Algona Mill Truck Dispatching Automation

Final Report
November 2006

Sponsored by
Murphy-Brown, LLC

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16. Abstract

This research was initiated by Murphy-Brown, LLC (MB), to automate the company's truck dispatching activities. The company's goals were to move away from a manual truck dispatching program, improve the economy of truck usage, and capitalize on truck back haul.

The research team observed MB's current manual truck dispatching operations at a MB mill in Algona, Iowa, and spoke with staff at the Algona site. A Hy-Vee distribution center in Chariton, Iowa, which recently acquired an automated truck dispatching system, was visited to evaluate Hy-Vee's automated dispatching operations. An internet search for truck routing software vendors was also completed. The Algona mill's automated truck dispatching system requirements were then compiled using all of these resources. Lastly, a teleconference was held to discuss the application of automated truck dispatching software from Paradox Software Consulting, Inc., and the results were positive.

This report recommends that Paradox Software Consulting, Inc., be selected to supply an automated truck dispatching program to MB. Paradox is currently providing other services for MB, and Paradox can meet or exceed the system requirements detailed in this report.

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ALGONA MILL TRUCK DISPATCHING AUTOMATION

Final Report
November 2006

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Sponsored by
Murphy-Brown, LLC

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ACKNOWLEDGMENTS

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INTRODUCTION

Murphy-Brown, LLC (MB), a livestock production company headquartered in Warsaw, NC, initiated the research described in this report. The company's goal was to automate its truck dispatching activities and to achieve the following objectives:

1. Move away from a manual truck dispatching program
2. Improve the economy of truck usage
3. Capitalize on truck back haul

To achieve these objectives, MB required an automated truck dispatching program that could interface with its already existing Taylor Feed AS 400 database (Taylor Feed).

Project Background

On January 13, 2006, representatives of MB attended a meeting at the Iowa State University Research Park with staff from the Center for Transportation Research and Education (CTRE). The following were present at the meeting:

- Bart Borg, Director of Feed Operations, MB
- Ron Hollenbeck, Western Operations Feed Manager, MB
- Brian Reding, Transportation and Logistics Manager, MB
- Steve Andrle, Director, CTRE
- Duane Smith, Associate Director of Outreach, CTRE
- Zach Hans, Research Engineer, CTRE

Research Tasks

As a result of this meeting, CTRE proposed the tasks listed below. The tasks define the issues surrounding MB's current manual truck dispatching operations and chart a direction for future MB automated truck dispatching operations.

> *Task 1*. CTRE staff will solicit data from MB staff that document current manual truck dispatching operations. This data gathering will include contact with MB personnel located in Smithfield, Virginia. CTRE will be interested in samples of data entered into MB's system and the system's supporting software and programming requirements.
>
> *Task 2*. CTRE staff will spend a day at a MB mill in Algona, Iowa, observing the operations, interviewing dispatchers and other employees as needed, and collecting data samples and reports.
>
> *Task 3*. CTRE staff will prepare an interim report that documents the findings of the data collection activities and defines MB's goals for automating the truck dispatching operations. An investigation into commercial dispatching software will also be

conducted. Included in this interim report will be recommendations for the optimization of truck routes from the Algona plant to the trucks' various destinations.

Task 4. CTRE staff will revise the interim report as needed.

A fifth task, to develop a second phase designed to meet MB's truck dispatching automation goals, was also proposed during the initial meeting. However, it has been recommended that Paradox Software Consulting, Inc., undertake this task. This task would include describing specific tasks to be pursued, a potential time frame for accomplishment, and a draft budget.

CURRENT OPERATIONS FOR MURPHY-BROWN, LLC

To begin documenting MB's current manual truck dispatching operations, the research team first met in Algona, Iowa, on May 23, 2006. The following attended the meeting:

- Bart Borg, Feed Operations, MB
- Brian Reding, Transportation and Logistics, MB
- Ron Hollenbeck, Feed Manufacturing, MB
- Gayle Odland, Business Systems, MB
- Larry Meyer, Dispatch, MB
- Duane Smith, Associate Director of Outreach, CTRE

Ron Hollenbeck provided an overview of the MB operations at Algona. A copy of his presentation is included in Appendix A. In addition, Larry Meyer provided a copy of the data sets used in MB's dispatching operations. The data sets are included in Appendix B and consist of the following:

1. SDI feed files from Taylor Feed
2. Nursery files
3. Sow files
4. Sow finishing files
5. Nursery files

6. and 7. Mill 15 outstanding orders, morning download

8. and 9. Feed dispatch report

10. Data input query
11. Load-out report to the mill
12. Driver's load-out daily report

After discussing these data sets and reports, the research team defined the following desirable qualities that an automated system would include:

1. Ability to be imported to other locations within the MB system
2. Ability to accept data from Taylor Feed
3. Ability to use GPS coordinates for each grower and for the mill site (the Algona mill has these) in the dispatching operations
4. Ability to calculate the time or distance the trucks travel for purposes of haul payment
5. Ability to upload feed orders to the mill system
6. Ability to provide the level of data now available from Taylor Feed
7. Ability to download the dispatching data to Taylor Feed

The basic existing dispatching process is illustrated in Figure 1. A grower initiates the process by calling into the SDI system located in West Virginia. The order information is then loaded into Taylor Feed. For the next step, the feed orders are downloaded to the Algona mill. This download is completed twice per day, once in the morning and once in the afternoon. After the dispatching has been completed, the order and dispatching data are transferred to WEM Speak

and WEM Load Out, where files are transferred back into Taylor Feed for historical records and for accounting purposes.

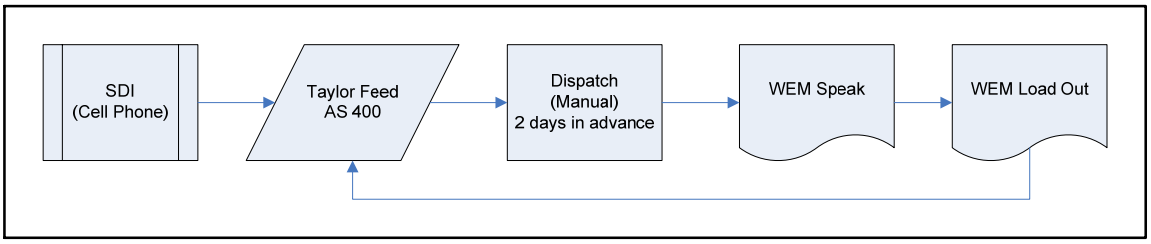


Figure 1. Basic existing dispatch process

The specific steps in this dispatching process are shown in Figure 2. The figure illustrates the individual activities, the location at which they occur, and the mechanism used (software, manual operation, etc.).

The requirements of the dispatching decision process are illustrated in Figure 3. The beginning of the process is defined as the point at which a grower calls in a feed order. The information captured includes order number, grower number, lot and bin numbers, pounds of feed to be delivered, and delivery date.

When the order data is downloaded to the Algona mill, two initial decisions must be made: (1) what zone the order fits into and (2) whether the order is a special mix or one of the standard mixes. Once these two decisions have been made, the system determines whether the order consists of a full load or a partial load. If the order is for a full load, the system identifies a truck available for delivery. If the order is for a partial load, the system searches for other partial loads in the same zone and completes the delivery in such a way that a full load is transported to the grower(s). As the orders are assigned to the available trucks, the distance to the grower and the round-trip time is calculated to determine when the various trucks will next be available at the Algona mill for other dispatches. The truck report and the mill report are then generated and combined into a summary report. The Algona mill receives this report, and it is uploaded to Taylor Feed.

Figure 3 also shows two large, red arrows that indicate the interface locations between the Algona mill and Taylor Feed. If the truck dispatching process in Algona is to be automated, an interface program will need to be developed.

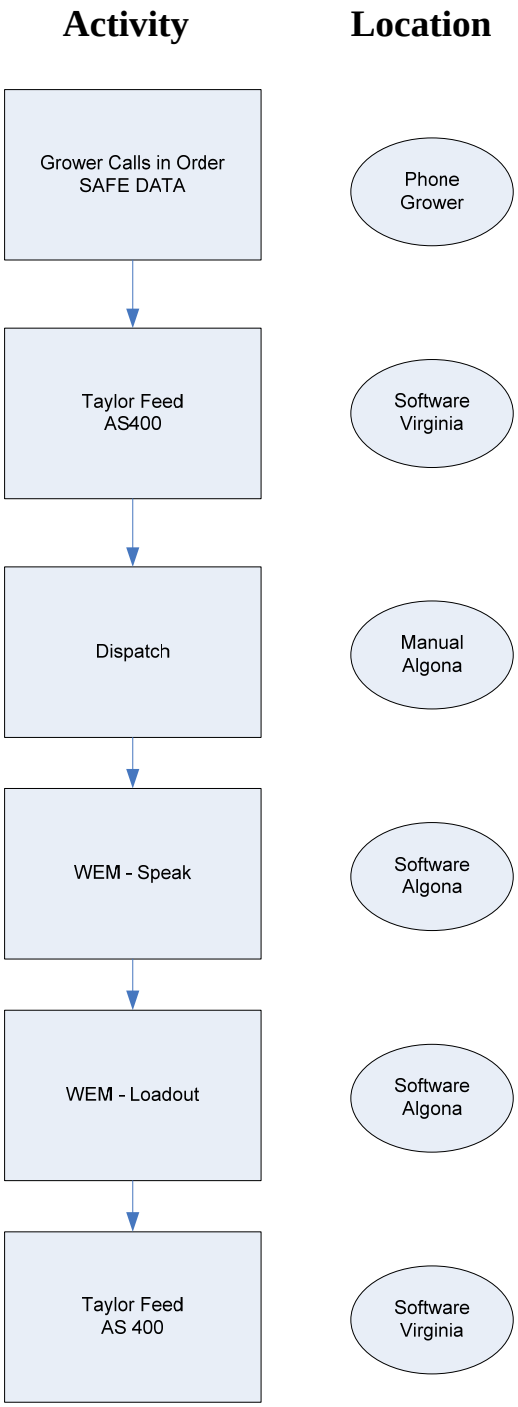


Figure 2. Overview of dispatch activities

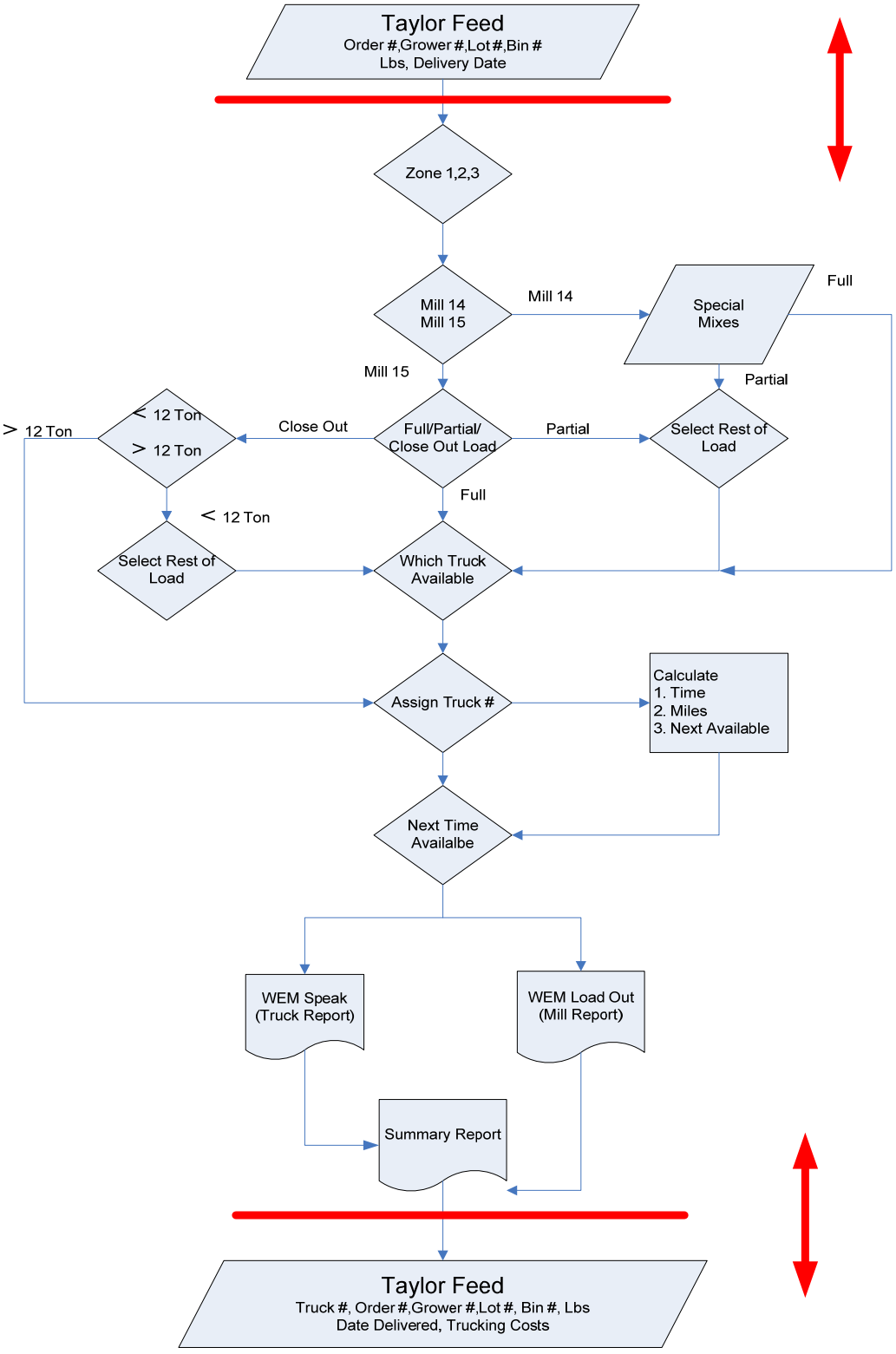


Figure 3. Dispatch decision process requirements

REVIEW OF PARADOX AUTOMATED ROUTING TOOL AND CONTINUOUS MOVE PLANNER

The Algona research team determined that an automated dispatching system for MB would need to meet the following requirements:

- Download to Windows-based applications and allow for interfacing with Taylor Feed
- Manage partial load orders
- Plan for multiple stops
- Allow scheduling of back haul orders
- Specify the order delivery times
- Specify the pickup times for back haul orders
- Complete one-way routing
- Complete round-trip routing
- Route to zones

The Paradox Automated Routing Tool (PART) and Continuous Move Planner (CMP) are two software products currently being used in other divisions of MB to route trucks automatically. Both of these products were reviewed to determine how well they would meet the routing requirements defined by the Algona research team.

Paradox Automated Routing Tool

PART is a "routing and scheduling" tool that produces optimum routes for a given set of orders or shipments while meeting predetermined requirements such as time windows and service times. The program is a standalone Windows-based application with a user-friendly interface. PART consists of data management, Geographic Information Systems (GIS), and scheduling modules. All the data and solutions can be exported as text files to Microsoft Word or Excel.

The program has the following features:

- Order data are displayed in a spreadsheet format.
- Routes are created to build closed-loop and one-way vehicle routes.
- Scheduling algorithms are used and have the flexibility to change assignments.
- Reports are exported as text files and imported into Microsoft Word or Excel
- PART runs in all Microsoft Windows operating systems.
- PART utilizes PC Miler or MapPoint routing and scheduling engines.
- Planning is done by the day of the week and date, and the dates of the planning horizon can be set manually.
- PART is not currently set up to match partial loads or create truckload deliveries.

In summary, it appears that PART would meet many of the requirements determined by the Algona research team. The question to ask now is, "Can the program be modified to meet the other requirements?" This question was further investigated during the presentation by Paradox Software Consulting, Inc., as discussed below.

Continuous Move Planner

CMP is a truckload tour/continuous move building tool that can generate optimal matches of truckload moves. It is a standalone Windows-based application with a user-friendly interface. The program has the following features:

- CMP can be used either as a network building tool or a daily execution tool for dispatching truckloads.
- Solutions can be exported as text files into Microsoft Word or Excel.
- Data input is in the form of flat files.
- Origin-destination data, such as grower addresses, can be imported into CMP.
- Time calculations can be based on user-defined speed zones.
- The program utilizes PCMiler as a routing program.
- The dispatcher can manually make changes to the schedule.

