dodge Charger (+\$600) with a checked checkbox and a red arrow pointing to the Summary section.
 - 2003 Chrysler T&C (+\$300) with a checked checkbox.
- Summary:** Titled "Transportation Details", it compares two auction scenarios:
 - KC Auction:** Base estimate: \$27,000; Mileage(16.5 k): -\$200; Regional/Seasonal: \$700; Total: \$26,100.
 - Atlanta Auction:** Base estimate: \$27,000; Mileage(16.5 k): -\$200; Regional/Seasonal: \$0; Transportation: -\$100; Total: \$27,700.
 - Difference:** +\$600.

An "Accept or reject suggestion" button is located at the bottom left, with an arrow pointing to the suggested changes list.



Screen Mockups

Auctions

The image shows a map of the United States with several red location pins placed across various states, including Washington, California, Colorado, Nebraska, Missouri, Illinois, Michigan, Indiana, Ohio, Pennsylvania, New York, Virginia, North Carolina, Georgia, and Florida. The map includes navigation controls on the left and a style selector at the top right. A sidebar on the right provides details for a specific auction.

Map | Satellite | Hybrid | Terrain

Manheim Arena Illinois Auto Auction (Chicago)

Town and Country

- Model Details
- Sold: 14
- Sold/Offered: 83.3%
- Avg Miles: 21,182
- Avg Gross: \$20,032
- Avg Wholesale: \$34,975
- Gross/Invoice: 57.3%
- MASP/Invoice: 57.5%
- Floor (+/-): -0.3%

Avenger

Jeep Liberty

Jeep Cherokee

Chrysler 300

Dodge Challenger

Dodge Ram

Map data ©2011 Europa Technologies, Geocentre Consulting, REGI, MapLink, Tele Atlas - Terms of Use

