Daily Route Optimization of Service and Delivery Fleets

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Yale Electric and Appliance

► Family owned operated since 1923

► New England's leading appliance and lighting retailer, 25% annual growth

► 'Best of Boston' 2004 and 2005

► Ten 28' trucks with driver and helper teams making about 150 deliveries each day

► Thirteen service vans with a single technician making about 100 repairs each day

Core Technology and Data

- ► Mixture of Sun and Microsoft Servers

- ► Windows Network

- ► GERS Retail System

- ► Oracle database

Pre-project Routing Process

► Print 'tickets' for delivery and service orders

► Look up addresses on paper maps and note map page numbers (for driver reference)

► Sort tickets by pre-set zones (large day-to-day volume variance)

► Sequence tickets manually based on dispatcher knowledge of geography

► Use number of tickets as a surrogate for vehicle capacity (cube, drive time, service time, etc. not considered)

► Develop ETAs and service time windows estimates based on sequence and dispatcher guess, then enter results manually in GERS

2003 Business Challenge

► To develop more cost and service efficient routes and schedules for <u>delivery</u> and <u>service</u> fleets on a daily basis

► Cost related goals
  - Maximize cube utilization of delivery vehicles
  - Maximize driver and tech work day
  - Reduce miles and overtime
  - Reduce administrative time

► Service related goals
  - Provide more accurate ETA's and time windows to clients
  - Honor 'pre-committed' time windows
  - For repairs, make sure tech has the right skill to do the job and that same tech is used for follow-ups

► Integrate solution with GERS system

Solution Components

► Two seats licenses of ESRI's ArcLogistics Route software

► GDT Dynamap street data (included with the ArcLogistics Route licenses)

► Custom ALR-GERS Interface programs (one for product deliveries and one for service repairs) by Pathfinder Logistics Solutions

► Cloudberry GPS System

ArcLogistics Route

► A desktop application that optimizes vehicle routing and scheduling for an entire fleet

► Considers factors such as vehicle capacities, vehicle costs, delivery windows, driver length of day, time at office, lunches, etc.

► Utilizes the actual street network (speed by class of highway, one way streets, etc.)

Why 'Real Streets' Matter!

St. Petersburg - Waterways
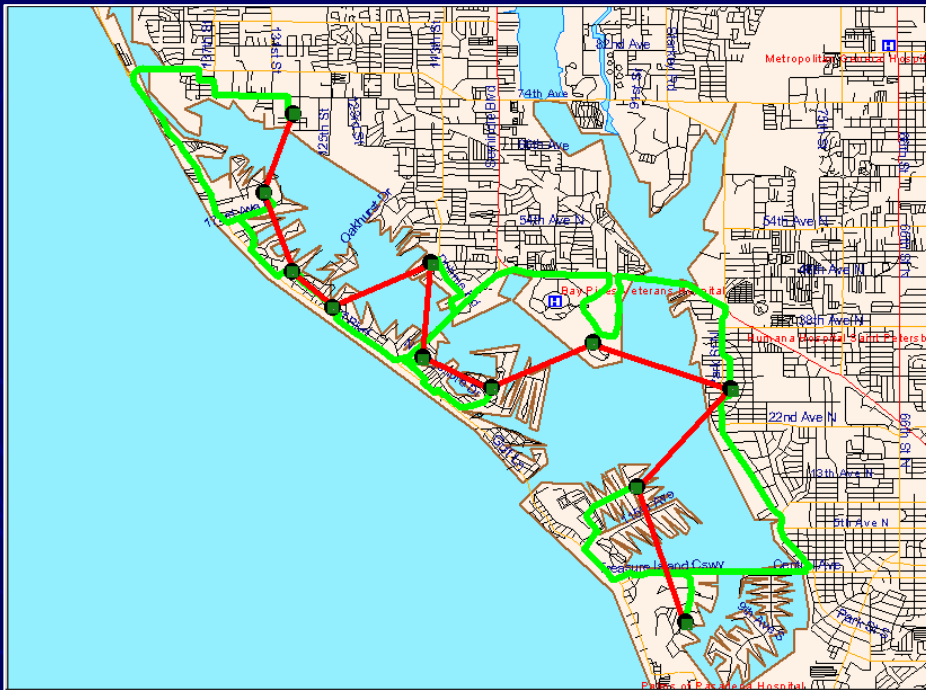
10 miles as the crow flies
26 miles actual