In summary, it appears that CMP can perform many of the same functions as PART, but does not take partial loads and configure them into full loads and does not have the capability to route back hauls.

RREVIEW OF A ROUTING PROGRAM USED BY THE HY-VEE, INC., DISTRIBUTION CENTER

After meeting with the Algona research team and discussing PART and CMP, there was general agreement that utilizing an existing software program would be better in the long term than having Iowa State University develop an application that may prove to be difficult to modify or support in the future. Duane Smith was asked to research some of the major trucking entities in the state of Iowa to determine the routing programs they were using and to gauge the extent to which the programs were meeting their needs. The three firms identified were Hy-Vee, Inc.; Casey's General Stores, Inc.; and Farner Bocken Company. These are all non-carrier firms: they do not haul for a fee, but rather move products to a location. Michael Crum, Associate Dean for Graduate Programs and Professor of Logistics and Supply Chain Management at Iowa State University, was approached for contact persons at each of these firms. Dr. Crum's e-mail response is included in Appendix D. He only had a reference for Hy-Vee, Fred Houseman.

When Mr. Smith contacted Hy-Vee and asked for Mr. Houseman, he was directed to Jim Moore, Assistant Vice President for Transportation, who had recently guided Hy-Vee through the process of selecting a truck routing program. Mr. Smith scheduled a trip to the Hy-Vee distribution center in Chariton, Iowa, on June 29, 2006, to meet with Mr. Moore. At the time of Mr. Smith's visit, Hy-Vee had recently gone through a selection process for a load building and truck routing program. A committee of Hy-Vee employees and users was established to make the selection. The committee took some time to come to a conclusion, but selected Supply Chain Logistics from Carey, North Carolina. The contact person at Supply Chain Logistics was Carl Hatt. (Mr. Smith did not contact Mr. Hatt because the documentation material from Hy-Vee was dated and because the dispatching program from Supply Chain Logistics did not match MB's requirements.) Two programs were utilized to design Hy-Vee's routing system, Route Pro and SSA Global. The routing system has the following characteristics:

- Geographical areas are used for zones.
- Optimum truck routes can be selected based on mileage or travel time.
- Back hauls can be scheduled for return trips.
- Truck routing results can be edited manually.

Mr. Moore did not recommend this system for the MB application. Hy-Vee employees had entered the data, which was a lengthy process. Moreover, program support does not include on-site visits by the provider, but instead involves phoning technical support personnel to talk the technician through troubleshooting steps.

However, Mr. Moore recommended another product that he had researched, but which the Hy-Vee committee did not select. The product, called TruckStops, is provided by Microanalytics. Mr. Moore provided Mr. Smith with a notebook containing the documentation he had reviewed. Mr. Smith reported the findings of his visit to the Algona research team.

INTERNET SEARCH FOR OTHER TRUCK ROUTING PROGRAMS

In addition to visiting Hy-Vee, Mr. Smith completed an internet search for additional truck routing programs and found that several are available. Appendix E presents selected results from the internet search, including information from the following sources:

- Apian Logistics
- Business Mileage and Routing Software
- Cube Route
- Dynamic Routing
- InterGis Advanced Routing, Scheduling, and Dispatching
- Optrak
- ServMan Route Management
- Truck Dispatching Innovations
- TruckStops Routing and Scheduling Software

Other truck routing resources are available, but the products above appear to represent most commercially available truck routing software systems. These products have the following features in common:

- PCMiler and/or Microsoft MapPoint routing software
- User-friendly software interface
- Software that runs on PCs with Microsoft products
- Capability of creating distribution zones
- Use of time, distance, or weight to build loads

SYSTEM REQUIREMENTS AND RECOMMENDATIONS FOR TRUCK ROUTING SOFTWARE

After meeting with the Algona research team and observing the existing routing operations firsthand, visiting a major trucking operation that had recently selected a truck routing system (Hy-Vee), and completing an internet search for truck routing software vendors, Mr. Smith recommended that the Algona research team select a commercial product or engage the services of an organization that develops truck routing software and that can provide support and upgrades in the future.

Truck Routing Software System Requirements

The truck routing system requirements that MB needed to be aware of included the following:

- Ability to interface with Taylor Feed software
    - Download the grower's feed orders
    - Upload the dispatching data for accounting purposes
    - Export reports into Microsoft products
- Ability to combine partial loads efficiently into economic full loads
- Ability to manage back haul demands
- Allowance for manual editing of truck routing software output
- Capability of creating and dispatching to zones

Recommended Truck Routing Software from Paradox Software Consulting, Inc.

To review a proposal for developing an automated truck dispatching system, a teleconference interview was arranged on August 8, 2006, with Paradox Software Consulting, Inc. The Paradox representatives included the following:

- Bob Glenn
- Bhushan Veerapaneic

The MB representatives included the following:

- Bart Borg
- Brian Reding
- Ron Hollenbeck
- Gayle Odland

Mr. Smith also attended the teleconference.

As mentioned in the discussion of PART and CMP, Paradox already provides services to MB. Therefore, before this teleconference, Paradox had downloaded the morning and afternoon orders from Taylor Feed and had successfully used this data to route trucks. Mr. Glenn outlined the MB system requirements, while Mr. Veerapaneic provided visual support for the Paradox

automated truck dispatching software using the data that had been downloaded from Taylor Feed. The demonstration of the Paradox automated truck dispatching system illustrated the following:

- Routing can be completed by time or by distance.
- Routing results can be edited manually by the dispatcher.
- PC Miler and Microsoft MapPoint are used for routing.
- The program can complete one-way routing.
- The system provides for back haul routing and scheduling.
- The system can recognize zones, and there is no limit to the number of zones.
- Paradox already provides an interface with Taylor Feed in another application.
- The following reports may be exported to Microsoft Excel:
    - Order summary
    - Route summary
    - Truck report (tons, miles, times, etc.)
- Orders may be moved around in the routing program using a “click and drag” function.
- The system, once developed for the Algona mill operations, can be exported to other MB locations.

Based on the features of the Paradox routing system, the system meets or exceeds the requirements described by the Algona research team.

SUMMARY

The research team for this project first discussed MB's current manual truck dispatching operations with the Algona mill staff and visited the Algona site. Mr. Smith then visited the Hy-Vee distribution center in Chariton, Iowa, and completed an internet search for truck routing software vendors. The Algona mill's automated truck dispatching system requirements were compiled using all of these resources. A teleconference was then held to discuss the application of the Paradox Software Consulting, Inc., automated truck dispatching software, and the results were positive.

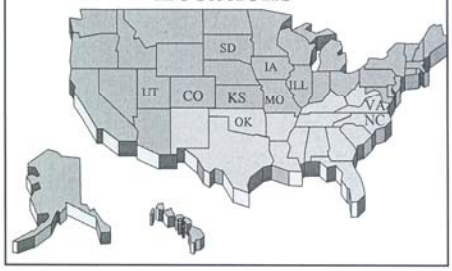
Consequently, this report recommends that Paradox Software Consulting, Inc., be selected to supply an automated dispatch truck routing program to MB. Paradox is currently providing other services for MB, the company has successfully downloaded growers' order data from Taylor Feed and completed a truck routing exercise, and the company can meet or exceed the system requirements detailed in this report. In addition, Paradox can export the results of the Algona mill project to other MB operations and will provide long-term system support and upgrading opportunities.

APPENDIX A. PRESENTATION BY RON HOLLENBECK

Murphy-Brown, LLC
Dispatching Program

January 13, 2006

Murphy-Brown Production Locations



Western Operations
Sow Operations (Company-owned and contract)

Missouri – 50,000	Iowa – 23,000
Illinois – 13,000	Colorado – 34,000
Oklahoma – 75,000	Kansas – 5,000
Utah – 60,000	

Total of 260,000 sows

Western Operations
Finishing Operations (Company-owned and contract)

Missouri	South Dakota
Illinois	Iowa
Oklahoma	Minnesota
Texas	Colorado
Utah	Kansas

Total of about 5.5 million market pigs
Murphy-Brown produces approximately 14% of pork raised in the U.S

All Sites

Algona Sites

Algona, Iowa Feed Mill

Background

- Dispatch Department in Algona
  - Staff of Two
  - Dispatch for 500+ Grower Sites (Primarily Iowa)
  - Process Feed Orders for Seven States
    - Iowa, Illinois, South Dakota, Missouri, Kansas, Oklahoma, Colorado
  - Process Feed Orders for 28 tollmills and 4 Company Owned Mills

All Mills

Iowa Mills

Background

- Algona Mill
  - Delivers 12,000 Tons of Feed Weekly
  - Approximately 500 Loads per Week
  - Need to load a truck every 16.5 minutes
  - Utilize 3 Company Owned Trucks and 29 Contract Trucks
  - Sites are Primarily Located in Western Iowa (West of I35)

Algona Truck Information

Truck #	Hrs/Day	Home Base	Est. Miles Per Day	Comments
99	12	Ruthven	500	
1100	12	Whittemore	440	
64	12	Dawson	440	
640	12	Whittemore	440	
56	12	Priest	440	
40	12	Algona	450	
1025	24	Ashton	600	
1302	12	Sheldon	375	
43	12	Algona	500	
48	24	Sheldon	500	
49	24	Yale	700	
53	24	Algona	700	
1300	24	Algona	Short	
1010	12	West Bend	440	
1011	12	Burt	440	
1012	12	Algona	440	
1013	12	Algona	500	
1020	18	Ashton	900	
1110A	12	Charles City	400	
1110	12	Charles City	400	
1111	12	Charles City	400	
1200	18	Algona	450	
1400	12	Yale	500	
1301	12	Algona	400	
1301B	48	Algona		Iowa Falls Runs (6 trucks)
1300V	12	Algona		Vac Unit
433	24	Algona	Short	Company Truck
432	24	Algona	Short	Company Truck
321	24	Algona	Short	Company Truck

Home Bases

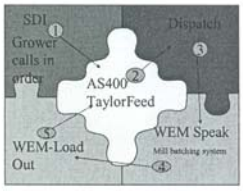
Current Dispatching Process

- Growers call Safe Data to place order
  - Orders are placed by bin number and lot number
- Orders are downloaded into our Taylor System twice each day and printed
  - Taylor assigns feed type, feed order number
- Orders are manually paired together to obtain full truck loads
  - Correct distribution of number of loads and delivery locations to balance the day and week

Current Process Continued

- Once all orders are paired together and balanced, the order file is dumped into an Access Program.
  - Truck number and load times are assigned
- Load sheets are printed for each truck
  - Schedule for each truck for next 24 hours
- File is uploaded to our mill control system for loading

Integrated Feed System Internal Mills



Objectives of Desired Program

- Accept a download of the feed orders from Taylor
- Utilize GPS Coordinates to most efficiently dispatch loads
  - Pairing of split loads
- Indicate the number of miles for each load
  - Will be used for paying of contract haulers
- Assign a load number for each load
- Follow DOT Regulations
- Print a Dispatch by Truck
  - Can use current Access program
- Upload Orders to Mill Control System

Objectives

- Robust System that can be Applied to Other Locations
  - Texhoma, Milford, Missouri, etc

Variables

- Number of Trucks Used per Day
- Designating Region for Last Load of the Day (Load Home)
- Ability to Lock Specific Trucks into a Region for Delivery
  - Iowa Falls Trucks
  - Opportunity to Expand this Function in Future

Variables

- Assign Dispatching Priority of Specified Trucks
  - Company Short Haul Filled First
  - Iowa Falls Trucks Filled in that Region
- Load Size
  - Usually 24 Tons or More
- Hours of Operation for Each Truck
- Maximum Miles Per Day
  - To meet DOT Regulations

Variables

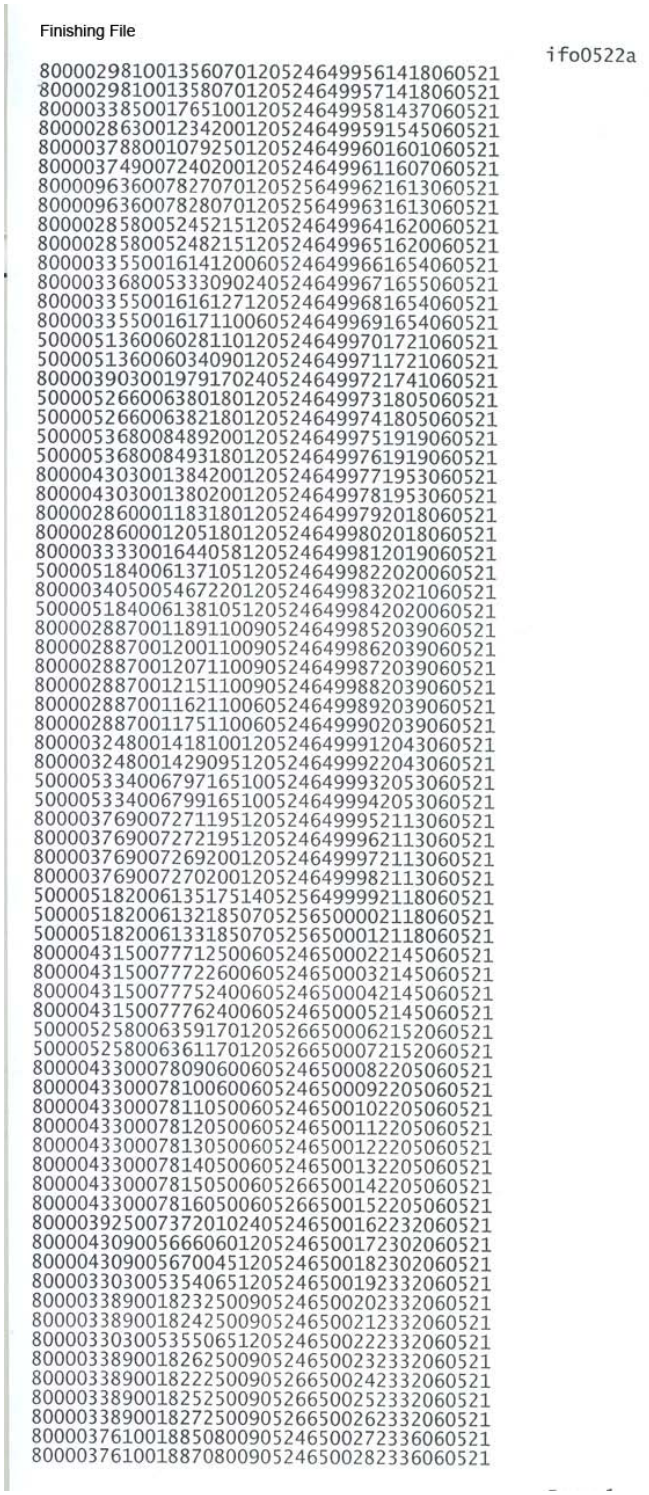
- Medication Sequencing Process
  - Feed type priorities
- Loads Needed Each Day
  - # Long Loads
  - # Mid Range Loads
  - # Short Loads

Next Step(s)

- Define Timeline
- CTRE Evaluation and Second Meeting to Answer Questions, etc.
- Budgetary Proposal by March 1

Thank You

APPENDIX B. ALGONA MILL DATA SHEETS



Finishing File

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OUTSTANDING ORDERS MFF - MIDWEST OPERATIONS 08:01:19 AM GRW252

Feed Mill 15 15 ALGONA FEED MILL (IA) Undelivered Tickets 82
Begin Req Deliver Date 5-24-06 End Req Deliver Date 5-24-06

Feed Order	Order Date	Req Del Date	Last Del Date	Load Date	Lbs Ordered	Grower Abbrev	Group
891562	5-22-06	5-24-06	6-01-06		24,000	ARB	28340136
891563	5-22-06	5-24-06	6-01-06		24,000	ARB	28340236
891564	5-22-06	5-24-06	6-01-06		24,000	ARB	28340236
891565	5-22-06	5-24-06	6-01-06		24,000	ARB	28340336
891566	5-22-06	5-24-06	5-31-06		24,000	BER	28450235
891567	5-22-06	5-24-06	5-31-06		24,000	BER	28450435
891276	5-21-06	5-24-06	6-01-06		24,000	BMY	28630131
891285	5-22-06	5-24-06	6-03-06		24,000	HEH	28990325
891576	5-22-06	5-24-06	6-02-06		24,000	HVJ	29110130
891577	5-22-06	5-24-06	6-03-06		24,000	HKL	29120226
890862	5-19-06	5-24-06	5-24-06		24,000	MRD	29440334
891578	5-22-06	5-24-06	5-31-06		24,000	NCN	29490409
891585	5-22-06	5-24-06	6-02-06		48,000	TRP	29870229
891130	5-22-06	5-24-06	5-24-06		24,000	SPN	29950327

