The Chip, or the Old Block?

Shaun Morrell
Metro Transit · Minneapolis-Saint Paul
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Minneapolis-Saint Paul

Metro Transit

263,000 daily boardings

on **7,100** daily trips

with **909** buses

91 light rail vehicles

and **6** commuter trains

APTA's 2016
Transit System of the Year

Metro Transit Scheduling

- Staff of 9
- Multi-year overhaul:
  - HASTUS upgrade
  - Computer-aided blocking
  - Advanced CrewOpt
  - MinBus
- Help from GIRO and Csched

- Service design
- Fleet
- Ridership
- Minimum layovers
- Deadhead times
- Special operating conditions

Blocking inputs

The Old Block

- "By hand" – On a computer, but manual manipulation

- Local routes blocked with themselves

- Commuter express blocks assembled from local knowledge

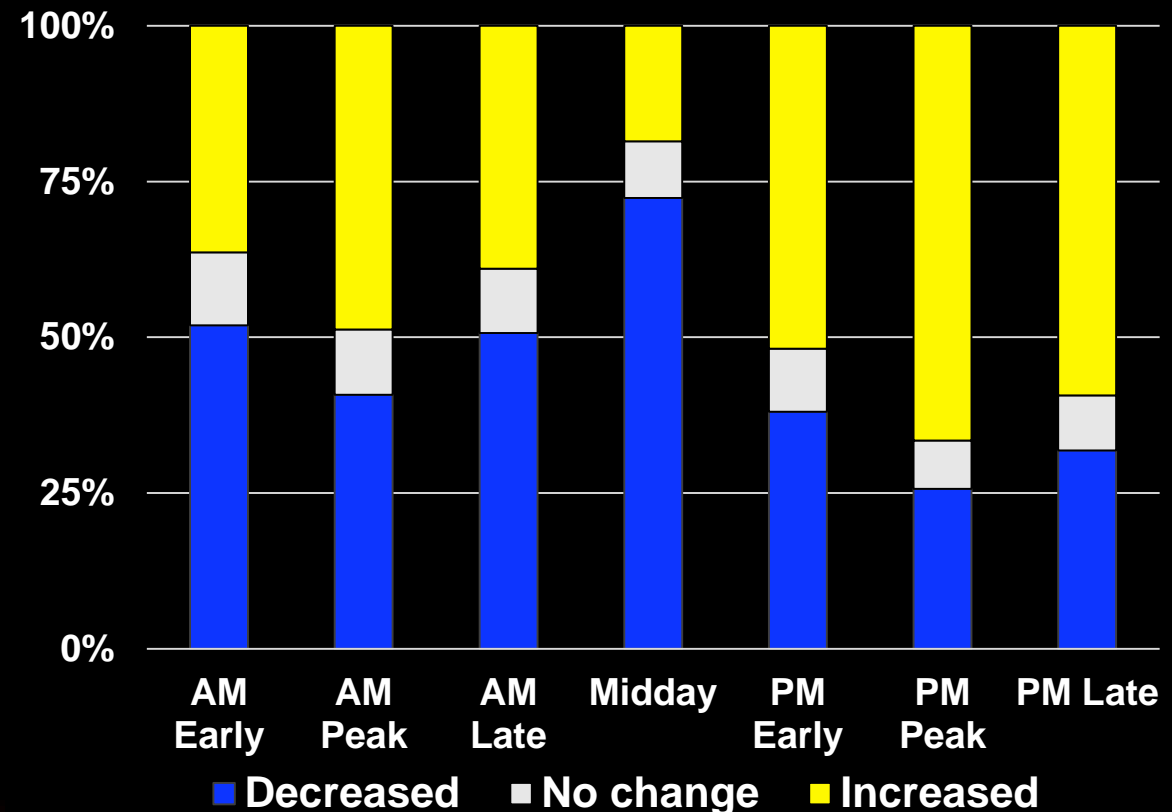- Case-by-case, incremental changes

The Chip

- Computer-aided blocking (Get it? The "chip"?)
- More human energy goes to the inputs
- "Big Data"
  - AVL run times
  - Deadhead times
  - Trip vehicle needs
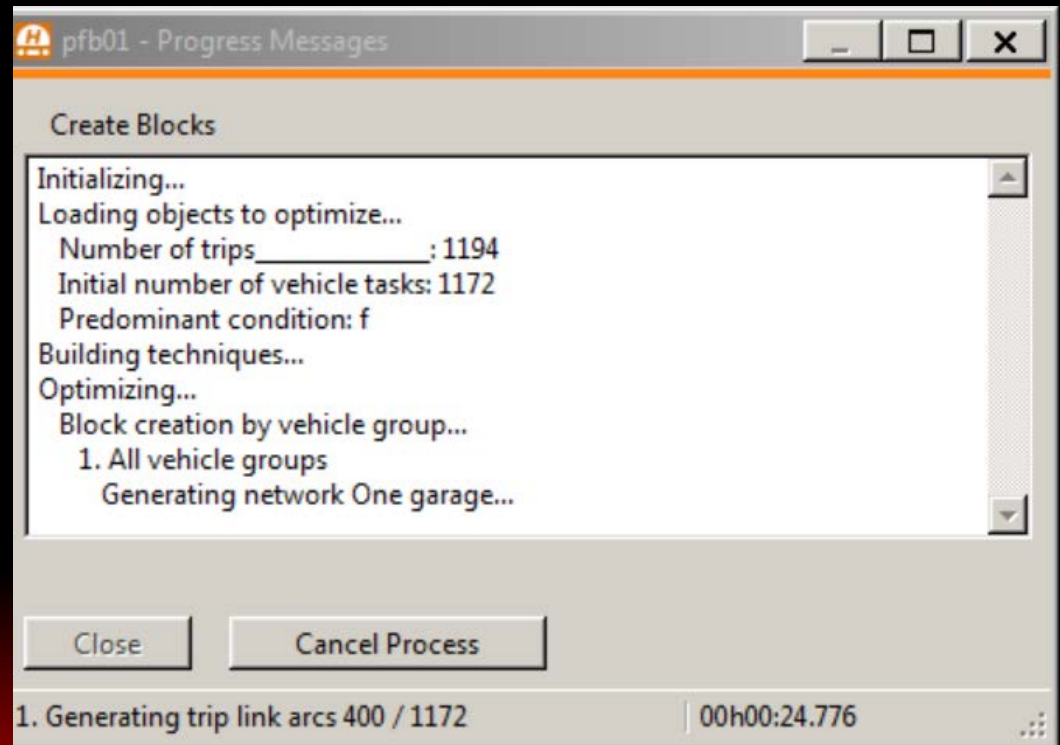
- Google Maps query
- Validations:
  - HASTUS
  - AVL
- Peak vs. base definitions
- ±0 net system deadhead run time change

Chart: Percentage of deadhead run time change by time period.

	AM Early	AM Peak	AM Late	Midday	PM Early	PM Peak	PM Late
