



Thinking in 360 Degrees. Making it Happen.



## 2012 BUS & PARATRANSIT CONFERENCE

# Applying Fixed Route Principles To Improve Paratransit Runcutting

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# Why is runcutting important?

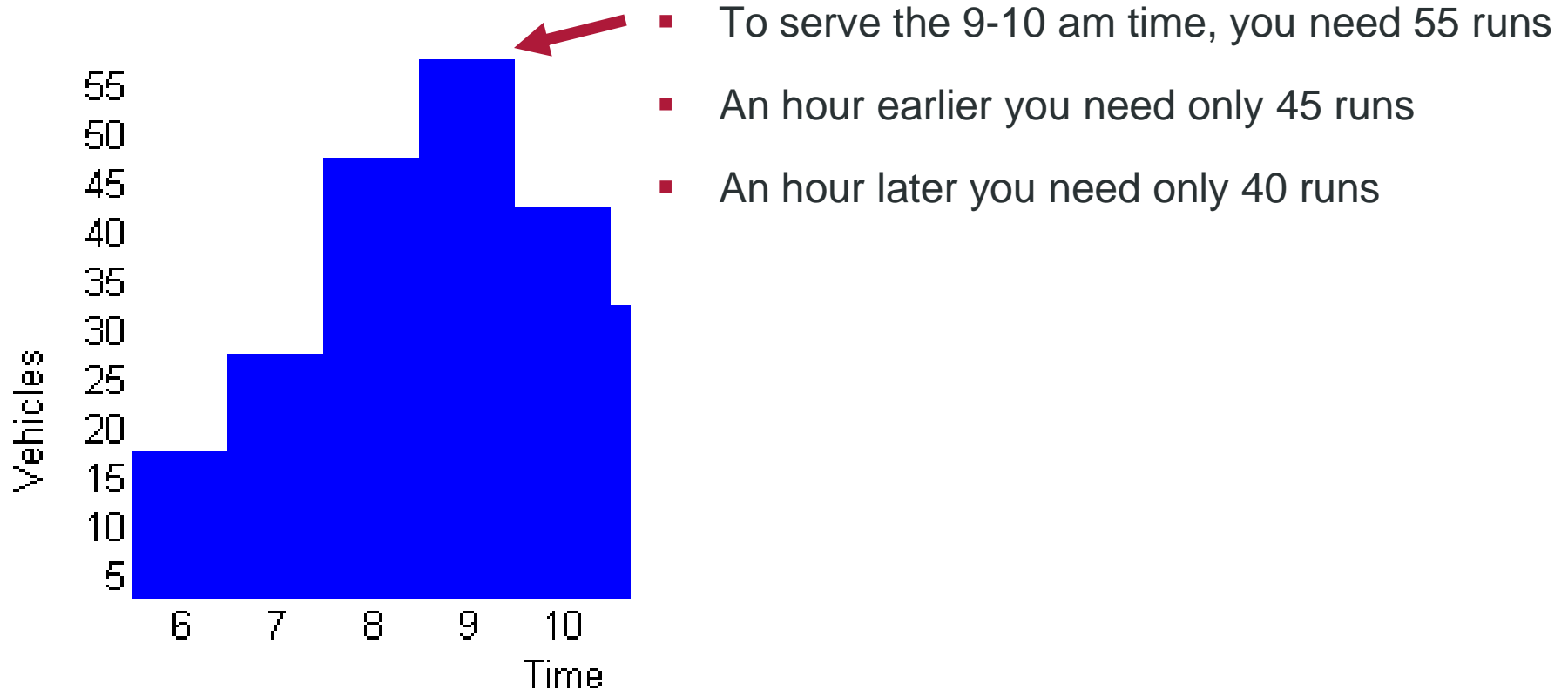
- Scheduling algorithms are designed to schedule trips efficiently
- They depend on vehicle capacity being available
- If runs are designed poorly, there may be too many or too few runs available throughout the day