More...
F9=Fold/Unfold F12=Main Menu

OUTSTANDING ORDERS MFF - MIDWEST OPERATIONS 08:01:19 AM GRW252

Feed Mill 15 15 ALGONA FEED MILL (IA) Undelivered Tickets 82
Begin Req Deliver Date 5-24-06 End Req Deliver Date 5-24-06

Feed Order	Order Date	Req Del Date	Last Del Date	Load Date	Lbs Ordered	Grower Abbrev	Group
891294	5-21-06	5-24-06	6-02-06		24,000	OAN	32480125
891413	5-22-06	5-24-06	5-24-06		24,000	OAN	32480325
891594	5-22-06	5-24-06	5-30-06		24,000	SER	32670123
891595	5-22-06	5-24-06	5-30-06		24,000	SER	32670223
891099	5-21-06	5-24-06	5-30-06		24,000	BHL	32740123
891298	5-22-06	5-24-06	6-03-06		24,000	SBE	32750120
891299	5-22-06	5-24-06	6-03-06		24,000	SBE	32750220
891302	5-22-06	5-24-06	6-03-06		24,000	SFJ	32810323
891303	5-22-06	5-24-06	6-01-06		24,000	OND	33070223
891596	5-22-06	5-24-06	6-02-06		24,000	KFI	33080123
891597	5-22-06	5-24-06	5-31-06		24,000	KFS	33090323
891600	5-22-06	5-24-06	6-02-06		24,000	HNJ	33100222
891601	5-22-06	5-24-06	6-01-06		24,000	HNJ	33100322
891607	5-22-06	5-24-06	6-03-06		24,000	WLR	33200122

More...
F9=Fold/Unfold F12=Main Menu

LARRY MEYER
(51) MFF - MIDWEST OPERATIONS
08:02:29 AM 15 ALGONA FEED MILL (IA)

FEED DISPATCH REPORT
05-24-06 THRU 05-24-06

FINAL SORT OPTION: FEED ORDER
GROUP COMPANIES: 00000 THRU 99999

ORDER	GROWER GROUP	MKT CODE	FEED ZONE	ORDERED	DELIVER	FEED	MED	LBS	BIN		FEED SCHED	SERVICEMAN
891729	00003351 HINZ, RODNEY *TCKT 33510122 (641) 3301065 ***X *** ***SDI REFERENCE: 650256 ***	CO		05-22-06 02:25 PM	05-24-06	GROWER 2 1110 ABT 5A	SFAC	24,000	1686		018	SLAVIN, JOHN T. (563) 5662611
891609	00003351 HINZ, RODNEY *TCKT 33510222 (641) 3301065 ***SDI REFERENCE: 650257 ***	CO		05-22-06 11:37 AM	05-24-06	GROWER 2	SFAC	24,000	1687		018	SLAVIN, JOHN T. (563) 5662611
891110	00003719 WEBER, WAYNE L *TCKT 37190218 (563) 5383839 ***SDI REFERENCE: 649864 ***	CO		05-21-06 07:31 AM	05-24-06	FINISHER 1111 ABT 5A	SFAC	18,000	1831		008	SLAVIN, JOHN T. (563) 5662611
891111	00003767 WEBER, WAYNE *TCKT 37670118 (563) 5383839 ***SDI REFERENCE: 649865 ***	CO		05-21-06 07:33 AM	05-24-06	FINISHER	SFAC	18,000	1801		016	SLAVIN, JOHN T. (563) 5662611
891112	00003767 WEBER, WAYNE *TCKT 37670118 (563) 5383839 ***SDI REFERENCE: 649866 ***	CO		05-21-06 07:33 AM	05-24-06	FINISHER	SFAC	12,000	1803		016	SLAVIN, JOHN T. (563) 5662611
891653	00004081 GRIFFIN SITE 2, *TCKT 40810109 (563) 3807104 ***SDI REFERENCE: 650248 ***	CO		05-22-06 11:17 AM	05-24-06	FINISHER 1110A ABT 5A	SFAC	24,000	1871		022	SLAVIN, JOHN T. (563) 5662611
891654	00004081 GRIFFIN SITE 2, *TCKT 40810309 (563) 3807104 ***SDI REFERENCE: 650249 ***	CO		05-22-06 11:17 AM	05-24-06	FINISHER	SFAC	24,000	1874		022	SLAVIN, JOHN T. (563) 5662611
891118	00004340 GARFIELD NASH *TCKT 43400101 (641) 3734242 ***SDI REFERENCE: 649823 ***	CO		05-20-06 01:43 PM	05-24-06	GROWER 2 433 Kenny 6A	SFAC	24,000	8956	A	019	SLAVIN, JOHN T. (563) 5662611
891669	00004340 GARFIELD NASH *TCKT 43400101 (641) 3734242 ***SDI REFERENCE: 650296 ***	CO		05-22-06 12:36 PM	05-24-06	GROWER 2 433 Kenny 9:30A	SFAC	12,000	8955		019	SLAVIN, JOHN T. (563) 5662611
891119	00004340 GARFIELD NASH *TCKT 43400201 (641) 3734242 ***SDI REFERENCE: 649824 ***	CO		05-20-06 01:43 PM	05-24-06	GROWER 2	SFAC	24,000	8958		019	SLAVIN, JOHN T. (563) 5662611
891670	00004340 GARFIELD NASH *TCKT 43400201 (641) 3734242 ***SDI REFERENCE: 650297 ***	CO		05-22-06 12:36 PM	05-24-06	GROWER 2	SFAC	12,000	8957		019	SLAVIN, JOHN T. (563) 5662611

(51) MFF - MIDWEST OPERATIONS
08:02:29 AM 15 ALGONA FEED MILL (IA)

FEED DISPATCH REPORT
05-24-06 THRU 05-24-06

FINAL SORT OPTION: FEED ORDER
GROUP COMPANIES: 00000 THRU 99999

ORDER	GROWER GROUP	MKT CODE	FEED ZONE	ORDERED	DELIVER	FEED	MED	LBS	BIN	FEED SCHED	SERVICEMAN
891671	00004340 GARFIELD NASH *TCKT 43400301 (641) 3734242 ***SDI REFERENCE: 650298 ***	CO		05-22-06 12:36 PM	05-24-06	GROWER1	OTC	24,000	8960	019	SLAVIN, JOHN T. (563) 5662611
891524	00005134 S&B PORK LC-SUN *TCKT 51340305 (712) 8435719 ***SDI REFERENCE: 650162 ***	CO		05-22-06 09:50 AM	05-24-06	GROWER1	OTC	24,000	6016	022	HOEPPNER, HARRY T. (712) 8342789
891525	00005134 S&B PORK LC-SUN *TCKT 51340405 (712) 8435719 ***SDI REFERENCE: 650163 ***	CO		05-22-06 09:50 AM	05-24-06	GROWER 2	SFAC	24,000	6018	022	HOEPPNER, HARRY T. (712) 8342789
891543	00005357 SCHNIEDERS, MAR *TCKT 53570105 (712) 4253552 ***SDI REFERENCE: 650290 ***	CO		05-22-06 12:30 PM	05-24-06	FINISHER	SFAC	24,000	6942	022	BRANDENBURG, ALAN C. (515) 2954047
891544	00005357 SCHNIEDERS, MAR *TCKT 53570205 (712) 4253552 ***SDI REFERENCE: 650293 ***	CO		05-22-06 12:30 PM	05-24-06	FINISHER	SFAC	24,000	6944	022	BRANDENBURG, ALAN C. (515) 2954047
891547	00005378 S&B PORK LC-BLO *TCKT 53780105 (712) 2896312 ***SDI REFERENCE: 650130 ***	CO		05-22-06 09:02 AM	05-24-06	FINISHER	SFAC	24,000	8555	022	HOEPPNER, HARRY T. (712) 8342789
891548	00005378 S&B PORK LC-BLO *TCKT 53780205 (712) 2896312 ***SDI REFERENCE: 650131 ***	CO		05-22-06 09:02 AM	05-24-06	FINISHER	SFAC	24,000	8557	022	HOEPPNER, HARRY T. (712) 8342789
891726	00009102 DAU, CORY *TCKT 91020303 (712) 4482027 ***X *** ***SDI REFERENCE: 650252 ***	CO		05-22-06 02:23 PM	05-24-06	DEV-MASH	SFAC	24,000	7411	002	HOEPPNER, HARRY T. (712) 8342789
891727	00009102 DAU, CORY *TCKT 91020403 (712) 4482027 ***X *** ***SDI REFERENCE: 650253 ***	CO		05-22-06 02:24 PM	05-24-06	DEV-MASH	SFAC	24,000	7412	002	HOEPPNER, HARRY T. (712) 8342789
891304	00003333 LANAKA LLC *TCKT 33330123 (641) 2579246 ***SDI REFERENCE: 649981 ***	CO	10	05-21-06 08:19 PM	05-24-06	GROWER 2	SFAC	24,000	1644	002	SLAVIN, JOHN T. (563) 5662611
891623	00003401 LINKENMEYER, TR *TCKT 34010122 (641) 2203003 ***SDI REFERENCE: 650201 ***	CO	10	05-22-06 10:27 AM	05-24-06	DEVELOPER PLEAN		24,000	1716	024	SLAVIN, JOHN T. (563) 5662611

Ref NO	Grower Number	Group Number	Bin Number	Load Date	Load Time	Truck Number	Driver Number
649960	3788	37880124	1079				
650217	2834	28340136	1109				
650215	2834	28340236	1129				
649886	4060	40600112	1130				
650216	2834	28340236	1146				
650219	2834	28340336	1149				
650120	4082	40820109	1161				
650137	4082	40820309	1170				
650182	4338	43380302	1201				
649959	2863	28630131	1234				
649650	2944	29440334	1262				
649877	2995	29950327	1355				
649885	4059	40590112	1363				
650291	2911	29110130	1373				
649978	4303	43030104	1380				
649977	4303	43030304	1384				
649878	4069	40690308	1390				
650160	4070	40700108	1392				
650158	4070	40700208	1394				
649879	4070	40700308	1397				
649991	3248	32480125	1418				
649992	3248	32480325	1429				
650295	2912	29120226	1449				
650088	2899	28990325	1457				
649871	3274	32740123	1511				
650036	3281	32810323	1539				
650113	3307	33070223	1567				
650204	3310	33100222	1634				
650197	3310	33100322	1636				
649981	3333	33330123	1644				
650241	3320	33200122	1661				
650256	3351	33510122	1686				
650257	3351	33510222	1687				

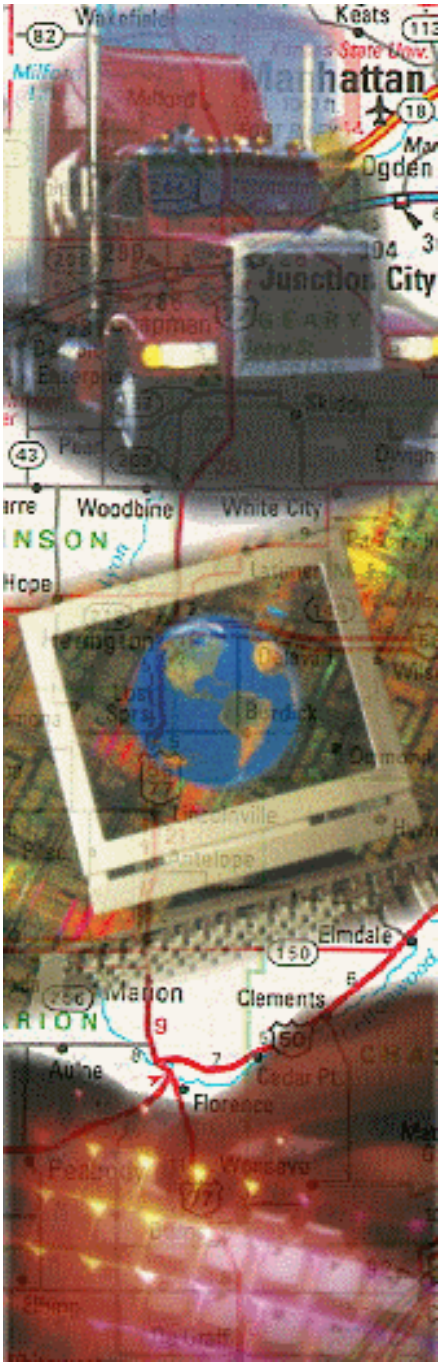
SDI #	Grower # / Name Address / Phone	Feed Order #	Group	Bin	Feed Formula	Pounds	Compartments	Weight of Pigs	Sex	Date
650117	3731	891323	37310319	5607	75112	24000		194	MIX	5/23/2006
	REISCHL, GARY & WANDA				0	0				
	WILDWOOD				0	0				
	MANILLA	IA	51454		0	0				
	6532055				0	0				
							Load Time	Truck Number	Driver Number	
	MKT Code **CO**						5 am	1010	77	
650119	3731	891324	37310319	5608	75112	24000		194	MIX	5/23/2006
	REISCHL, GARY & WANDA				0	0				
	WILDWOOD				0	0				
	MANILLA	IA	51454		0	0				
	6532055				0	0				
							Load Time	Truck Number	Driver Number	
	MKT Code **CO**						5 am	1010	77	
650214	3312	891603	33120322	7222	75112	24000		202	BAR	5/23/2006
	BENZ 2, MARY				0	0				
	5864 270TH ST				0	0				
	MELVIN	IA	51350		0	0				
	2607187				0	0				
							Load Time	Truck Number	Driver Number	
	MKT Code **CO**						10 am	1010	77	
650213	3312	891602	33120122	7217	75112	24000		210	MIX	5/23/2006
	BENZ 2, MARY				0	0				
	5864 270TH ST				0	0				
	MELVIN	IA	51350		0	0				
	2607187				0	0				
							Load Time	Truck Number	Driver Number	
	MKT Code **CO**						10 am	1010	77	

DRIVER'S LOADOUT DAILY REPORT

Grower Information		Group Number	Order Number		
3731		37310319	891323		Start Mileage
REISCHL, GARY & WANDA		Bin Number	5607		End Mileage
WILDWOOD					
MANILLA	IA	Load Time	Truck Number	Driver Number	Start Time
6532055	75112	5 am	1010	77	End Time
MKT Code:	CO				LBS Loaded
3731		37310319	891324		Start Mileage
REISCHL, GARY & WANDA		Bin Number	5608		End Mileage
WILDWOOD					
MANILLA	IA	Load Time	Truck Number	Driver Number	Start Time
6532055	75112	5 am	1010	77	End Time
MKT Code:	CO				LBS Loaded
3312		33120322	891603		Start Mileage
BENZ 2, MARY		Bin Number	7222		End Mileage
5864 270TH ST					
MELVIN	IA	Load Time	Truck Number	Driver Number	Start Time
2607187	75112	10 am	1010	77	End Time
MKT Code:	CO				LBS Loaded
3312		33120122	891602		Start Mileage
BENZ 2, MARY		Bin Number	7217		End Mileage
5864 270TH ST					
MELVIN	IA	Load Time	Truck Number	Driver Number	Start Time
2607187	75112	10 am	1010	77	End Time
MKT Code:	CO				LBS Loaded

APPENDIX C. AUTOMATED TRUCK ROUTING SOFTWARE

Paradox Software Consulting Inc.



PART

PARADOX AUTOMATED
ROUTING TOOL

PRODUCT REVIEW

OCTOBER, 2002

GENERAL PRODUCT DESCRIPTION

OVERALL FUNCTIONALITY

PART is a Routing & Scheduling tool that sequences a given set of stops or shipments following Department of Transportation rules while meeting predefined customer service requirements (time windows and service times). It is a stand-alone Windows based application with a friendly user interface. The ease of use is the strength of the system. PART is designed to manage tactical and operational route planning. It can be easily interfaced with the Order processing and dispatching systems to provide an integrated solution through ASCII data file transfers.