San Diego - Canyons
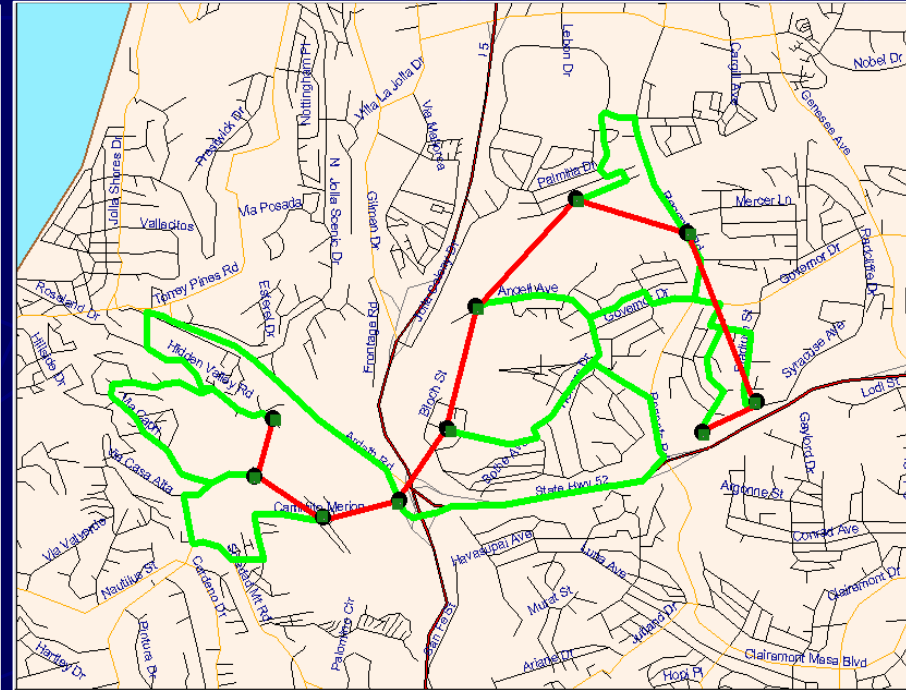
3.9 miles as the crow flies
16.3 miles actual

ArcLogistics Route Advantage

► Robust geographic data – real streets, one-ways, customizable, etc.

► Sophisticated optimizer/solver, more than just an assignment tool

► Powerful geocoding capabilities, easy-to-use tools to manage exceptions

► Superior look and feel, drop and drag, etc.

► Integrates with Cloudberry, a fully functional GPS/AVL system

► Backed by ESRI, an industry leader

ALR-GERS Interface - Delivery

► **Multiple Downloads**

- Selects orders and item detail by date and zone, aggregates orders with same customer number and address into stops

- Synchronizes to central database with each download, highlights changes

- Order and inventory details are viewable through routing program, user can view last 10 sales comments

► **Multiple Uploads**

- Creates user-defined time windows based on ETA's for each order

- Updates GERS by sales order (ETA, vehicle, stop, sequence, time windows)

- Marks orders when time window is revised so customers can be recalled

ALR-GERS Interface - Service

► Download

- Selects service orders by date and zone
- Service orders contain skill codes required by tech
- Queries historical service order database by customer to determine last tech
- Assigns minutes of service by service type code
- Skill codes and last tech are imported as order 'specialties' to the routing system to insure work orders are matched to appropriate technicians