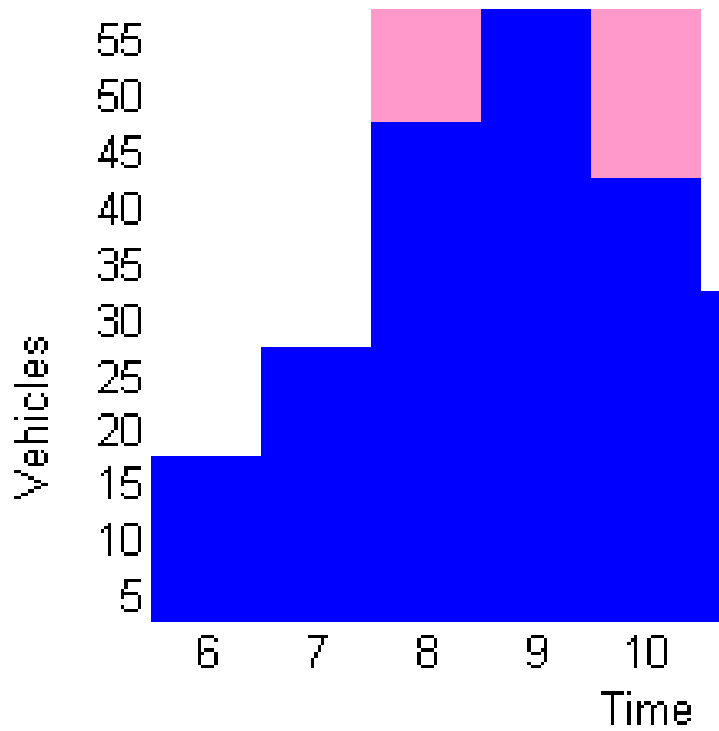
# How does a runcut affect schedule efficiency?



- The goal of a good scheduling algorithm is to group riders efficiently
- The goal of a good runcut is to make sure that the runs themselves are available when needed
- ... and not cost you money for service that is not needed



## ...."legal" requirements result in waste



- Even a part time run must operate at least 3 hours
- Result: you end up putting 55 runs on the street for three hours, and at least 10 of them are idle for two of those hours.