PART consists of Data Management, Geographic Information System (GIS), Routing, and Scheduling modules. Presentation features of PART include route maps, reports, and charts. All the data and solutions can be exported as text files into MS Word or MS Excel. The GIS module was built using Microsoft Map Point & PC*Miler's development tools (Mapping engine) and provides a geographic view of the routing solution. Its presentation features include route maps, order distribution, and road networks. Routing and Scheduling modules use proprietary solver engines built based on proven mathematical models to generate optimal solutions. The scheduling module includes Gantt charts to present the vehicle schedules in a spatial (time) view. Various reports and export options allow the solution to be presented in numerous user-defined formats.

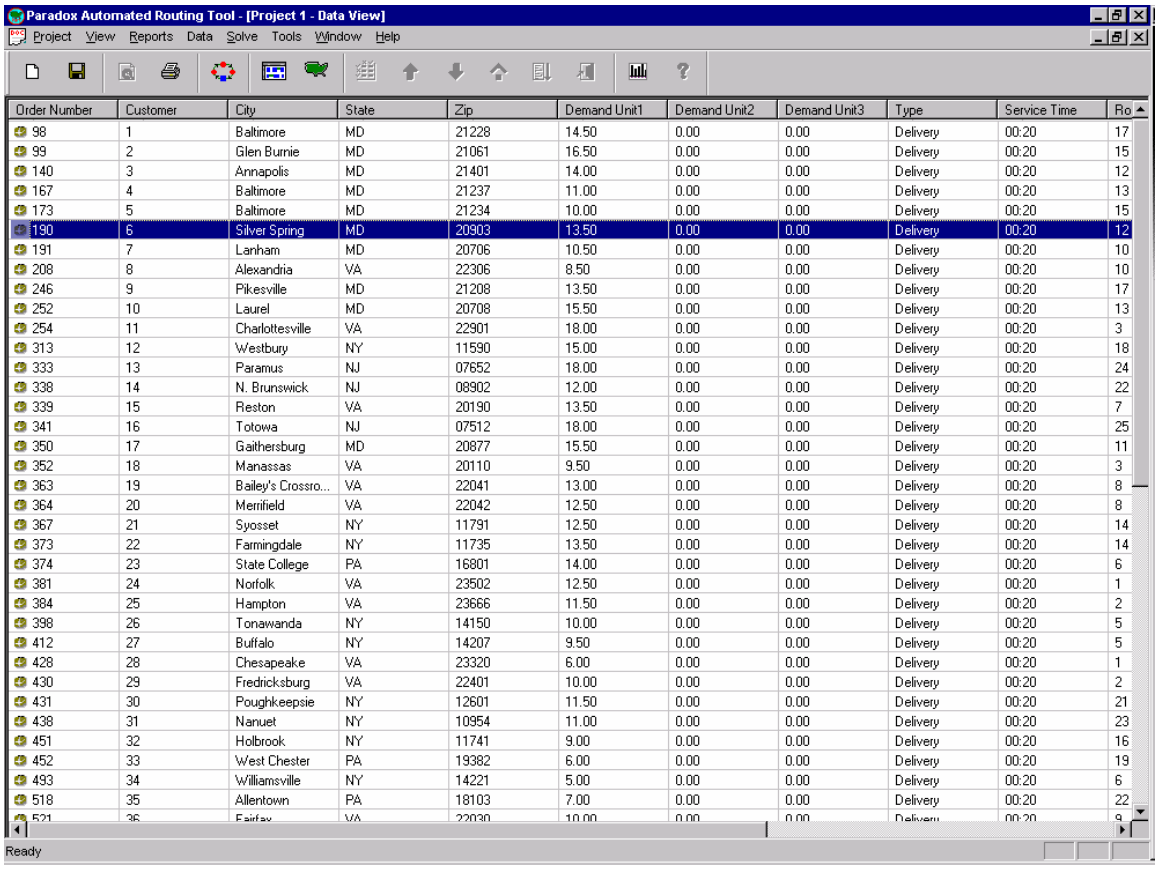
In addition to generating optimal routing and scheduling solutions, PART enables benchmarking an existing solution. Existing routes can be imported into the system 'as is' and calculated to reproduce the benchmark solution. The solution can then be generated in PART and compared to the benchmark solution.

DATA MANAGEMENT

Orders can be imported into PART in the form of ASCII files. The data import wizard guides users through the setup process for importing Order data into the system. Minimal data entry is required during the setup. All the user settings are stored in the system so that repeated imports of the same format will not require further data entry, minimizing user errors.

PART's Data View presents Order data in a spreadsheet format. This view enables users to sort the orders based on different criteria (Load, City, Zip Code, Service Time etc.), get more details on any Order by double clicking on a row, and provides drag and drop features. This view presents a text representation of the data imported into the system.

As the solution is developed, the Data View updates automatically to reflect the changes.

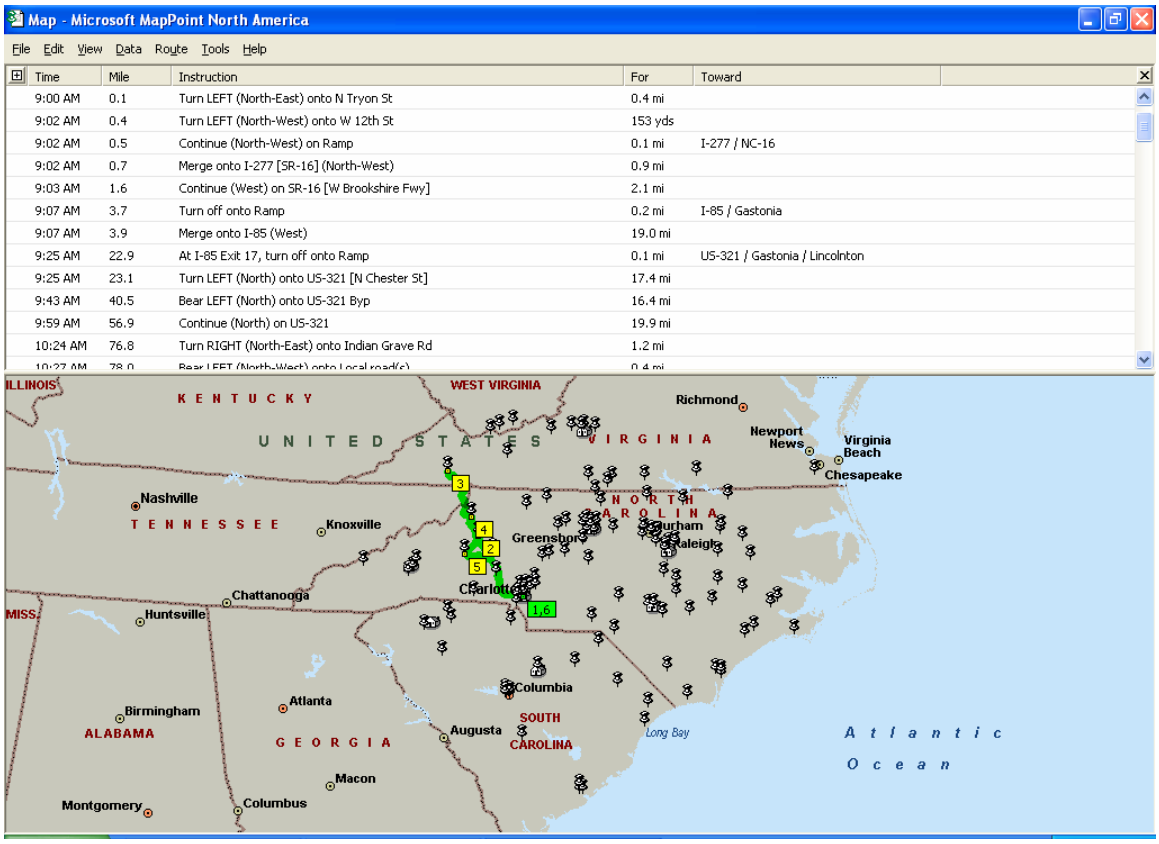


Order Number	Customer	City	State	Zip	Demand Unit1	Demand Unit2	Demand Unit3	Type	Service Time	Ro
98	1	Baltimore	MD	21228	14.50	0.00	0.00	Delivery	00:20	17
99	2	Glen Burnie	MD	21061	16.50	0.00	0.00	Delivery	00:20	15
140	3	Annapolis	MD	21401	14.00	0.00	0.00	Delivery	00:20	12
167	4	Baltimore	MD	21237	11.00	0.00	0.00	Delivery	00:20	13
173	5	Baltimore	MD	21234	10.00	0.00	0.00	Delivery	00:20	15
190	6	Silver Spring	MD	20903	13.50	0.00	0.00	Delivery	00:20	12
191	7	Lanham	MD	20706	10.50	0.00	0.00	Delivery	00:20	10
208	8	Alexandria	VA	22306	8.50	0.00	0.00	Delivery	00:20	10
246	9	Pikesville	MD	21208	13.50	0.00	0.00	Delivery	00:20	17
252	10	Laurel	MD	20708	15.50	0.00	0.00	Delivery	00:20	13
254	11	Charlottesville	VA	22901	18.00	0.00	0.00	Delivery	00:20	3
313	12	Westbury	NY	11590	15.00	0.00	0.00	Delivery	00:20	18
333	13	Paramus	NJ	07652	18.00	0.00	0.00	Delivery	00:20	24
338	14	N. Brunswick	NJ	08902	12.00	0.00	0.00	Delivery	00:20	22
339	15	Reston	VA	20190	13.50	0.00	0.00	Delivery	00:20	7
341	16	Totowa	NJ	07512	18.00	0.00	0.00	Delivery	00:20	25
350	17	Gaithersburg	MD	20877	15.50	0.00	0.00	Delivery	00:20	11
352	18	Manassas	VA	20110	9.50	0.00	0.00	Delivery	00:20	3
363	19	Bailey's Crossro...	VA	22041	13.00	0.00	0.00	Delivery	00:20	8
364	20	Merrifield	VA	22042	12.50	0.00	0.00	Delivery	00:20	8
367	21	Syosset	NY	11791	12.50	0.00	0.00	Delivery	00:20	14
373	22	Farmingdale	NY	11735	13.50	0.00	0.00	Delivery	00:20	14
374	23	State College	PA	16801	14.00	0.00	0.00	Delivery	00:20	6
381	24	Norfolk	VA	23502	12.50	0.00	0.00	Delivery	00:20	1
384	25	Hampton	VA	23666	11.50	0.00	0.00	Delivery	00:20	2
398	26	Tonawanda	NY	14150	10.00	0.00	0.00	Delivery	00:20	5
412	27	Buffalo	NY	14207	9.50	0.00	0.00	Delivery	00:20	5
428	28	Chesapeake	VA	23320	6.00	0.00	0.00	Delivery	00:20	1
430	29	Fredricksburg	VA	22401	10.00	0.00	0.00	Delivery	00:20	2
431	30	Poughkeepsie	NY	12601	11.50	0.00	0.00	Delivery	00:20	21
438	31	Nanuet	NY	10954	11.00	0.00	0.00	Delivery	00:20	23
451	32	Holbrook	NY	11741	9.00	0.00	0.00	Delivery	00:20	16
452	33	West Chester	PA	19382	6.00	0.00	0.00	Delivery	00:20	19
493	34	Williamsville	NY	14221	5.00	0.00	0.00	Delivery	00:20	6
518	35	Allentown	PA	18103	7.00	0.00	0.00	Delivery	00:20	22
521	36	Fairfax	VA	22030	10.00	0.00	0.00	Delivery	00:20	9

GEOGRAPHIC INFORMATION SYSTEM (GIS)

The GIS module consists of Mapping, Geo coding, and Path finding functionality. PART uses the mapping libraries of Microsoft Map Point or PC*Miler to Geo code and plot the locations and draw routes on the Map. The display of various geographic features (stops, routes, roads, highways, states etc.) of the Map is user configurable. Map View also provides Zoom In/Out and Pan features for adjusting the view. Geo coding is automatically done before plotting the locations on the Map when users choose to open the Map View. The Path finding feature can be used to generate driving directions for a specific route or all routes in the system. The driving directions report is generated in the form of a text file that can be imported into MS Word or MS Excel and configured further according to requirements. Actual highway miles via the road network from Microsoft Map Point or PC*Miler's database is used for generating the directions report.

PART currently uses the highway and street level mapping capabilities of Microsoft Map Point or PC*Miler. PART also provides a plug and play capability for using the mapping tools of other vendors.