► Upload

- Creates user-defined time windows based on ETA's for each order
- Updates service scheduling screens in GERS – schedules and closes completed services orders

New Routing Process

► Import delivery orders from GERS

► Review and resolve Geocoding exceptions

► Automatically build routes

► Export results to GERS

► Print management reports, manifests, maps and directions

► Upload to Cloudberry GPS

File　Edit　Maintain　Window　Help
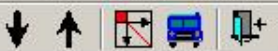
Download View

Download From GERS

Date: 9/28/2000 ▼ Thursday

Zones:

Available Zones:

- 13M
- 13R
- 13T
- 24F
- 24M
- 24T
- 24W
- 2FR

Selected Zones:

- M-S
- R/S
- THU
- X-S

[>]
[<]
[>>]
[<<]

Routing Folder:

Folder: Test Data ▼

☑ Remove existing orders

Download History...   OK   Cancel

Jordan's Furniture

10 orders selected from GERS.
50 pieces selected from GERS.

4 records added to ArcLogistics.

OK

Review Geocoding

Screenshot of Geocode Address application showing:

1. Scores address data

2. Places address locations on map

Input Address:
- Address: 3700 COLE AVE #361
- City: DALLAS
- State: TX
- Postal Code: 75204

Current Candidate — Standard Address: 3700 COLE AVE, DALLAS, TX 75204

Currently Geocoded To — Standard Address: 3700 COLE AVE, DALLAS, TX 75204

Score	Left Side	Right S...	Street	City	Postal	ST
100	3701 - 3799	3700 - ...	COLE AVE	DALLAS	75204	TX
66	2801 - 2899	2800 - ...	COLE AVE	DALLAS	75204	TX
66	2775 - 2799	2774 - ...	COLE AVE	DALLAS	75204	TX
66	2901 - 2999	2900 - ...	COLE AVE	DALLAS	75204	TX
66	3301 - 3499	3300 - ...	COLE AVE	DALLAS	75204	TX
66	4001 - 4099	4000 - ...	COLE AVE	DALLAS	75204	TX
66	3601 - 3699	3600 - ...	COLE AVE	DALLAS	75204	TX
66	3501 - 3599	3500 - ...	COLE AVE	DALLAS	75204	TX
66	3201 - 3299	3200 - ...	COLE AVE	DALLAS	75204	TX
66	3001 - 3199	3000 - ...	COLE AVE	DALLAS	75204	TX
66	3943 - 3999	3942 - ...	COLE AVE	DALLAS	75204	TX
66	3901 - 3941	3900 - ...	COLE AVE	DALLAS	75204	TX
66	3851 - 3899	3850 - ...	COLE AVE	DALLAS	75204	TX
66	3801 - 3849	3800 - ...	COLE AVE	DALLAS	75204	TX
66	2601 - 2773	2600 - ...	COLE AVE	DALLAS	75204	TX
66	4101 - 4199	4100 - ...	COLE AVE	DALLAS	75204	TX
	2201 - 2299	2200 - ...	CADDO ST	DALLAS	75204	TX

3768 BROWN ST
DALLAS, TX
75219

X: -96.8118
Y: 32.8059

Automatically Build Routes

1. Develops optimal delivery plan for each vehicle

2. Designs routes using actual street network

3. Calculates accurate drive times, ETA's and length of driver's day

ArcLogistics Route

File Edit View Solve Reports Window Help

Truck 01 Route

- Service Area
  - Locations
  - Vehicles
  - Stops Inbox
  - Routing Folders
    - Test Data
      - Unassigned Stops
      - Routes
        - Truck 01
        - Truck 02
        - Truck 03

Map View :

Accessing Order and Inventory Detail

Display Detail Screen
Edit Address
Unassign   F8
Assign to Route   ▶
Geocode Address...   Ctrl+G
Move To...
Set Priority   ▶
Specialties...
Grace...
Lock
Unlock
Delete
Cut   Ctrl+X
Copy   Ctrl+C
Paste
Properties...