Decreased (blue)	~52%	~41%	~50%	~72%	~38%	~26%	~32%
No change (gray)							
Increased (yellow)							

Legend: Decreased, No change, Increased

Deadheads

Layovers

- Contract minimum not enough?
- Run time deficiency and variability
- Codifies known issues
- AVL observations
- 95th percentile standard

Layovers

Trip with consistent travel times:

Scheduled: **60** minutes

95th percentile actual: **66** minutes

Operational minimum layover = **6** minutes

Contract minimum (15%) = **9** minutes

Trip with more variable travel times:

Scheduled: **60** minutes

95th percentile actual: **71** minutes

Operational minimum layover = **11** minutes

Contract minimum (15%) = **9** minutes

2014-2016: Process review, project planning

October-December 2016: Prepare prerequisite data

January, April, June 2017: Training and parallel blocking

March 2017: Go-live with 1 bus garage

June 2017: Go-live with all 5 garages

The roll-out

The gains

- System-wide scope
- More dynamic and nimble
- Efficiency in buses, hours, and miles
- Increase in layover compliance

| Garage	Old method	New method	Difference
Peak vehicles	742	731	-11
Pull + deadhead time	983:02	938:26	-44:36
Layover time	1181:09	1200:05	+18:56
Total platform time	**7422:35**	**7396:58**	**-25:37**
Vehicle miles	99,831	99,055	-776
Interlines (avg. routes/duty)	2.1	2.3	+0.2