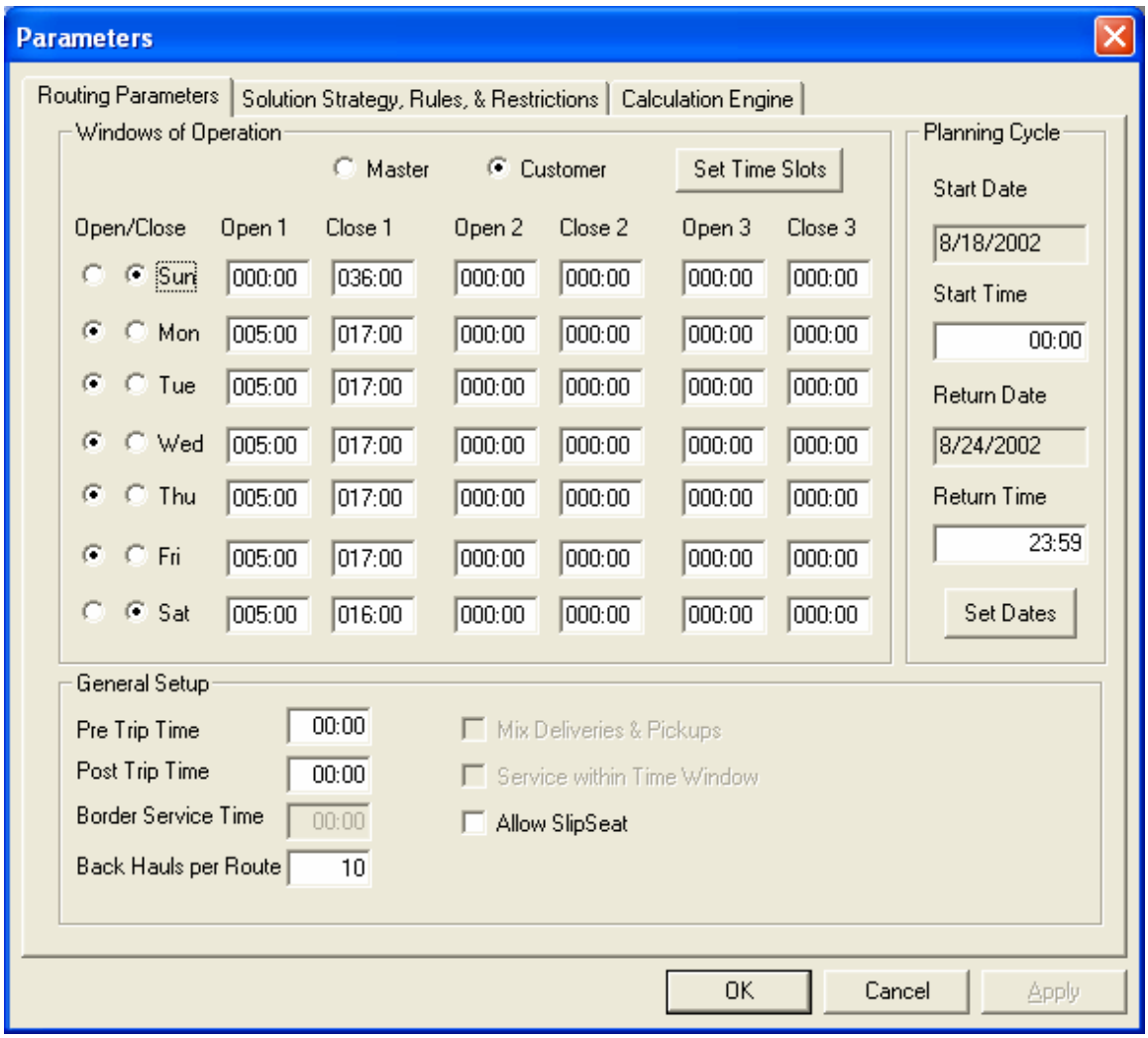


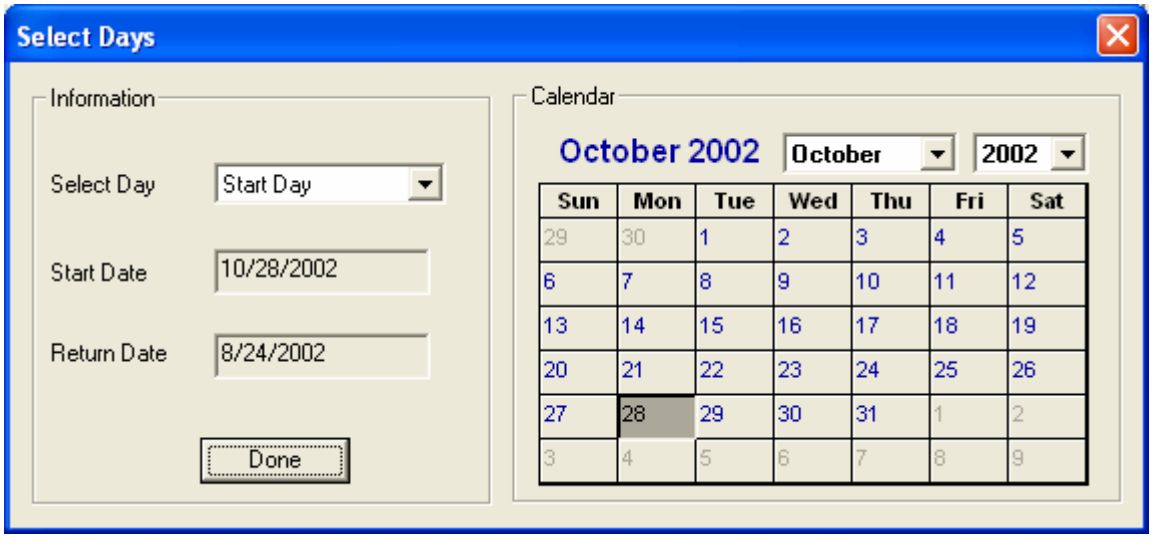
ROUTING

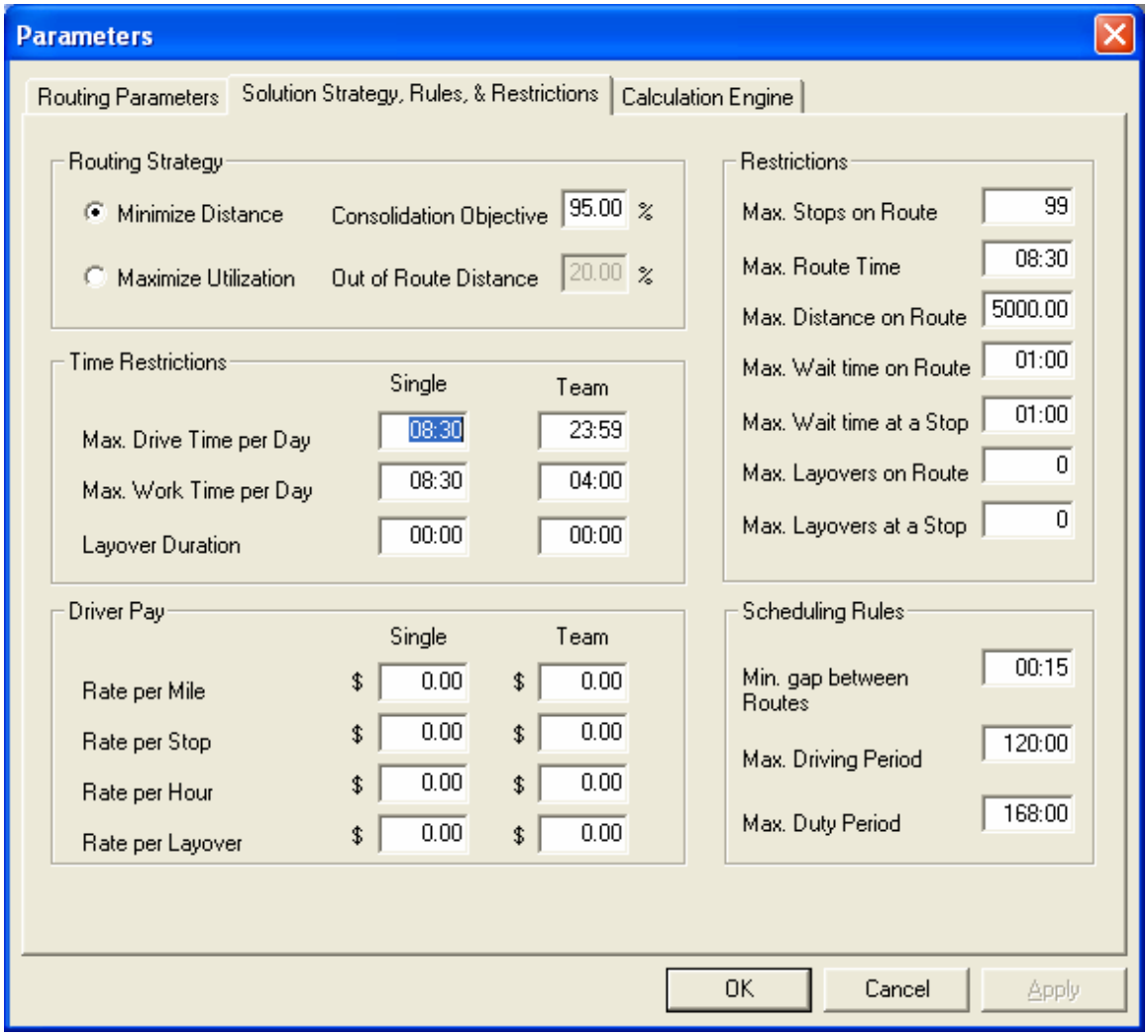
The routing engine uses proven routing algorithms to create optimal routes. Distance and time calculations required by the routing engine are run using Microsoft Map Point or PC*Miler's Server or BatchPro utility. When using the Server utility the calculations are done on an as needed basis, while using the BatchPro utility all the calculations are done in one instance and used repeatedly as required. These calculations can be done based on City and State combination, Zip Codes, or Latitude and Longitude values. The calculated distance and time values are automatically saved into a file that can be used for later use when using the same Stop data. After building the Routes and determining the optimal Stop sequence for each route, PART schedules them following the different restrictions and constraints predefined by the user. Planning cycles can be defined by actual calendar days and Routes are simulated by day of the week and date.

Parameters

Routing parameters in PART let the users specify various restrictions and constraints
In addition to the Planning cycle, Customer/Master time windows and DOT rules, constraints could be defined for maximum route distance, route time, number of stops, layovers, wait time etc. Vehicle definitions are also used to constrain Routes in terms of availability and capacities.


Parameters
Routing Parameters
Solution Strategy, Rules, & Restrictions
Calculation Engine
Windows of Operation
Master
Customer
Set Time Slots
Open/Close
Open 1
Close 1
Open 2
Close 2
Open 3
Close 3
Sun 000:00 036:00 000:00 000:00 000:00 000:00
Mon 005:00 017:00 000:00 000:00 000:00 000:00
Tue 005:00 017:00 000:00 000:00 000:00 000:00
Wed 005:00 017:00 000:00 000:00 000:00 000:00
Thu 005:00 017:00 000:00 000:00 000:00 000:00
Fri 005:00 017:00 000:00 000:00 000:00 000:00
Sat 005:00 016:00 000:00 000:00 000:00 000:00
Planning Cycle
Start Date
8/18/2002
Start Time
00:00
Return Date
8/24/2002
Return Time
23:59
Set Dates
General Setup
Pre Trip Time
00:00
Post Trip Time
00:00
Border Service Time
00:00
Back Hauls per Route
10
Mix Deliveries & Pickups
Service within Time Window
Allow SlipSeat
OK
Cancel
Apply


Select Days
Information
Select Day
Start Day
Start Date
10/28/2002
Return Date
8/24/2002
Done
Calendar
October 2002
October
2002
Sun Mon Tue Wed Thu Fri Sat
29 30 1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31 1 2
3 4 5 6 7 8 9

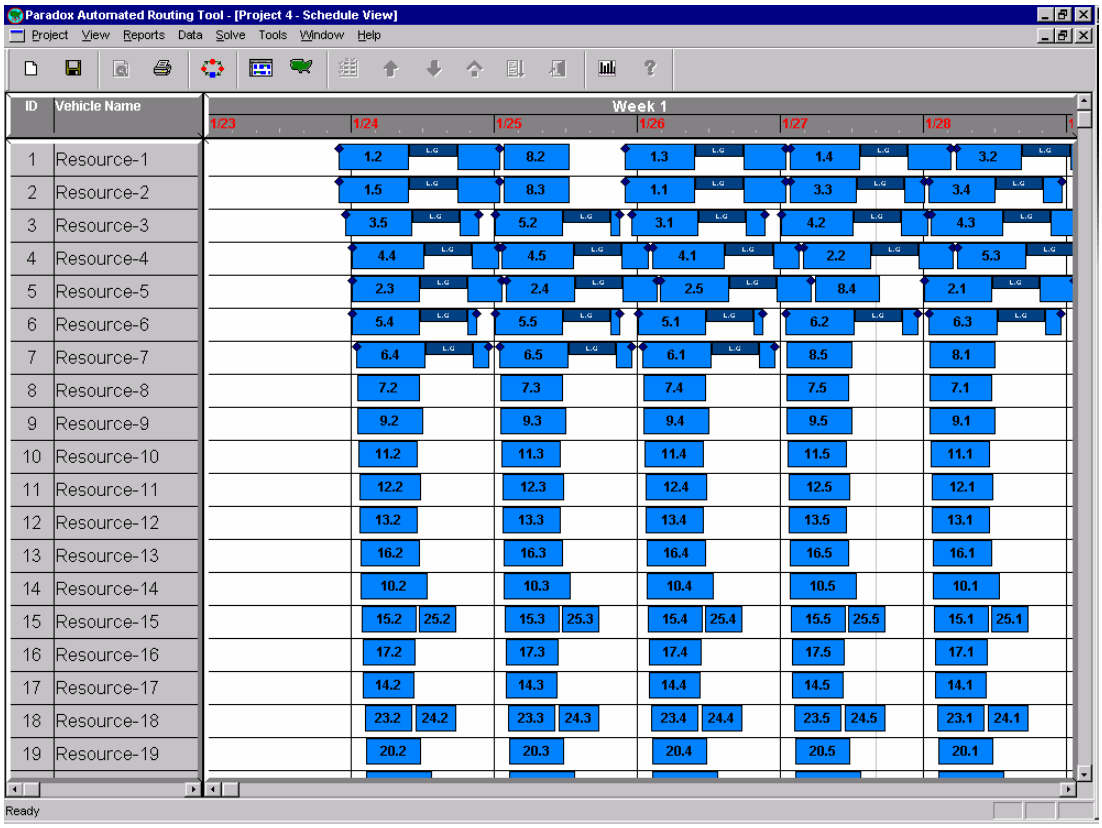


SCHEDULING

PART uses robust scheduling algorithms to schedule the routes within a predefined planning horizon. The Vehicle to Route assignments is presented on a Gantt chart. The chart provides the users the ability to change the assignments, route departure times, and days manually. The Gantt chart can be configured (time scale of 1 day to 4 weeks), printed or saved for presentations.

A major strength of PART's schedule charts is the graphic representation of the different events (driving, arrivals, layovers, waits etc.) that occur on a route as it is occurs within a planning horizon. Each event is presented in a different configuration (color or size of the bar) to distinguish them from each other. At any time the complete (statistics and manifest) information of a route can be obtained by double clicking on any bar that corresponds to it on the chart. The labels on the bars distinguish routes on the chart. When a route is dragged and dropped (at a different time or day or resource) it is automatically re-simulated and scheduled to check feasibility of the move. In case of infeasible moves users are warned of violation but are let to decide on forcing the move. Important resource statistics are also presented on the chart for quick reference.

While scheduling routes for a driver, PART ensures that the DOT regulations are complied with by considering the rules in rolling 24-hour periods (normal 10-hour driving and 15 hour duty restrictions for any 24-hour period for a driver).

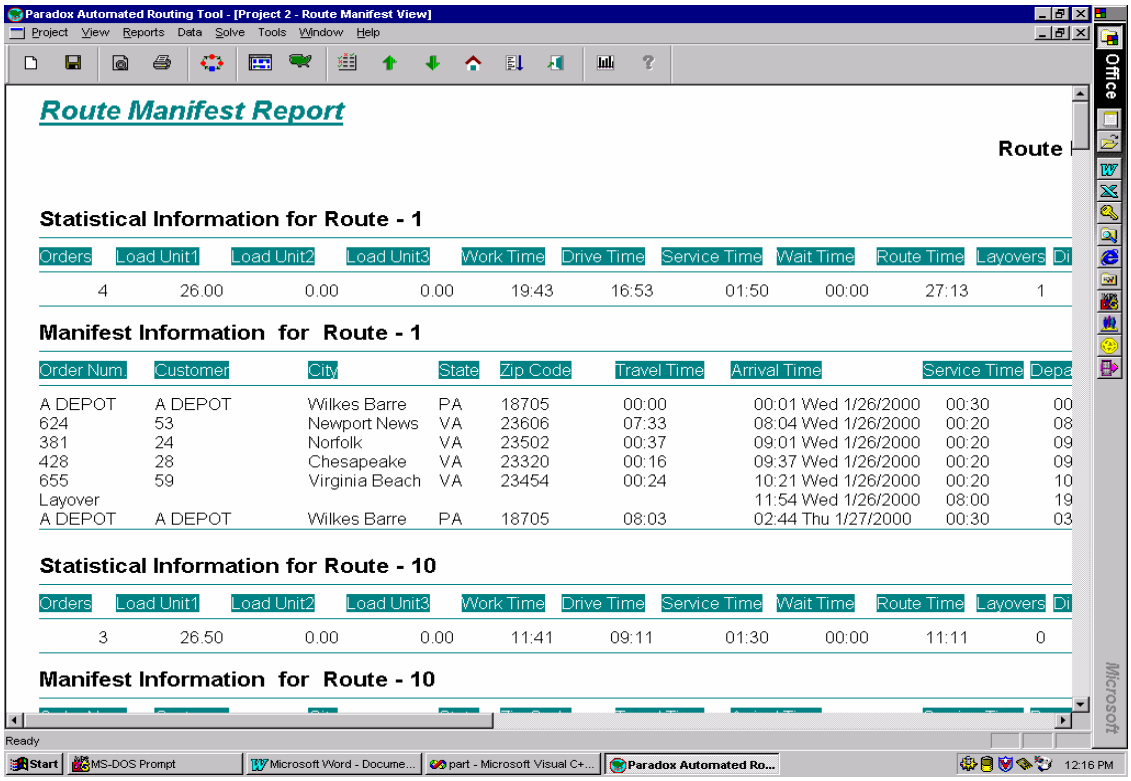


REPORTS & EXPORTS

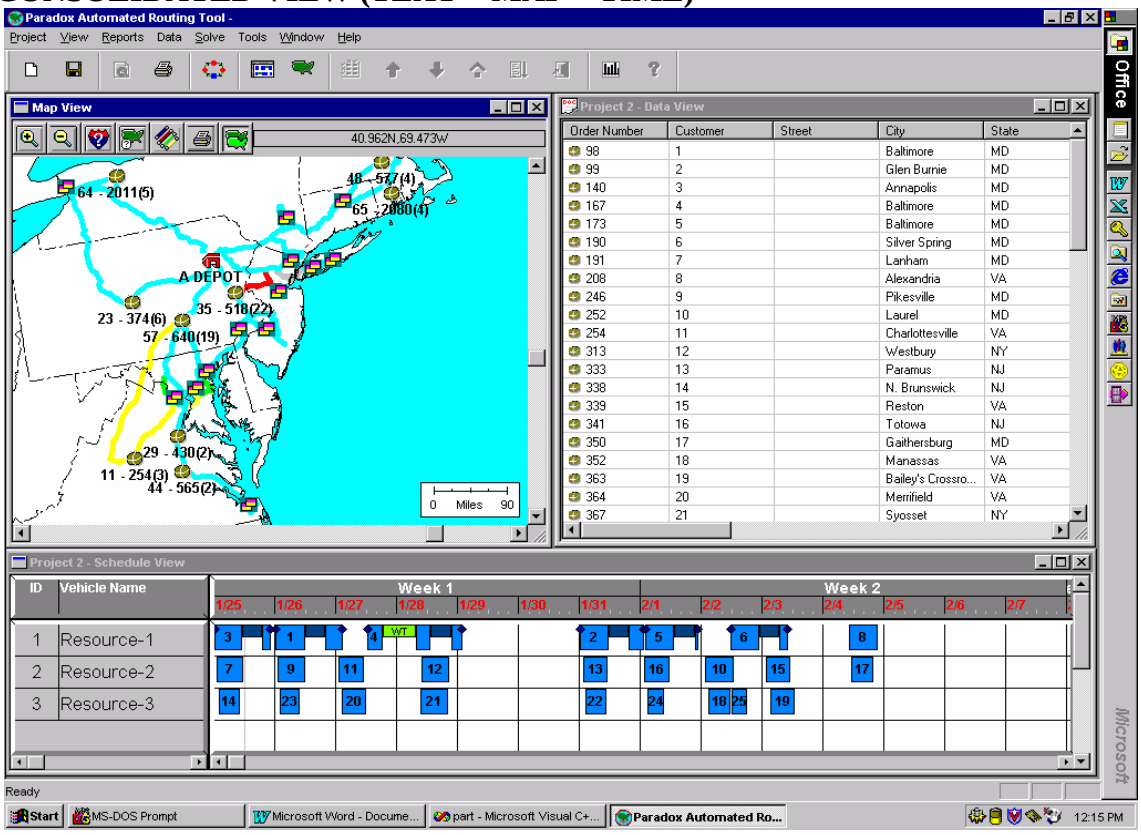
Various reports can be created and printed. Order Summary, Route Summary, and Route Manifest reports can be viewed and printed. Along with the driving directions' reports these reports can be exported as text files and imported into MS Word or MS Excel for further configuration. A summary of the routing and scheduling solution is presented in the form of Summary Statistics, which can be printed.