List View   Route for Tru

	ETA △	Time Window	Name				Postal	Pieces	Cube	Value	Duration	Description
	6:00:00 AM	Wide Open	Wareh		h		02322				0	
	7:14:00 AM	7:00:00 AM - 10:00...	Custo		ASSET		02559	4	0	2396	6	0209005HS...
	9:11:00 AM	7:00:00 AM - 10:00...	Custo				01801	6	0	2519	8	0923005RF...
	9:23:00 AM	7:00:00 AM - 10:00...	Custo		7 PIGEON RD, WOBURN		01801	34	0	13644	36	0923003XF...
	9:59:00 AM	9:00:00 AM - 12:00...	Customer 3		7 HOLTON ST, WOBURN		01801	6	0	2519	8	0923005RF...
	10:07:00 AM		Lunch								20	
	11:06:00 AM	Wide Open	Warehouse		100 Stockwell Drive, Avon		02322				0	

1 Stop(s) Selected

Start   Microsoft PowerPoint - [G...   ArcLogistics Route   Stop   10:31 AM

Detail Can Include Sales Comments
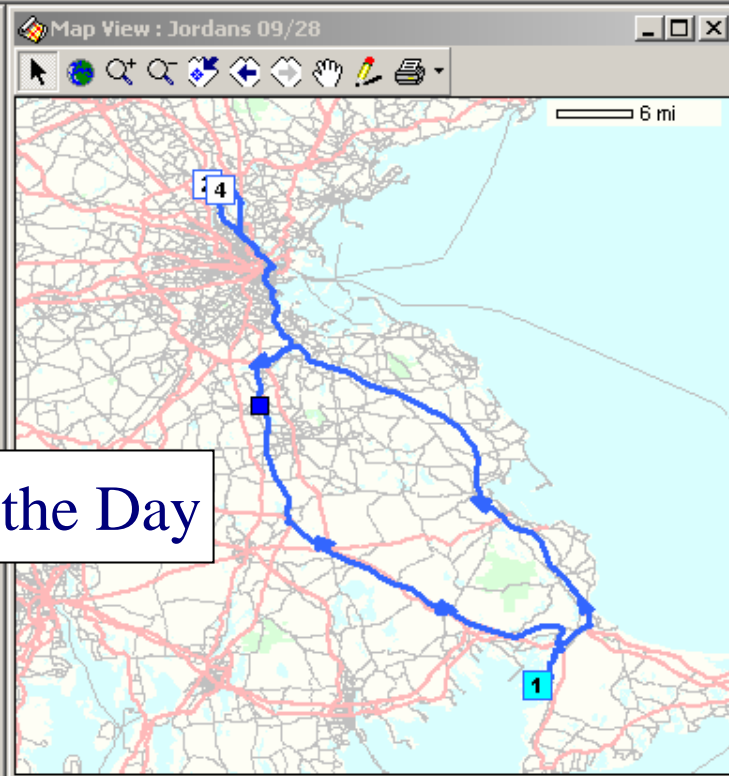
Import and Route Early in the Day
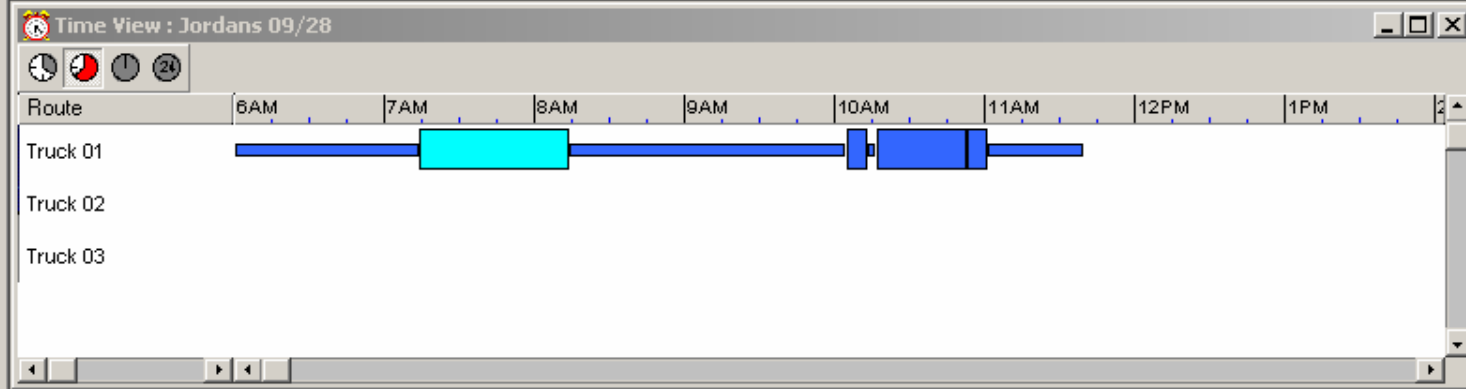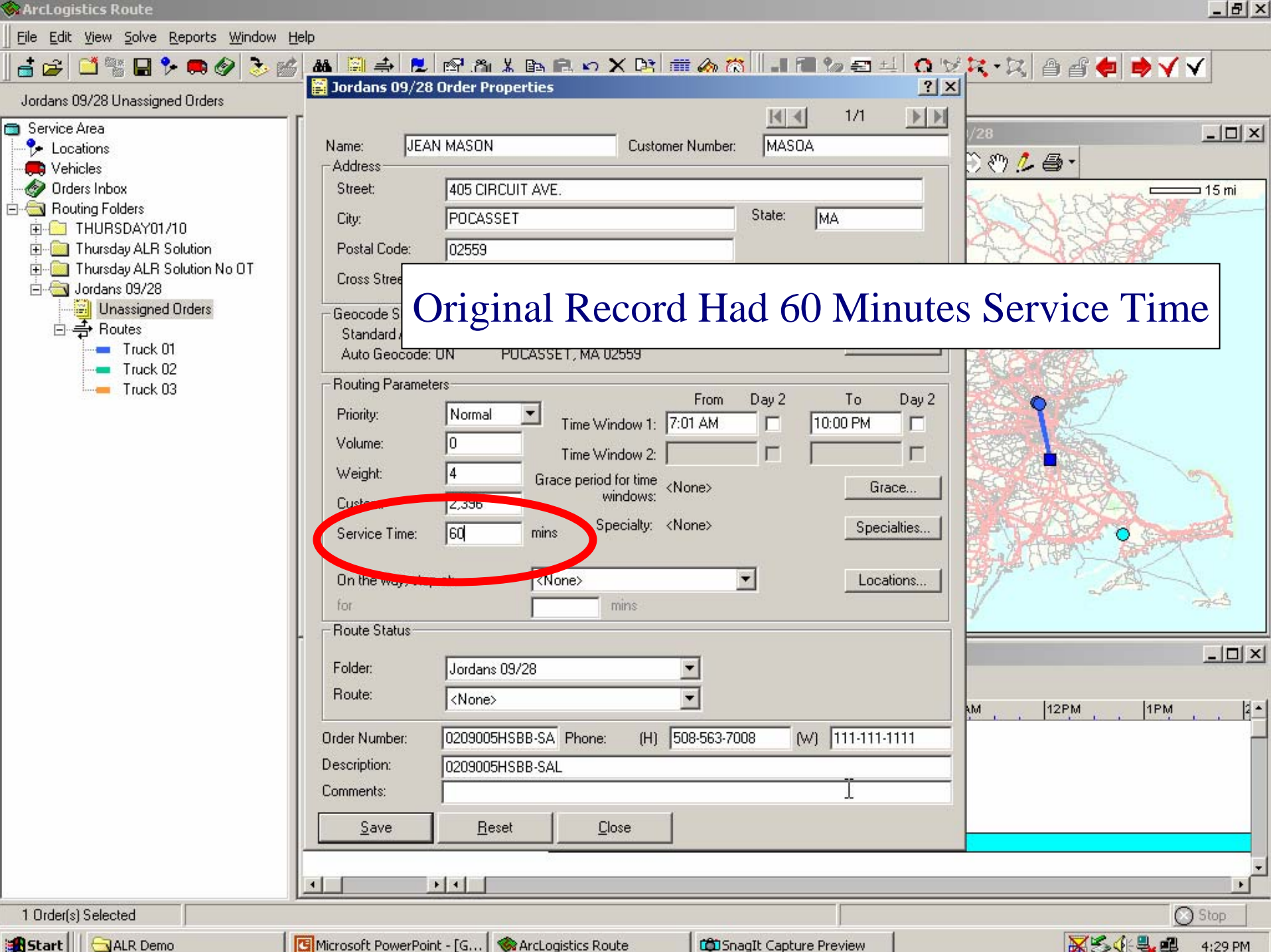
Original Record Had 60 Minutes Service Time