# Paratransit hasn't had the same tools that fixed route schedulers take for granted

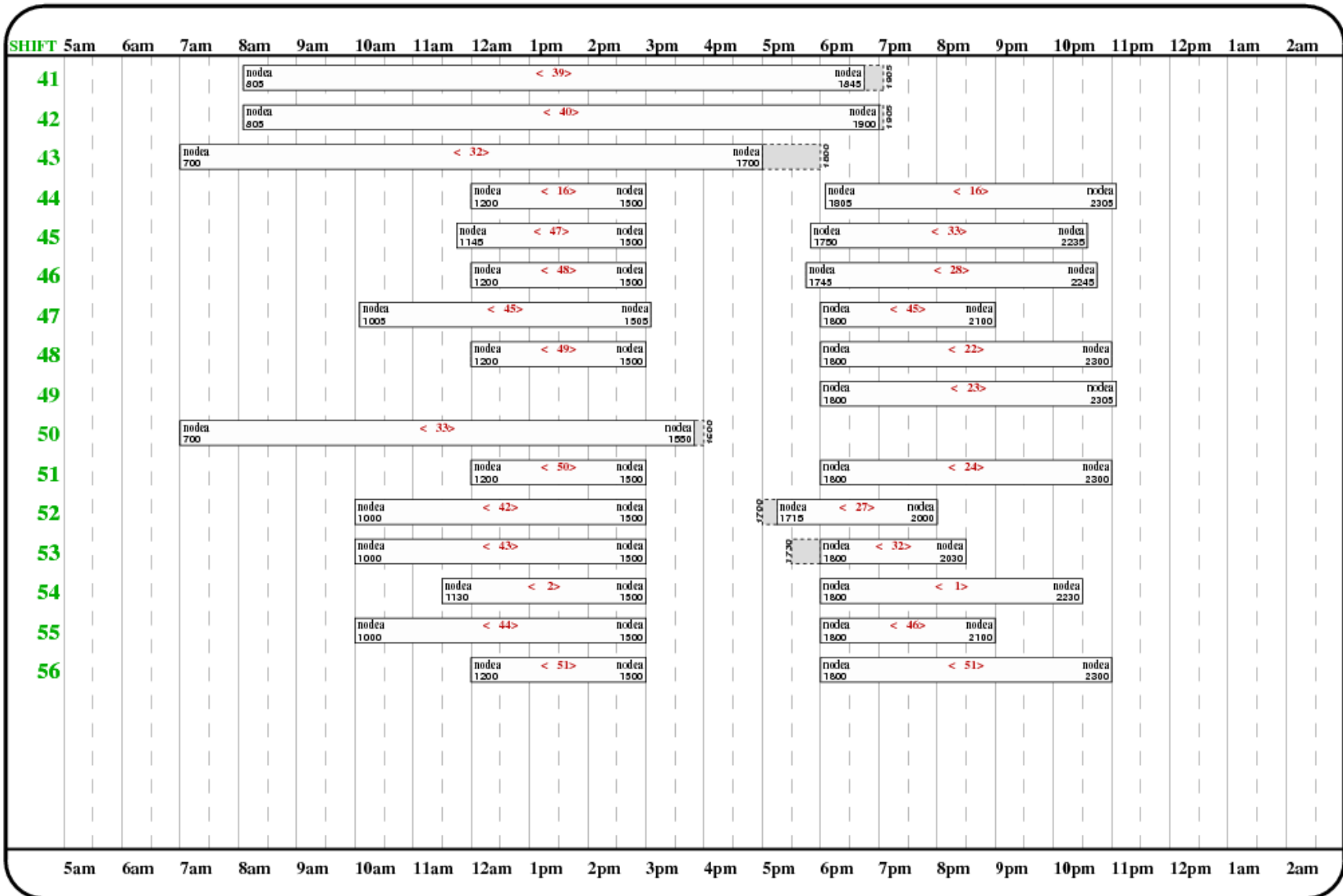


- For decades, fixed route scheduling has been automated.
- Paratransit, on the other hand, has always been manual.
- Yet, the two processes have much in common.

- Fixed Route
  - Trips: what will be on the published schedule
  - Blocking: how trips are assembled into what a vehicle will do
  - Runcutting: how trips are assembled into what a driver will do

# VISUAL REPRESENTATION OF SHIFTS

## GROUP 00





# Why is paratransit runcutting difficult?



- There are no trips
- Runs must be designed before passenger rides have been requested.
- When, where, and how many rides must be served varies from day to day

# What are runcutting “best practices”?



## 1. Figure out how much service you need

- Understand your demand
- Figure out what a representative day is
- Determine how many runs you need to adequately serve that demand

## 2. Build a set of runs that

- Provide the minimum number of vehicles throughout the day
- Meet legal shift requirements

Schedules	
Date	Trips ▼
11-04-2009	3424
10-07-2009	3401
10-28-2009	3314
10-14-2009	3309
10-21-2009	3291
12-02-2009	3285
12-16-2009	3246
11-18-2009	3245
09-02-2009	3232
12-09-2009	3228
09-09-2009	3223
09-16-2009	3213
11-11-2009	3195
09-23-2009	3185
09-30-2009	3130
11-25-2009	2864
12-23-2009	2707
12-30-2009	2506

# Step 1: Define target service level



What is a  
representative day?



What changes would  
have improved OTP  
and reduced slack?

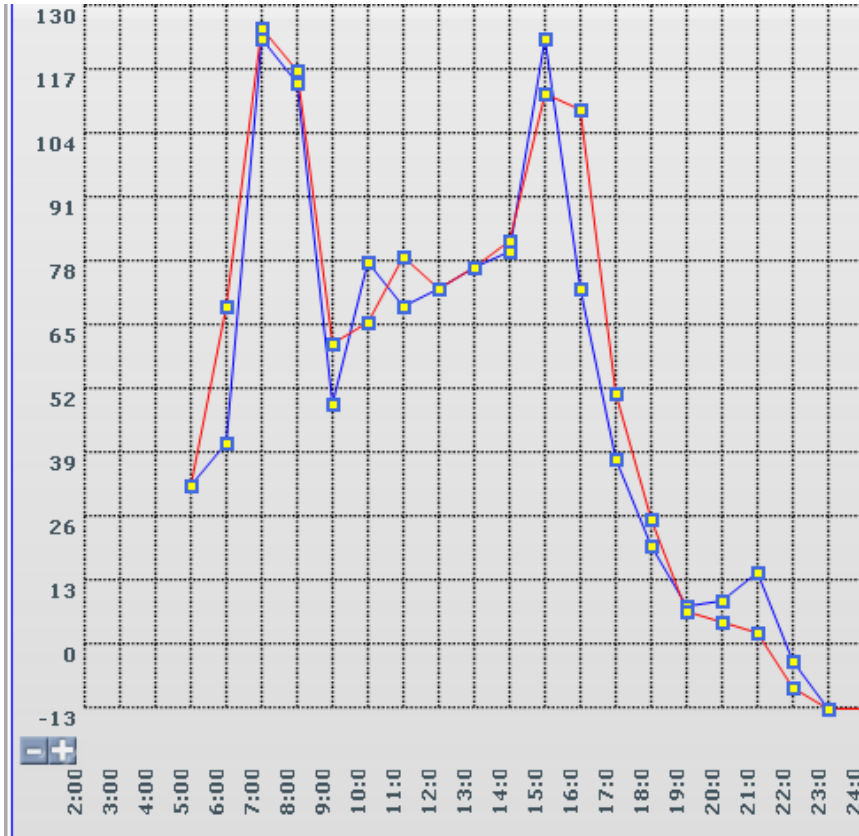


What did I actually  
operate on that day?