Sample Report

The Route Manifest report is shown in the following figure. This report includes a summary of all the key statistics of all the routes in the system in addition to detailed manifest information for each route. Manifest information includes Stop information (City, State, and Zip Code) and arrival and departure information at each Stop. Manifest also lists the other events on the route (layovers and waiting at stops).



CONSOLIDATED VIEW (TEXT + MAP + TIME)



TECHNOLOGY

Developed in Visual C++ using Object Oriented Design (OOD) methodology and Component Object Model (COM) concepts. Uses industry standard STL (Standard Template Libraries) and streaming techniques for efficient data storage, retrieval, and persistence. PART does not require any database drivers or software.

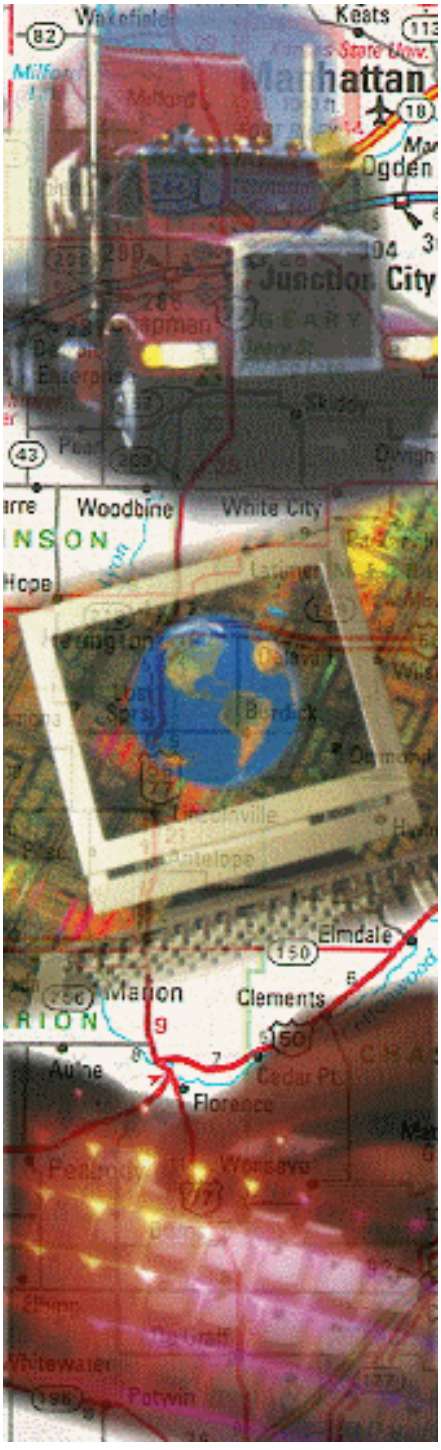
KEY FEATURES & BENEFITS

- PART's technical architecture is based on Object Oriented design principles, which enable plug and play of functionality. For example, any Mapping engine can be used in PART instead of that of Microsoft Map Point or PC*Miler. Similarly the Routing and Scheduling engines can be swapped as and when needed.
- Complete visibility of the routing and scheduling solution through Data (text based), Map (geographic), and Schedule (Gantt chart) views.
- Consolidated view of all the routing entities (Depots, Orders, Routes, and Vehicles).
- Industry standard Microsoft Map Point or PC*Miler distances and times used for routing and scheduling. Users are also provided with the ability to specify maximum driving speed irrespective of the speeds used by Map Point or PC*Miler.
- Turn by turn driving directions for all routing solutions.
- Planning is done by the day of the week and date. Start and End dates of the planning horizon can be set using a user friendly Calendar.
- Routing and scheduling solutions for the whole of North America. Street level routing (based on latitudes and longitudes) for US.
- Configurable Maps and Gantt charts. Spatial (Gantt chart) view of the routes indicates different events like arrivals, waits, and layovers etc. that happen as the route is simulated within the planning horizon. Real-time simulation runs in the background as the routes are moved around on the Gantt chart to reflect changes in departure times and route events.
- Comprehensive reports and exports of data and solution. Summary Statistics can be printed.
- User friendly and interactive interface, facilitating shorter learning curve for new users. Easy to setup the problem with minimal data entry.
- Runs in Windows 95/98/2000, NT environments.

For Pricing Information Please Call Toll Free: **888-713-2245**

Paradox Software Consulting, Inc.
5082 S.E. Inkwood Way
Hobe Sound, FL 33455

Paradox Software Consulting Inc.



CMP

CONTINUOUS MOVE PLANNER

PRODUCT REVIEW

OCTOBER, 2002

GENERAL PRODUCT DESCRIPTION

OVERALL FUNCTIONALITY

CMP is a truck load tour building tool that can generate optimal matches of truck load moves for a given set of Origin-Destination (Leg) pairs, where each Origin-Destination pair identifies a truck load move. It is a stand-alone Windows based application with an extremely user friendly interface. Problem setup and solution generation requires minimal user interaction virtually eliminating the learning curve on the system.

CMP needs the geographic information about the locations that constitute each Origin-Destination pair (Leg). It consists of data management and continuous move planning engine modules. Solutions can be exported as text files into MS Word or MS Excel. Data input is in the form of flat files. CMP uses powerful matching algorithms to generate the different continuous moves.

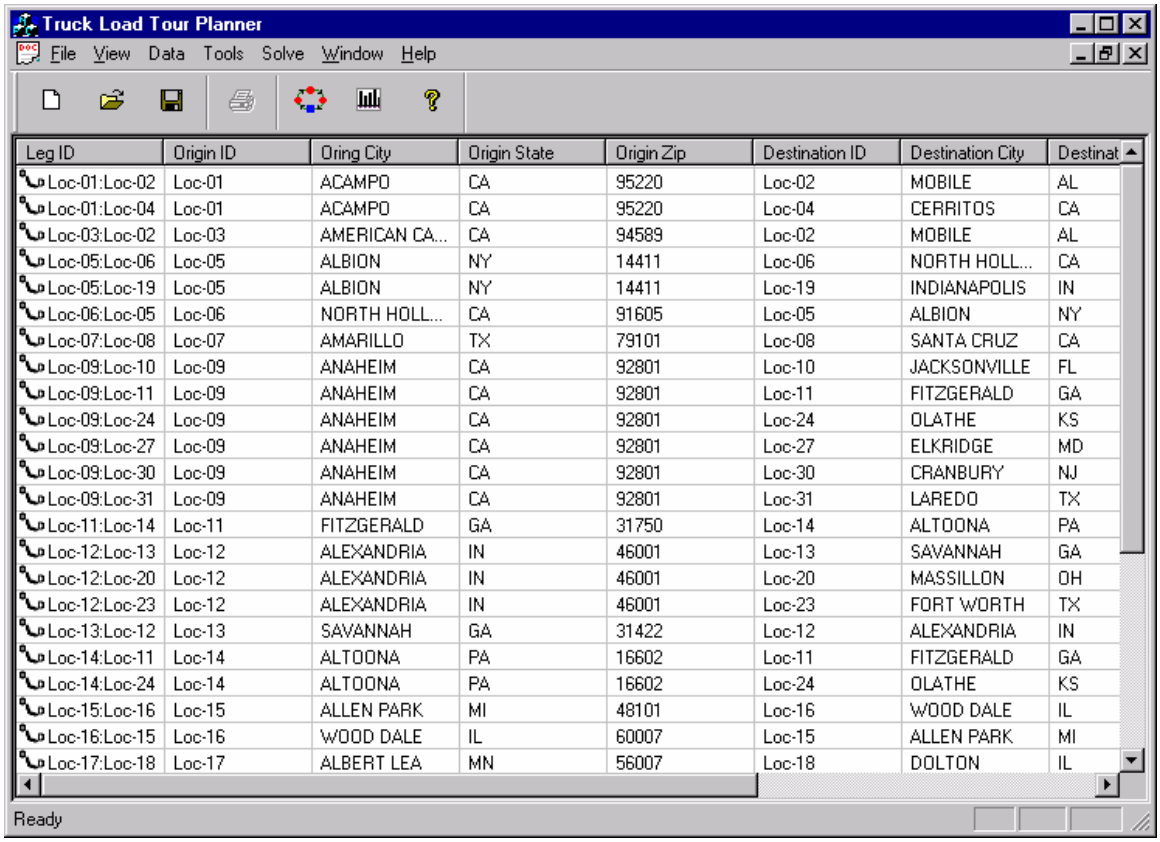
Each continuous move in CMP consists of a set of moves and can start and end at a user defined Domicile. The set of moves consists of loaded and empty moves/legs. When trying to match the loaded moves input by the user the system needs to build an empty move if required to move the truck from the previous loaded leg's Destination location to the next loaded leg's Origin location. If the user specifies a set of Domiciles (locations where the trucks are domiciled), CMP tries to build continuous moves starting from and returning to those Domiciles. In the absence of Domiciles each continuous move starts from and returns to the same location, which is the Origin location of its first loaded leg.

DATA MANAGEMENT

Origin-Destination data can be imported into CMP in the form of ASCII files. The data import wizard guides users through the setup process for importing Origin-Destination pair data into the system. Very minimal data entry is required during the setup. All the user settings are stored in the system so that repeated imports of data of same format will require absolutely no data entry, minimizing user errors.

CMP's data views present legs and continuous moves data in spreadsheet format. These views enable users to sort the data based on different criteria, get more details on any Leg or Continuous move by double clicking on a row, and provide a text representation of the data imported into the system.

As the solution is developed, the data views update automatically to reflect the changes.



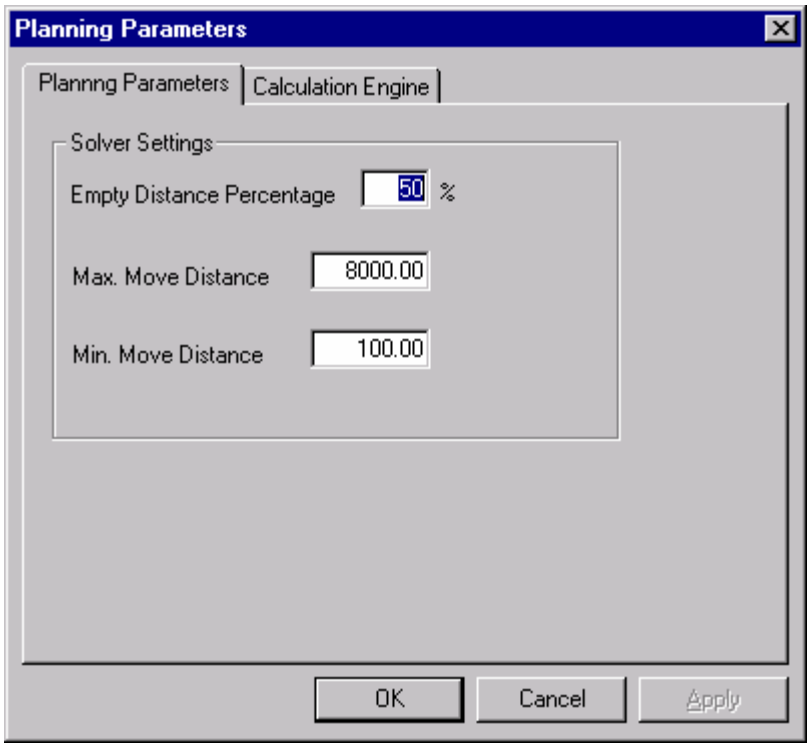
Leg ID	Origin ID	Oring City	Origin State	Origin Zip	Destination ID	Destination City	Destinat
Loc-01:Loc-02	Loc-01	ACAMPO	CA	95220	Loc-02	MOBILE	AL
Loc-01:Loc-04	Loc-01	ACAMPO	CA	95220	Loc-04	CERRITOS	CA
Loc-03:Loc-02	Loc-03	AMERICAN CA...	CA	94589	Loc-02	MOBILE	AL
Loc-05:Loc-06	Loc-05	ALBION	NY	14411	Loc-06	NORTH HOLL...	CA
Loc-05:Loc-19	Loc-05	ALBION	NY	14411	Loc-19	INDIANAPOLIS	IN
Loc-06:Loc-05	Loc-06	NORTH HOLL...	CA	91605	Loc-05	ALBION	NY
Loc-07:Loc-08	Loc-07	AMARILLO	TX	79101	Loc-08	SANTA CRUZ	CA
Loc-09:Loc-10	Loc-09	ANAHEIM	CA	92801	Loc-10	JACKSONVILLE	FL
Loc-09:Loc-11	Loc-09	ANAHEIM	CA	92801	Loc-11	FITZGERALD	GA
Loc-09:Loc-24	Loc-09	ANAHEIM	CA	92801	Loc-24	OLATHE	KS
Loc-09:Loc-27	Loc-09	ANAHEIM	CA	92801	Loc-27	ELKRIDGE	MD
Loc-09:Loc-30	Loc-09	ANAHEIM	CA	92801	Loc-30	CRANBURY	NJ
Loc-09:Loc-31	Loc-09	ANAHEIM	CA	92801	Loc-31	LAREDO	TX
Loc-11:Loc-14	Loc-11	FITZGERALD	GA	31750	Loc-14	ALTOONA	PA
Loc-12:Loc-13	Loc-12	ALEXANDRIA	IN	46001	Loc-13	SAVANNAH	GA
Loc-12:Loc-20	Loc-12	ALEXANDRIA	IN	46001	Loc-20	MASSILLON	OH
Loc-12:Loc-23	Loc-12	ALEXANDRIA	IN	46001	Loc-23	FORT WORTH	TX
Loc-13:Loc-12	Loc-13	SAVANNAH	GA	31422	Loc-12	ALEXANDRIA	IN
Loc-14:Loc-11	Loc-14	ALTOONA	PA	16602	Loc-11	FITZGERALD	GA
Loc-14:Loc-24	Loc-14	ALTOONA	PA	16602	Loc-24	OLATHE	KS
Loc-15:Loc-16	Loc-15	ALLEN PARK	MI	48101	Loc-16	WOOD DALE	IL
Loc-16:Loc-15	Loc-16	WOOD DALE	IL	60007	Loc-15	ALLEN PARK	MI
Loc-17:Loc-18	Loc-17	ALBERT LEA	MN	56007	Loc-18	DOLTON	IL

BUILDING CONTINUOUS MOVES

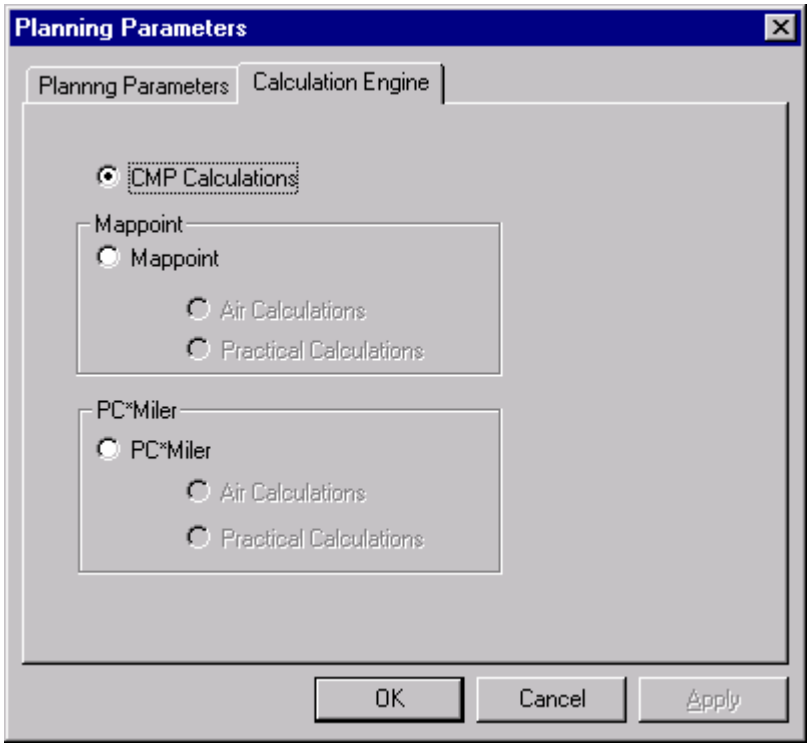
CMP uses robust matching algorithms to build continuous moves from the imported Origin-Destination pairs. The algorithms are controlled by the user-defined parameters.