Managing construction impacts

- Deadheads adjusted by geographic zones
- Layover buffers by route pattern
- Pull out buffers by garage / time
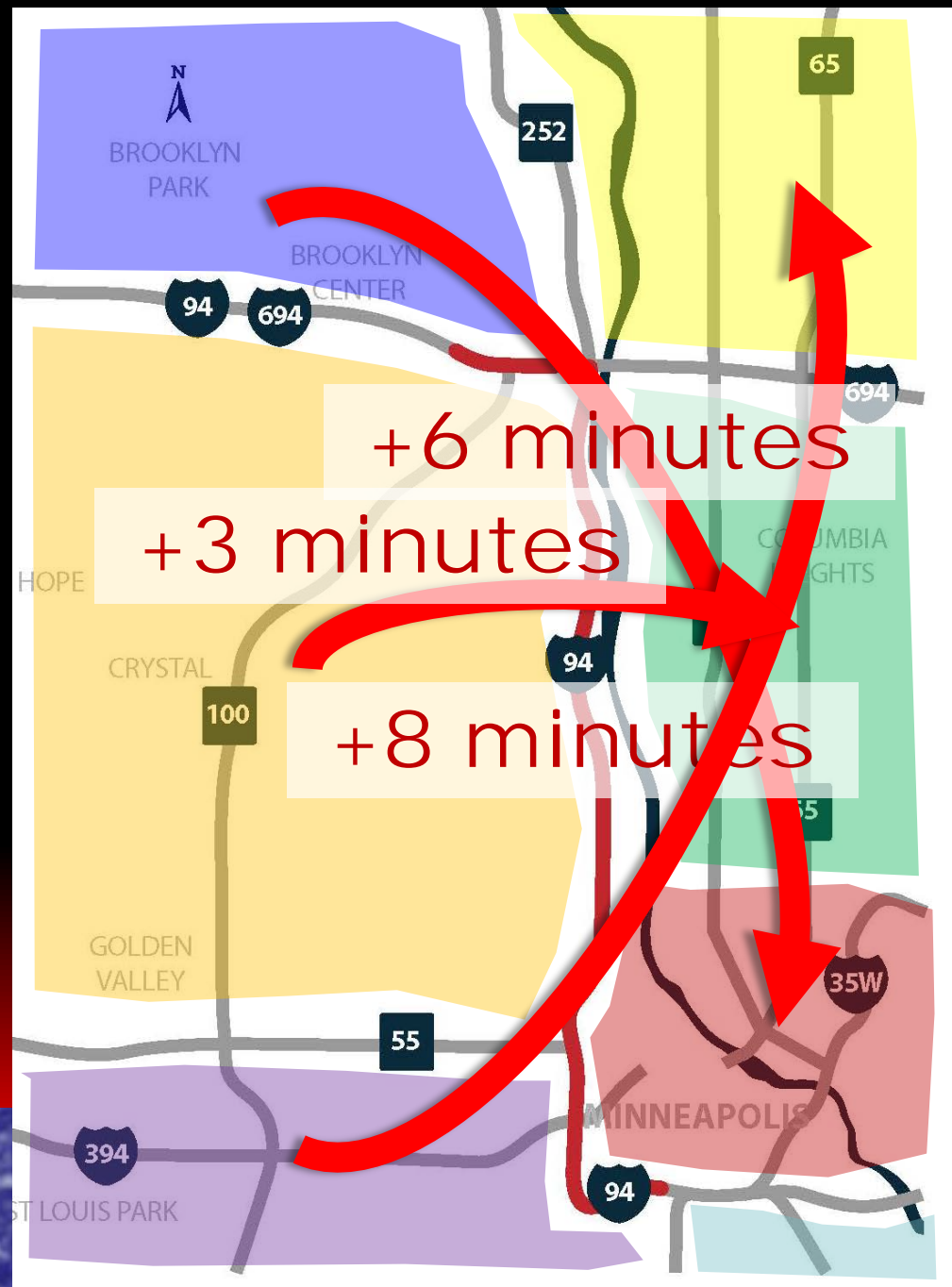
- Higher incidence of interlining
- More drastic changes to operator pick
- Blocking oddities
- New processes to manage:
  - Updating data
  - Trip-level review
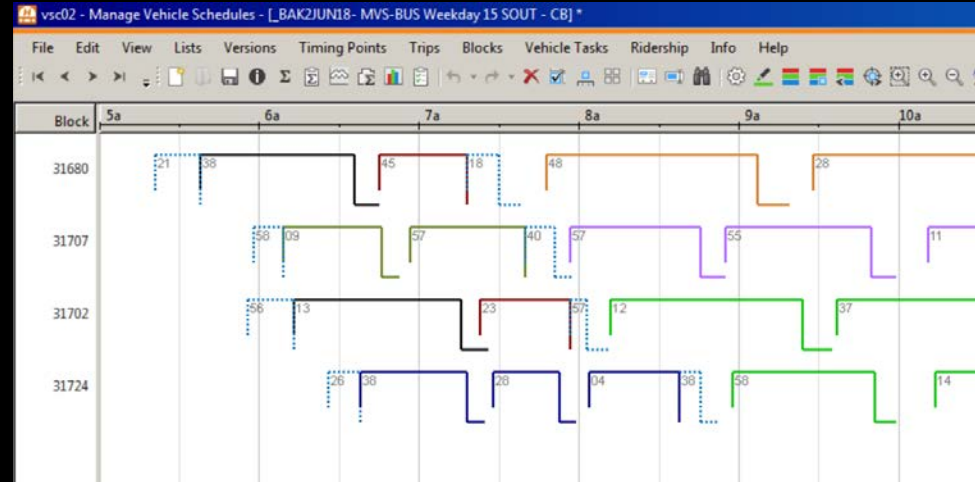
The trade-offs

Keys to success

- Communicate
- Get some help
- Don't skimp on training
- Build confidence
- Take your time, then take the plunge
- Look to the future

For further questions, comments, and cautionary tales, contact:

Shaun Morrell
Manager of Scheduling
Metro Transit (Minneapolis-Saint Paul)
shaun.morrell@metrotransit.org