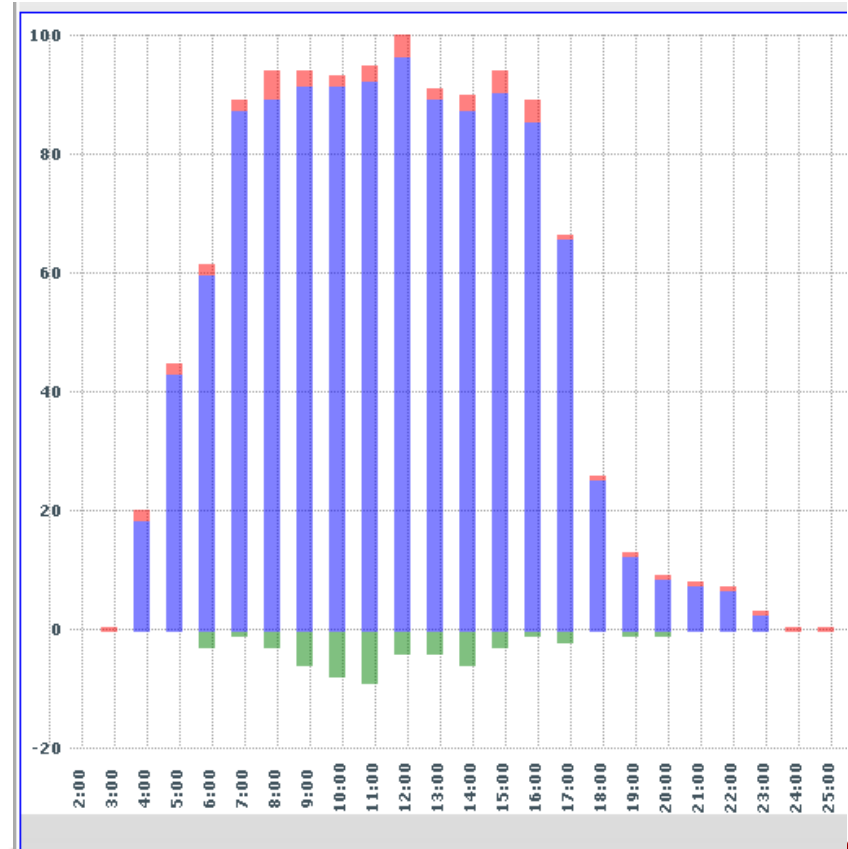
# Reallocating service hours

Identify opportunities to shift service from one time period to another

## Rides



## Runs




# Step 2: Create Runs and Shifts



- Inputs
  - Required number of vehicles on the street in each time period throughout the day
  - Shift rules
- Logic
  - Proven fixed route blocking and runcutting algorithms
  - Adapted for demand response
- Output
  - Runs
  - Vehicle “Blocks”
  - Driver Shifts

# Tying It All Back Together



My Tasks   Para Cutter   System   Real Time Views

### Manage Runcutter Jobs

- Select
- Info
- Review**
- Import

Job Name:	<input type="text" value="one six"/>	
Job Description:	<input type="text" value="one six"/>	
Time Scheduled:	<input type="text" value="1578h20"/>	
Time Operated:	<input type="text" value="1379h47"/>	
Time Requested:	<input type="text" value="1468h30"/>	
Time As Built:	<input type="text" value="1528h00"/>	
	As operated	As built
Vehicles:	<input type="text" value="155"/>	<input type="text" value="135"/>
Drivers:	<input type="text" value="159"/>	<input type="text" value="153"/>

# Why is automated runcutting better?



- Many manual runcuts are created by simply adding or deleting an hour here and there from the last runcut
- Comprehensive solutions are better
  - Let you minimize your total payroll hours
  - Shifts are more likely to adhere to policy
  - Potential to minimize overtime pay
- Performing a comprehensive runcut manually can take days or weeks
  - Automated solutions take minutes
  - This allows you to test many “What If” scenarios
- Solutions can be imported back into your database

# Thank you !