Parameters

The matching algorithm is currently controlled by three parameters: 1) Empty Distance Percentage, 2) Maximum Continuous move Distance, and 3) Minimum Continuous move Distance. Empty Distance Percentage controls the ratio of the total empty distance (deadhead) on the continuous move to its total distance (sum of empty and loaded distances). The empty distance or deadhead results from the empty legs/moves of the truck between a pair of loaded legs/moves whenever required. Maximum and Minimum continuous move distances control the distance a truck can run on any continuous move and thereby control the number of loaded legs on a continuous move. Additional constraints include equipment types and weeks of availability. Any number of parameters/constraints can be added to the matching algorithm. Cost and Time constraints are being built into the engine at this time.



Calculation Engine



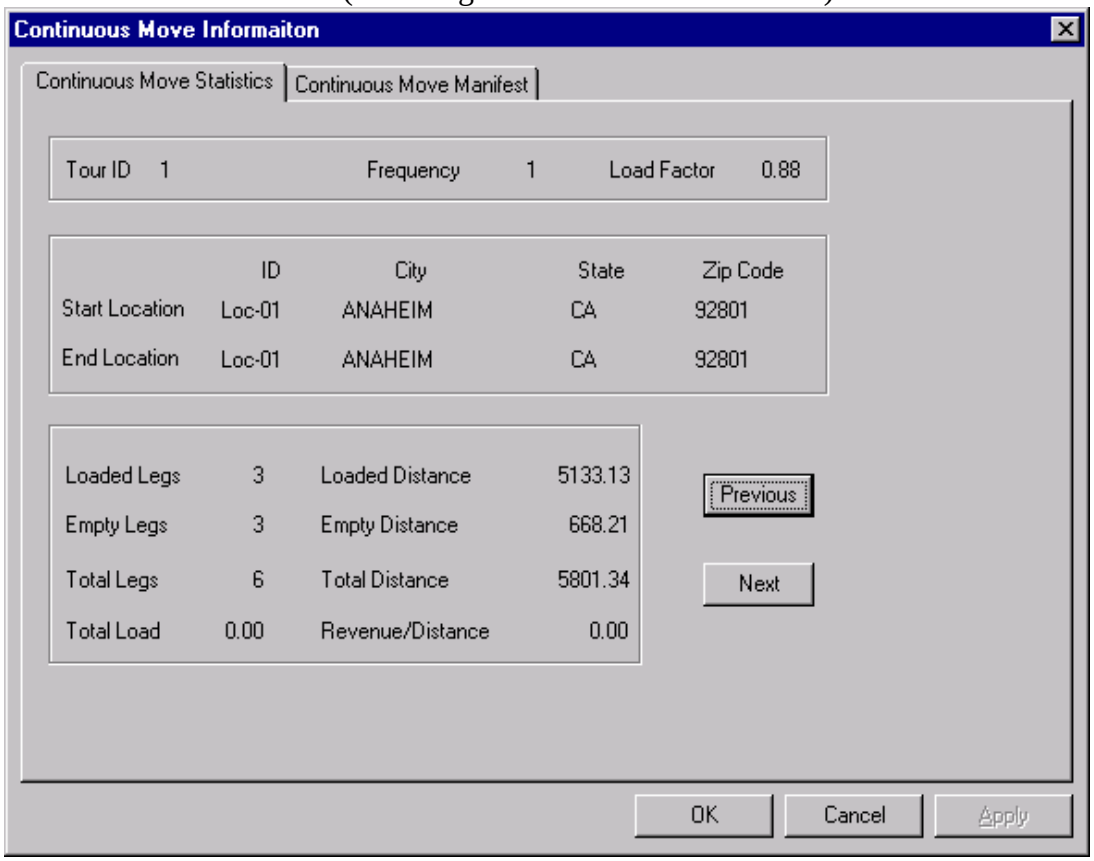
The distance and time calculations required by the matching algorithm are obtained from different sources. CMP's proprietary engine is the quickest in terms of rate of running the

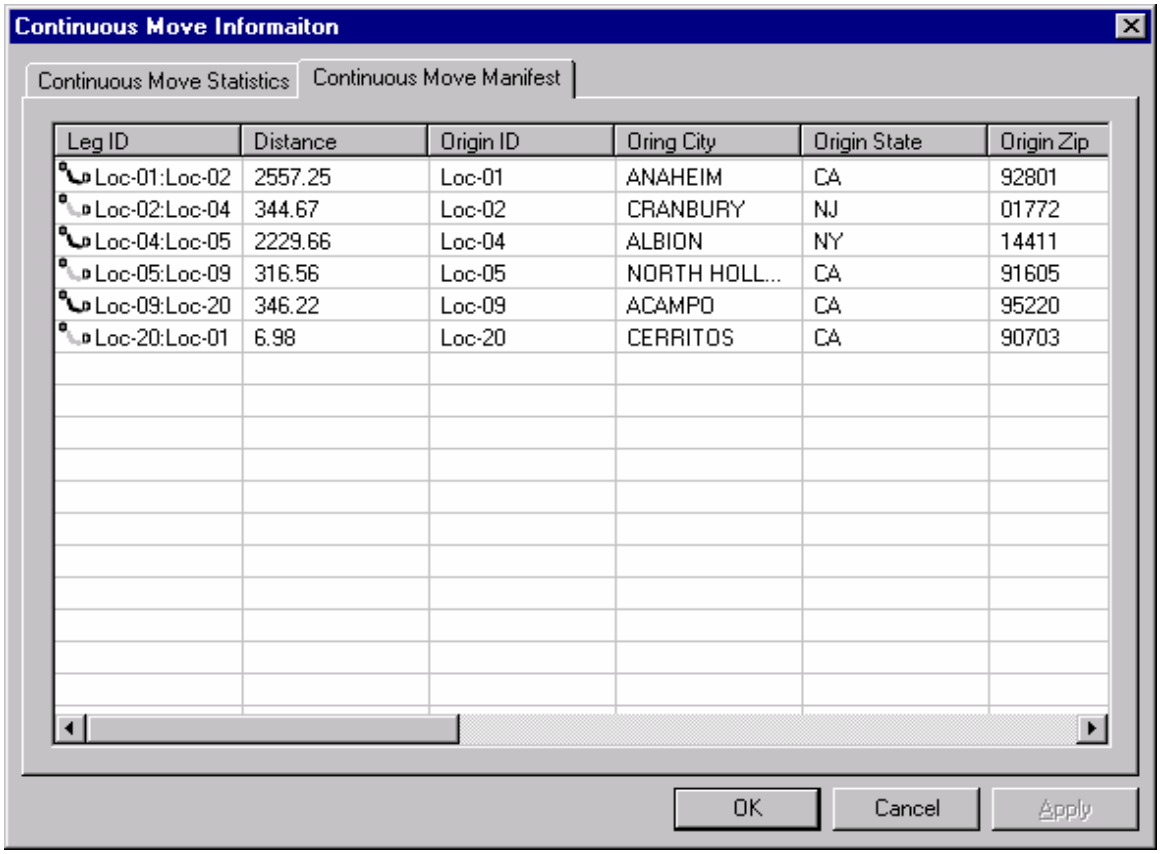
calculations. Microsoft's Mappoint and ALK's PC*Miler are the other alternatives supported at this time. Included in both these options is the ability to use air distances and actual road distances. Air distances are calculated at a faster rate than the road distances.

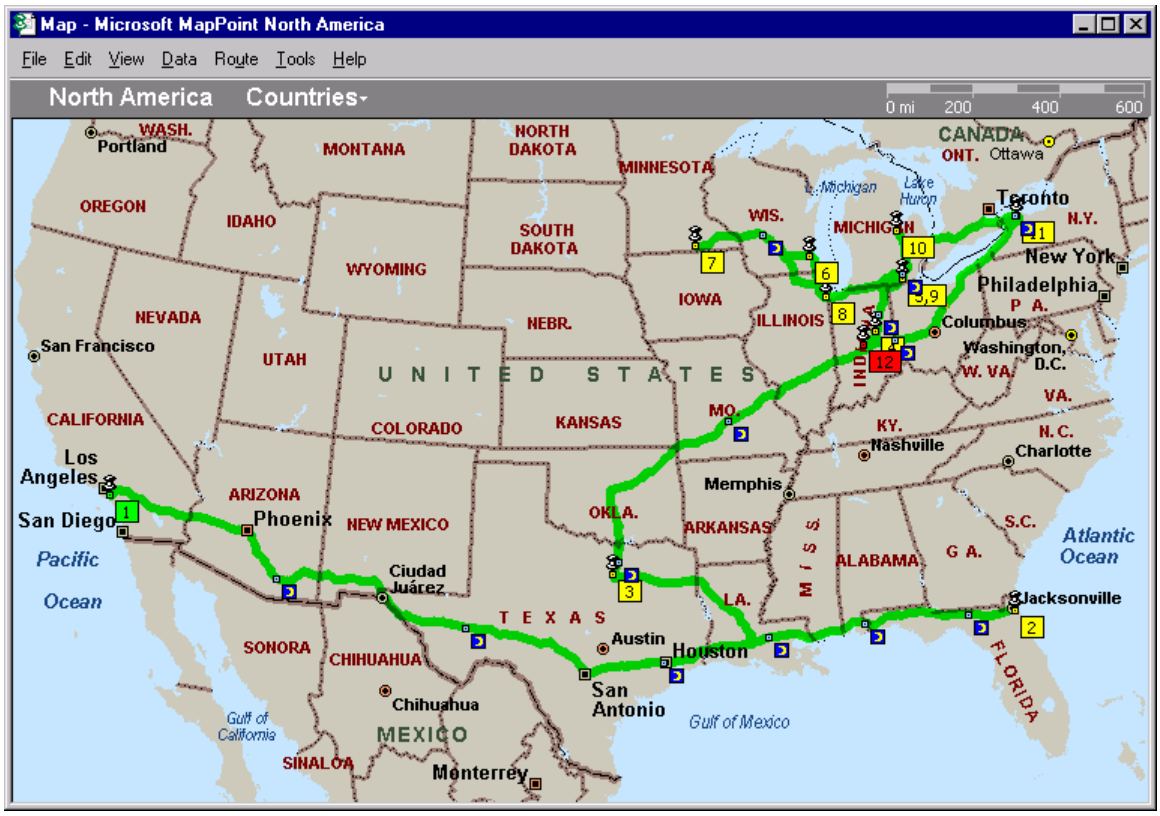
Solution and Presentation

Parameters and Calculation engine settings control the solution. The resulting continuous moves and any unmatched legs are presented in the form of spreadsheets and reports. The reports can be exported as text files and customized in MS Word or MS Excel.

Information on each continuous move or unmatched leg can be obtained by double clicking on the row that corresponds to them. The information dialogs display all the attributes of the continuous moves and the legs. The continuous move information dialog presents both the statistics and the manifest (list of legs in the order of occurrence).




Continuous Move Informaiton
Continuous Move Statistics
Continuous Move Manifest
Leg ID | Distance | Origin ID | Oring City | Origin State | Origin Zip
Loc-01:Loc-02 | 2557.25 | Loc-01 | ANAHEIM | CA | 92801
Loc-02:Loc-04 | 344.67 | Loc-02 | CRANBURY | NJ | 01772
Loc-04:Loc-05 | 2229.66 | Loc-04 | ALBION | NY | 14411
Loc-05:Loc-09 | 316.56 | Loc-05 | NORTH HOLL... | CA | 91605
Loc-09:Loc-20 | 346.22 | Loc-09 | ACAMPO | CA | 95220
Loc-20:Loc-01 | 6.98 | Loc-20 | CERRITOS | CA | 90703
OK
Cancel
Apply

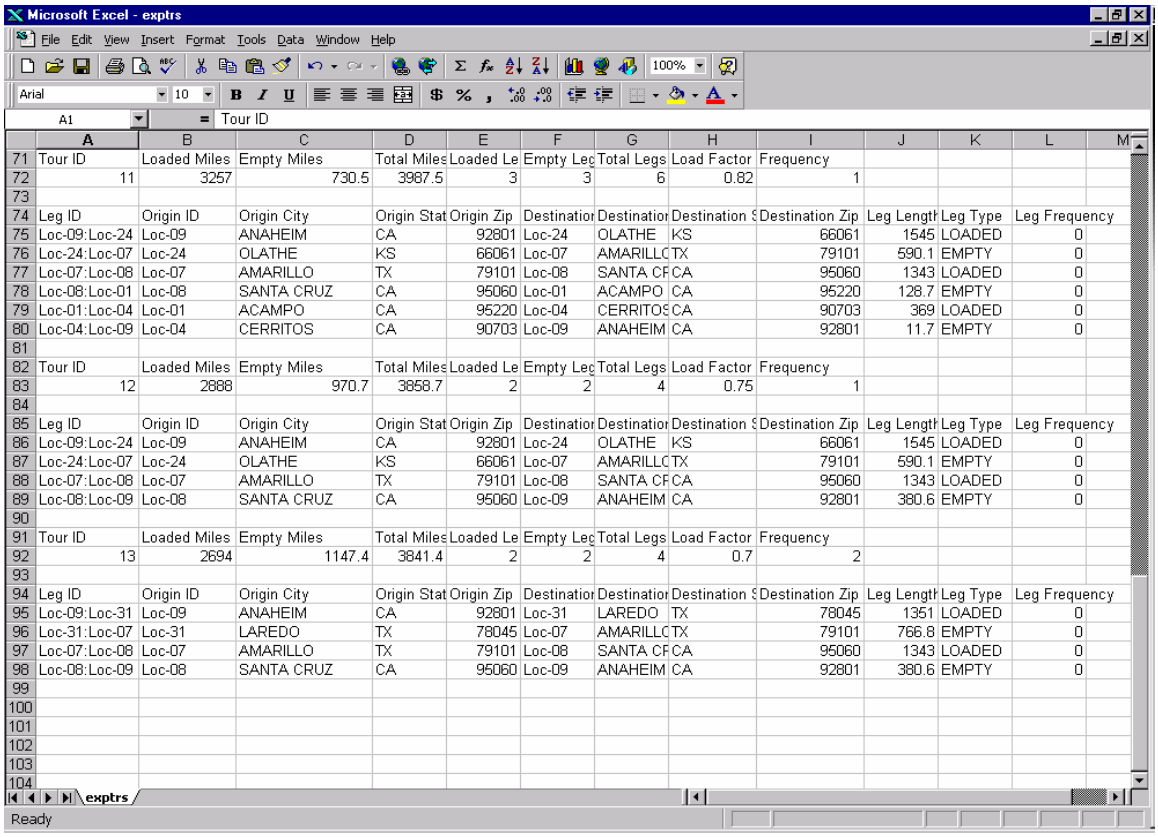

Map - Microsoft MapPoint North America
File Edit View Data Route Tools Help
North America Countries
0 mi 200 400 600
WASH.
Portland
MONTANA
NORTH DAKOTA
MINNESOTA
CANADA
ONT. Ottawa
Lake Huron
Toronto
OREGON
IDAHO
WIS.
MICHIGAN
N.Y.
SOUTH DAKOTA
WYOMING
New York
Philadelphia
P A.
IOWA
NEVADA
NEBR.
ILLINOIS
IND.
Columbus
San Francisco
UTAH
Washington, D.C.
W. VA.
U N I T E D S T A T E S
VA.
CALIFORNIA
COLORADO
KANSAS
MO.
KY.
Nashville
N. C.
Charlotte
Los Angeles
ARIZONA
Memphis
San Diego
Phoenix
NEW MEXICO
OKLA.
ARKANSAS
S.C.
Atlantic Ocean
Pacific Ocean
Ciudad Juárez
MISS.
ALABAMA
G A.
LA.
Jacksonville
T E X A S
Austin
Houston
SONORA
CHIHUAHUA
San Antonio
FLORIDA
Chihuahua
Gulf of California
Gulf of Mexico
MEXICO
SINALOA
Monterrey

REPORTS & EXPORTS

Touring solution can be exported in the form of text files. These reports consist of detailed information on all the continuous moves and any unmatched legs generated by the algorithm and can be imported into MS Word or MS Excel for further configuration.