When There Is A Change In Cube or Service Time, Stops Are Unassigned and Highlighted

Build Time Windows Function

Time Window Maintenance

Time Window Values

ETA		ALR Time	
From	To	From	To
07:00 AM	07:30 AM	07:00 AM	10:00 AM
07:31 AM	08:00 AM	07:00 AM	10:00 AM
08:01 AM	08:30 AM	07:00 AM	10:00 AM
08:31 AM	09:00 AM	07:00 AM	10:00 AM
09:01 AM	09:30 AM	07:00 AM	10:00 AM
09:31 AM	10:00 AM	09:00 AM	12:00 PM
10:01 AM	10:30 AM	09:00 AM	12:00 PM
10:31 AM	11:00 AM	09:00 AM	12:00 PM
11:01 AM	11:30 AM	09:00 AM	12:00 PM
11:31 AM	12:00 PM	11:00 AM	02:00 AM
12:01 PM	12:30 PM	11:00 AM	02:00 PM
12:31 PM	01:00 PM	12:00 PM	03:00 PM
01:01 PM	01:30 PM	12:00 PM	03:00 PM
01:31 PM	02:00 PM	12:00 PM	03:00 PM
02:01 PM	02:30 PM	12:00 PM	03:00 PM
02:31 PM	03:00 PM	01:00 PM	04:00 PM
03:01 PM	03:30 PM	01:00 PM	04:00 PM
03:31 PM	04:00 PM	02:00 AM	05:00 AM
04:01 PM	04:30 PM	02:00 PM	05:00 PM
04:31 PM	05:00 PM	03:00 PM	06:00 PM
05:01 PM	05:30 PM	03:00 PM	06:00 PM
05:31 PM	06:00 PM	03:00 PM	06:00 PM

Reset to Default

Cancel

Select Sub IDs and Upload

Upload to GERS

Folder: Test Data

Delivery Date: 9 /28/2000

Entire Folder ☑

Substitutes	
Truck	**Substitute**
Truck 01	TH01

OK   Cancel

Jordan's Furniture

ℹ 10 orders uploaded to GERS

OK

Upload to Cloudberry
Manage Actual Vs. Plan

Benefits

► Streamlined administration (3 hours to 1 hour each day over a period when volume doubled)

► Improved fleet productivity (lower miles and overtime, more cube per vehicle)

► More accurate ETAs and time windows for customers

► Estimated first year savings:

  ▪ About $100K per year in delivery (one less vehicle and team)

  ▪ About $100K per year in service (handled about 20% more service orders with existing fleet)

► Installed, set-up, trained and went live in under two weeks!

Contact Information

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