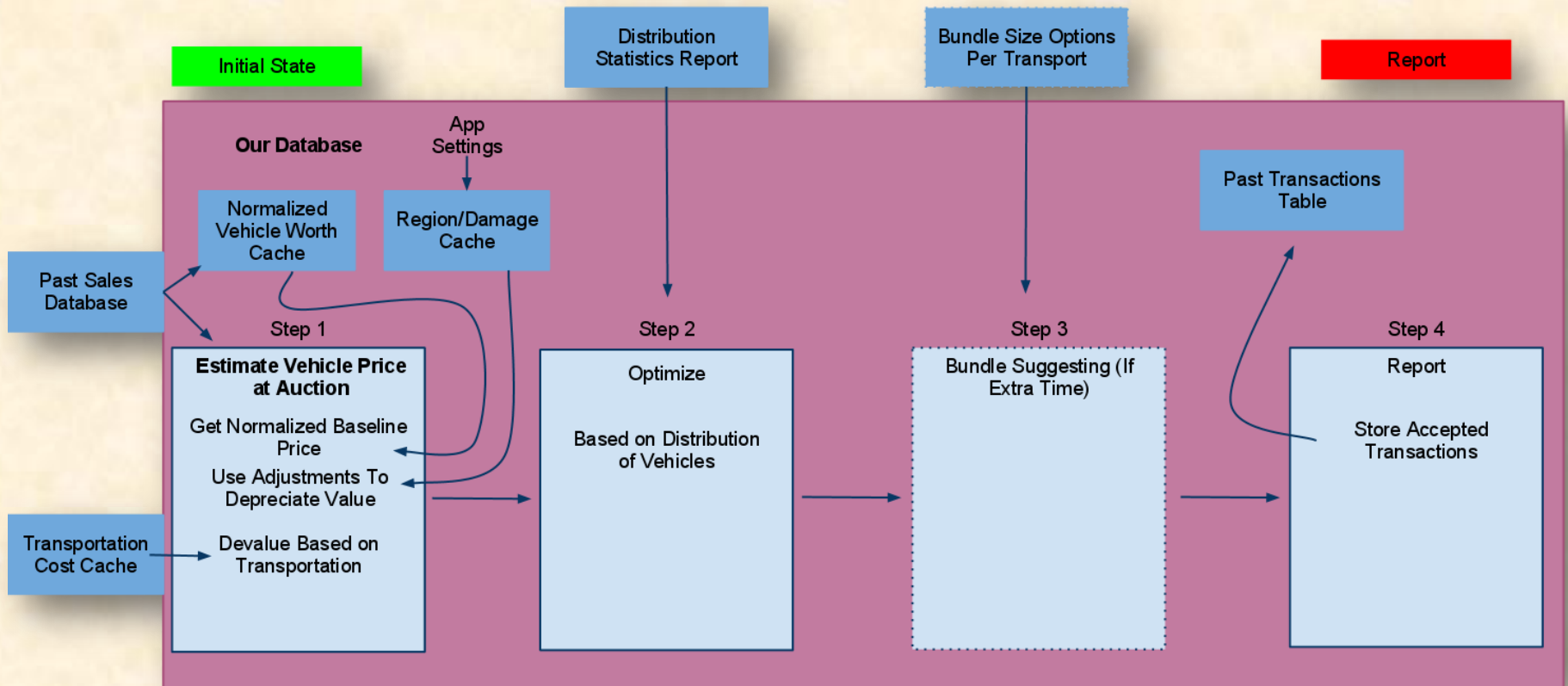


Technical Specifications

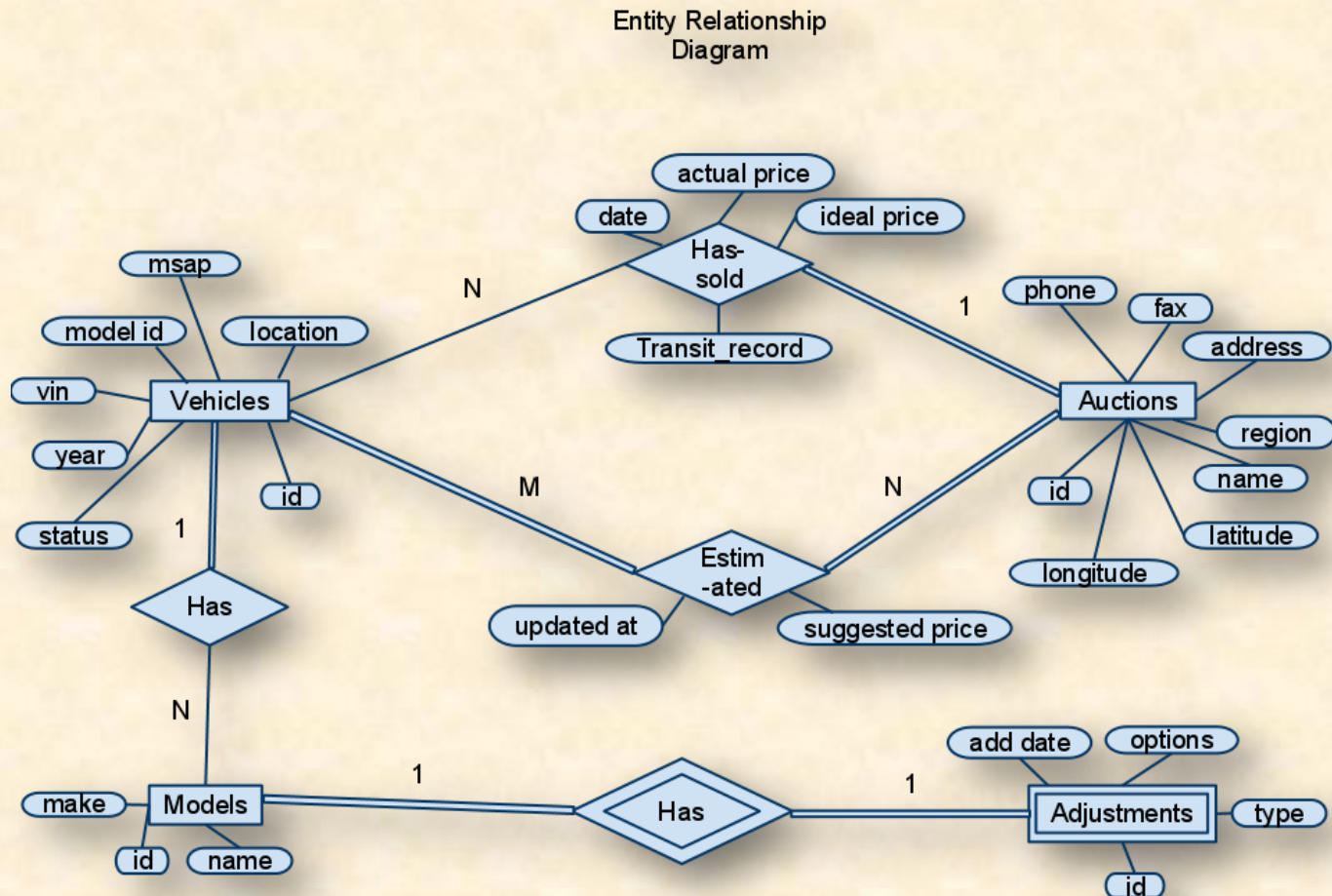
- Estimate/cache baseline prices for each vehicle model at each auction site
 - Can be aggregated over various amounts of time
- Depreciate vehicle instance from baseline based on user defined statistics
- Depreciate instance based on external distribution information
- Package vehicles into bundles based on transport options for specific source auction site
- Report summary of optimization session in a consumable format