Sample Export

The continuous move manifest report includes a summary of all the key statistics of all the continuous moves in the system in addition to the details of the legs (loaded and empty) that are part of them. Displayed below are the snapshots of the two reports generated by CMP, Tour Detail and Unmatched Leg Summary.



Microsoft Excel - exptrs

File Edit View Insert Format Tools Data Window Help

Arial 10 100%

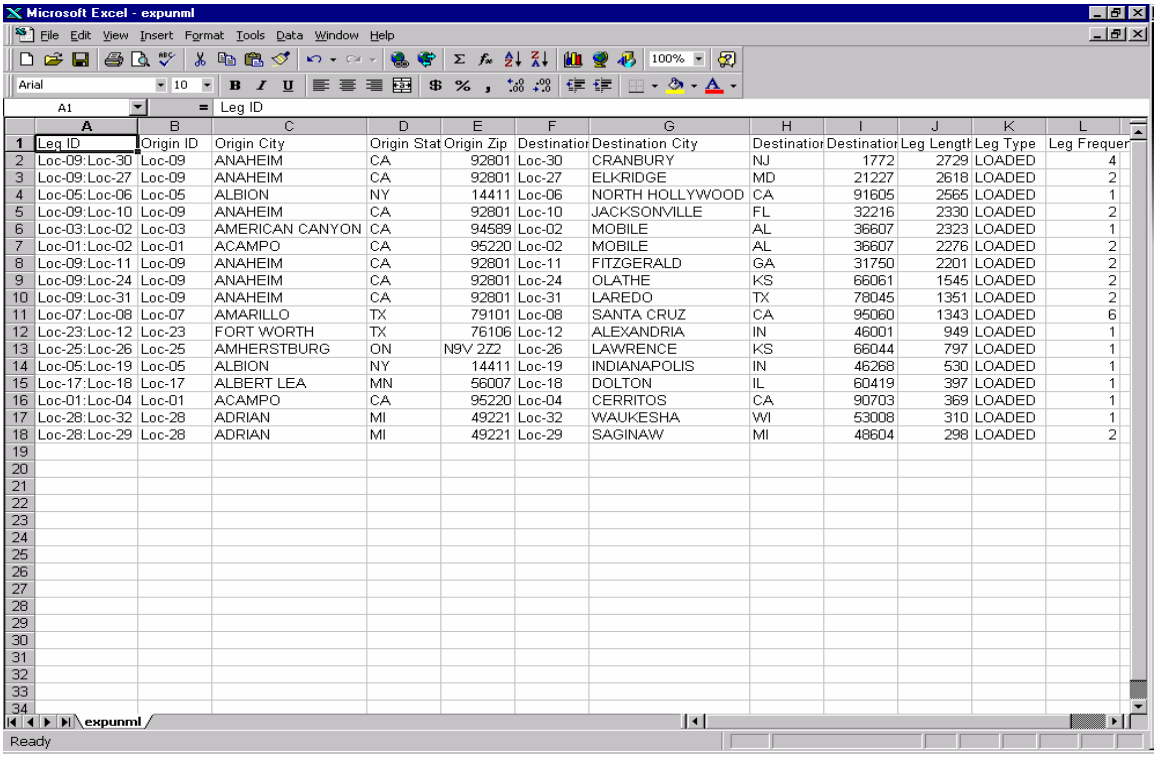
A1 = Tour ID

	A	B	C	D	E	F	G	H	I	J	K	L	M
71	Tour ID	Loaded Miles	Empty Miles	Total Miles	Loaded Le	Empty Leg	Total Legs	Load Factor	Frequency				
72	11	3257	730.5	3987.5	3	3	6	0.82	1				
73													
74	Leg ID	Origin ID	Origin City	Origin Stat	Origin Zip	Destinatior	Destinatior	Destination S	Destination Zip	Leg Length	Leg Type	Leg Frequency	
75	Loc-09:Loc-24	Loc-09	ANAHEIM	CA	92801	Loc-24	OLATHE	KS	66061	1545	LOADED	0	
76	Loc-24:Loc-07	Loc-24	OLATHE	KS	66061	Loc-07	AMARILLO	TX	79101	590.1	EMPTY	0	
77	Loc-07:Loc-08	Loc-07	AMARILLO	TX	79101	Loc-08	SANTA CR	CA	95060	1343	LOADED	0	
78	Loc-08:Loc-01	Loc-08	SANTA CRUZ	CA	95060	Loc-01	ACAMPO	CA	95220	128.7	EMPTY	0	
79	Loc-01:Loc-04	Loc-01	ACAMPO	CA	95220	Loc-04	CERRITOS	CA	90703	369	LOADED	0	
80	Loc-04:Loc-09	Loc-04	CERRITOS	CA	90703	Loc-09	ANAHEIM	CA	92801	11.7	EMPTY	0	
81													
82	Tour ID	Loaded Miles	Empty Miles	Total Miles	Loaded Le	Empty Leg	Total Legs	Load Factor	Frequency				
83	12	2888	970.7	3858.7	2	2	4	0.75	1				
84													
85	Leg ID	Origin ID	Origin City	Origin Stat	Origin Zip	Destinatior	Destinatior	Destination S	Destination Zip	Leg Length	Leg Type	Leg Frequency	
86	Loc-09:Loc-24	Loc-09	ANAHEIM	CA	92801	Loc-24	OLATHE	KS	66061	1545	LOADED	0	
87	Loc-24:Loc-07	Loc-24	OLATHE	KS	66061	Loc-07	AMARILLO	TX	79101	590.1	EMPTY	0	
88	Loc-07:Loc-08	Loc-07	AMARILLO	TX	79101	Loc-08	SANTA CR	CA	95060	1343	LOADED	0	
89	Loc-08:Loc-09	Loc-08	SANTA CRUZ	CA	95060	Loc-09	ANAHEIM	CA	92801	380.6	EMPTY	0	
90													
91	Tour ID	Loaded Miles	Empty Miles	Total Miles	Loaded Le	Empty Leg	Total Legs	Load Factor	Frequency				
92	13	2694	1147.4	3841.4	2	2	4	0.7	2				
93													
94	Leg ID	Origin ID	Origin City	Origin Stat	Origin Zip	Destinatior	Destinatior	Destination S	Destination Zip	Leg Length	Leg Type	Leg Frequency	
95	Loc-09:Loc-31	Loc-09	ANAHEIM	CA	92801	Loc-31	LAREDO	TX	78045	1351	LOADED	0	
96	Loc-31:Loc-07	Loc-31	LAREDO	TX	78045	Loc-07	AMARILLO	TX	79101	766.8	EMPTY	0	
97	Loc-07:Loc-08	Loc-07	AMARILLO	TX	79101	Loc-08	SANTA CR	CA	95060	1343	LOADED	0	
98	Loc-08:Loc-09	Loc-08	SANTA CRUZ	CA	95060	Loc-09	ANAHEIM	CA	92801	380.6	EMPTY	0	
99													
100													
101													
102													
103													
104													

exptrs

Ready

TOUR DETAIL REPORT



Microsoft Excel - expunml

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Arial 10 100%

A1 = Leg ID

	A	B	C	D	E	F	G	H	I	J	K	L
1	Leg ID	Origin ID	Origin City	Origin Stat	Origin Zip	Destinatior	Destination City	Destinatior	Destinatior	Leg Length	Leg Type	Leg Frequer
2	Loc-09:Loc-30	Loc-09	ANAHEIM	CA	92801	Loc-30	CRANBURY	NJ	1772	2729	LOADED	4
3	Loc-09:Loc-27	Loc-09	ANAHEIM	CA	92801	Loc-27	ELKRIDGE	MD	21227	2618	LOADED	2
4	Loc-05:Loc-06	Loc-05	ALBION	NY	14411	Loc-06	NORTH HOLLYWOOD	CA	91605	2565	LOADED	1
5	Loc-09:Loc-10	Loc-09	ANAHEIM	CA	92801	Loc-10	JACKSONVILLE	FL	32216	2330	LOADED	2
6	Loc-03:Loc-02	Loc-03	AMERICAN CANYON	CA	94589	Loc-02	MOBILE	AL	36607	2323	LOADED	1
7	Loc-01:Loc-02	Loc-01	ACAMPO	CA	95220	Loc-02	MOBILE	AL	36607	2276	LOADED	2
8	Loc-09:Loc-11	Loc-09	ANAHEIM	CA	92801	Loc-11	FITZGERALD	GA	31750	2201	LOADED	2
9	Loc-09:Loc-24	Loc-09	ANAHEIM	CA	92801	Loc-24	OLATHE	KS	66061	1545	LOADED	2
10	Loc-09:Loc-31	Loc-09	ANAHEIM	CA	92801	Loc-31	LAREDO	TX	78045	1351	LOADED	2
11	Loc-07:Loc-08	Loc-07	AMARILLO	TX	79101	Loc-08	SANTA CRUZ	CA	95060	1343	LOADED	6
12	Loc-23:Loc-12	Loc-23	FORT WORTH	TX	76106	Loc-12	ALEXANDRIA	IN	46001	949	LOADED	1
13	Loc-25:Loc-26	Loc-25	AMHERSTBURG	ON	N9V 2Z2	Loc-26	LAWRENCE	KS	66044	797	LOADED	1
14	Loc-05:Loc-19	Loc-05	ALBION	NY	14411	Loc-19	INDIANAPOLIS	IN	46268	530	LOADED	1
15	Loc-17:Loc-18	Loc-17	ALBERT LEA	MN	56007	Loc-18	DOLTON	IL	60419	397	LOADED	1
16	Loc-01:Loc-04	Loc-01	ACAMPO	CA	95220	Loc-04	CERRITOS	CA	90703	369	LOADED	1
17	Loc-28:Loc-32	Loc-28	ADRIAN	MI	49221	Loc-32	WAUKESHA	WI	53008	310	LOADED	1
18	Loc-28:Loc-29	Loc-28	ADRIAN	MI	49221	Loc-29	SAGINAW	MI	48604	298	LOADED	2

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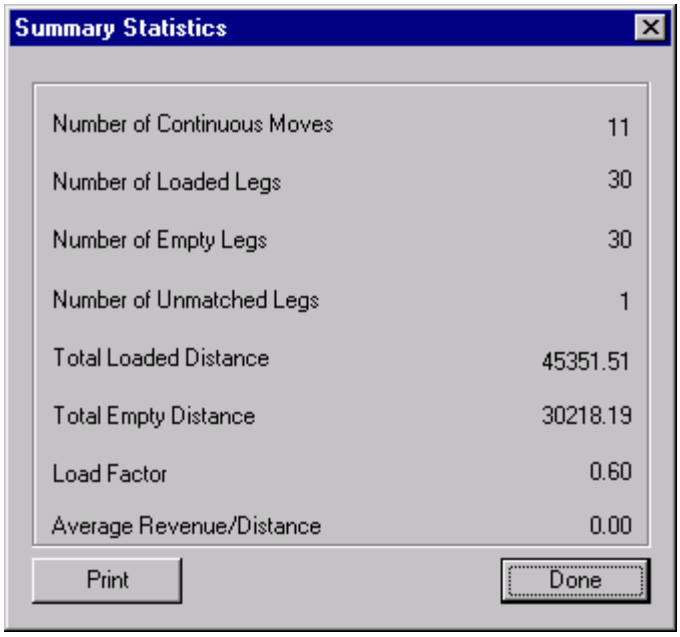
UNMATCHED LEGS SUMMARY REPORT

SUMMARY STATISTICS

CMP provides a statistical summary of the touring solution each time the matching algorithm is executed. The summary statistics can be printed out.



TECHNOLOGY

Developed in Visual C++ using Object Oriented Design (OOD) methodology and Component Object Model (COM) concepts. Uses industry standard STL (Standard Template Libraries) and streaming techniques for efficient data storage, retrieval, and persistence. CMP does not require any database drivers or software.

KEY FEATURES & BENEFITS

- CMP can be used as an operational decision support tool for matching disparate truckload moves in the most optimal manner. It can handle any number of truckload moves.
- Familiar user friendly interfaces facilitating shorter learning curve. Problem set up is quick and easy, requiring minimal data entry.
- Industry standard distances and times used for matching truckload moves.
- Technical architecture is based on Object Oriented design principles, which enable plug and play of functionality.
- Comprehensive reports and exports of data and solution. Summary statistics can be printed.
- Runs in Windows 95/98/ME/XP/NT/2000 environments.

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APPENDIX D. EMAIL FROM MICHAEL CRUM

>From popserve Mon Jun 26 15:58:06 2006
Subject: Dispatch systems
Date: Mon, 26 Jun 2006 15:58:10 -0500
X-MS-Has-Attach:
X-MS-TNEF-Correlator:
Thread-Topic: Dispatch systems
thread-index: AcaZLqtVqVpH2ehfSnqcTICXK9vWDwAMvvmA
From: "Crum, Mike" <mcrum@iastate.edu>
To: "Duane E Smith" <desmith@iastate.edu>

Hi Duane,

I apologize for not getting back to you this morning -- got tied up on some unexpected things today.

The three non-carrier companies that I can think of that might be able to help with the automated dispatch project are: Hy-Vee, Casey Stores, and Farner Bocken. Unfortunately, I do not have a contact at the latter two. However, I know the VP of Distribution at Hy-Vee. Please feel free to contact him and indicate I suggested to do so. His name is Fred Housman and he can be reached at 641-774-7270 and fhousman@hy-vee.com

As we discussed last week, the one carrier that has a similar transportation operation to Murphy Farms is Ruan. I think some of your folks have contacts there. If you don't, please let me know and I'll check around here.

I'll continue to think of companies that might be helpful.

Mike

Michael R. Crum
Associate Dean for Graduate Programs
John and Ruth DeVries Chair in Business
Professor of Logistics and Supply Chain Management
Iowa State University
2200 Gerdin Business Building
Ames, IA 50011-1350
(515) 294-8105
mcrum@iastate.edu

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---

1 Named by Inbound Logistics from 1999 - 2006.
2 Actual results may vary but these numbers represent averages.

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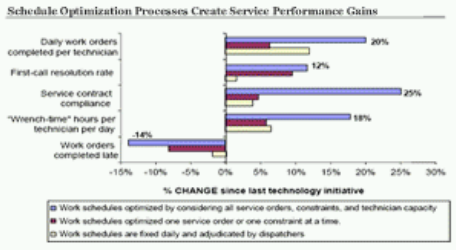

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