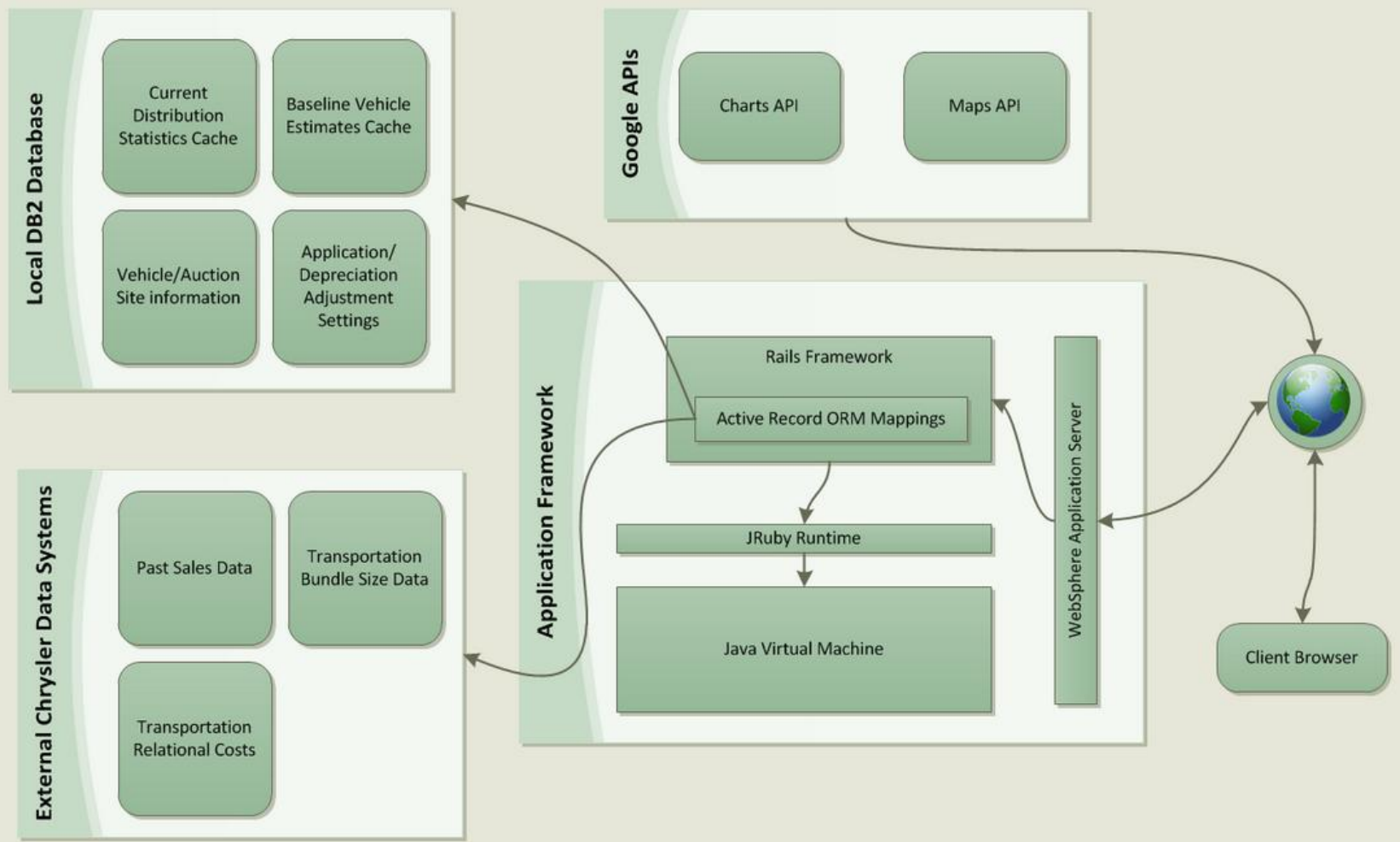
Technical Specifications



Technical Specifications



System Architecture



System Components

- Hardware Platforms
 - Production server Solaris
 - We use a Linux staging environment because of WebSphere
 - Using DB2 and WebSphere for hosting data and application
- Software Platforms / Technologies
 - Ruby/Rails web application framework
 - Mixture of JavaScript and HTML for client code
 - Google maps/charts APIs



Testing

- Unit Testing
 - Rails Test Unit framework
- Algorithm Accuracy Testing
 - Given historical sales data, establish different scenarios
 - Run our optimization on the data and compare against actual sales
- Integration Testing
 - Verify application works cross browser



Risks

- Getting aggregated/preprocessed sales reports from Chrysler
 - Time frame
 - Method of adding data to the system
- Efficiency of system
 - We assume because there are a discrete number of auction sites and limited number of cars per session
- Internal deployment
 - Chrysler network is relatively locked down, need to be careful what APIs we use

