



# Identifying the Origins and Destinations of Transit Customers Using Farebox Data

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Manager, Monitoring & Forecasting

#### **Overview**

- Background
  - » BC Transit, Monitoring & Forecasting
- GFI Farebox
- Automated Passenger Counters (APC)
- Origin Destination Concept
- Proof Of Concept



# **Background**

#### BC Transit

» Authority for public passenger transportation systems and rail transit systems in regions throughout BC. (1000+ vehicles in 80+ systems)

#### Monitoring & Forecasting

- » Department for monitoring BC Transit's productivity with ridership and vehicle performance.
- » GIS (Geographical Information Systems)
  - Feature Manipulation Engine (FME)
  - Python
  - ArcGIS



# **GFI Farebox**







# **GFI Farebox - Boardings**

Ts	Bus	Route	Seq	Amt	Longitude	Latitude
12/06/2011 07:08:39	8074	2	528		0	0
12/06/2011 07:08:49	8074	2		0	0	0
12/06/2011 07:09:35	8074	2		1.75	0	0
12/06/2011 07:12:56	8074	2		0	0	0
12/06/2011 07:14:03	8074	2		0	0	0
12/06/2011 07:20:55	8074	2		1.75	0	0
12/06/2011 07:21:01	8074	2	184415		0	0
12/06/2011 07:21:15	8074	2		0	0	0
12/06/2011 07:31:33	8074	2		0	0	0

**GPS** 





### **Automated Passenger Counters (APC)**





**Boardings & Alightings** 

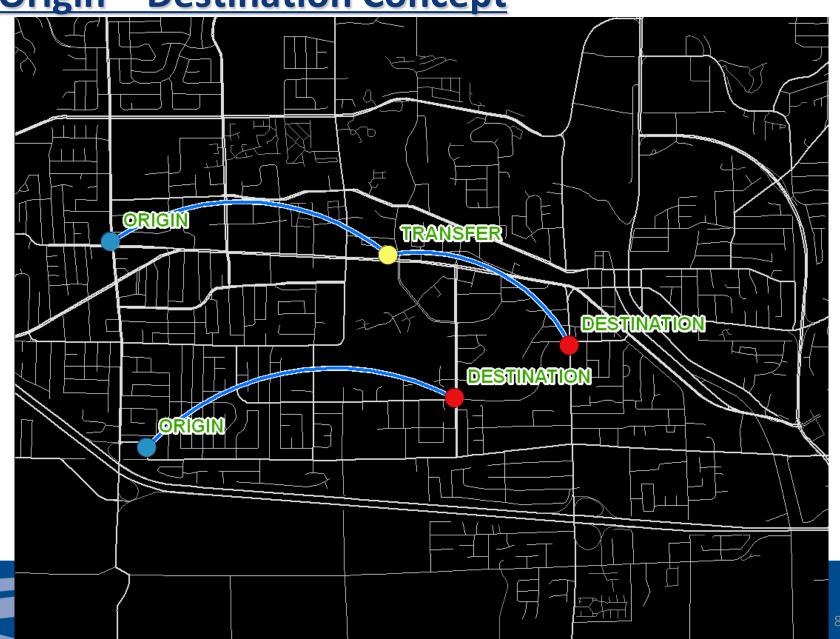


# **APC – Vehicle Assignment**

🥦 Kelowna_Sept05 2010 onwards_DMPD1009.dat - No	tepa	d					
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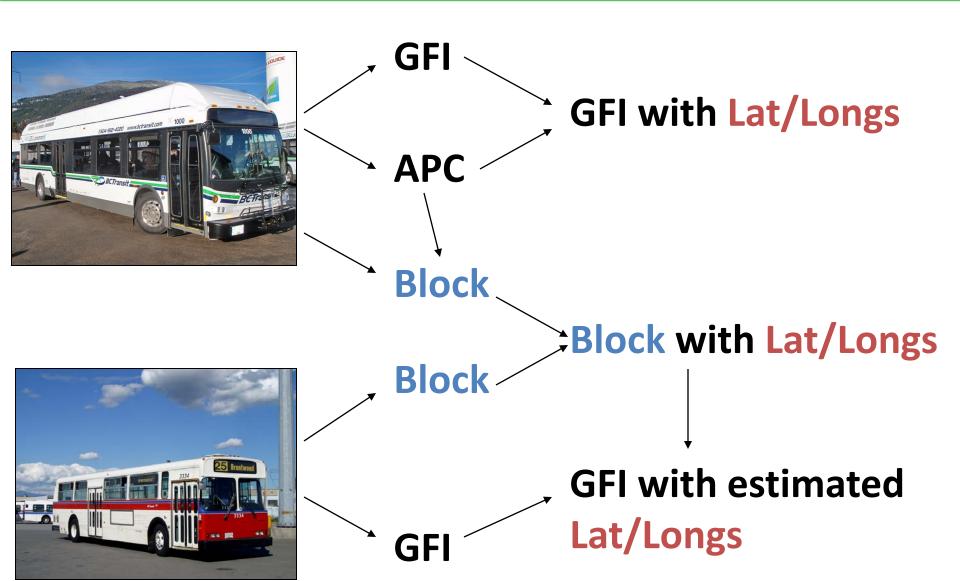
<u>Origin – Destination Concept</u>



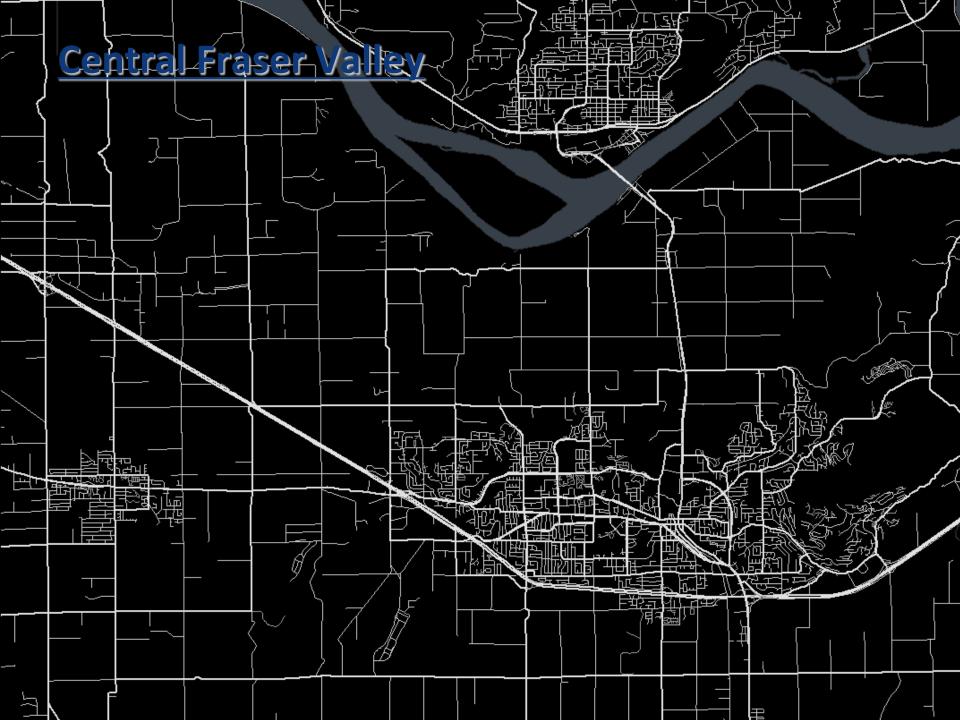
#### **Proof Of Concept – Part 1**

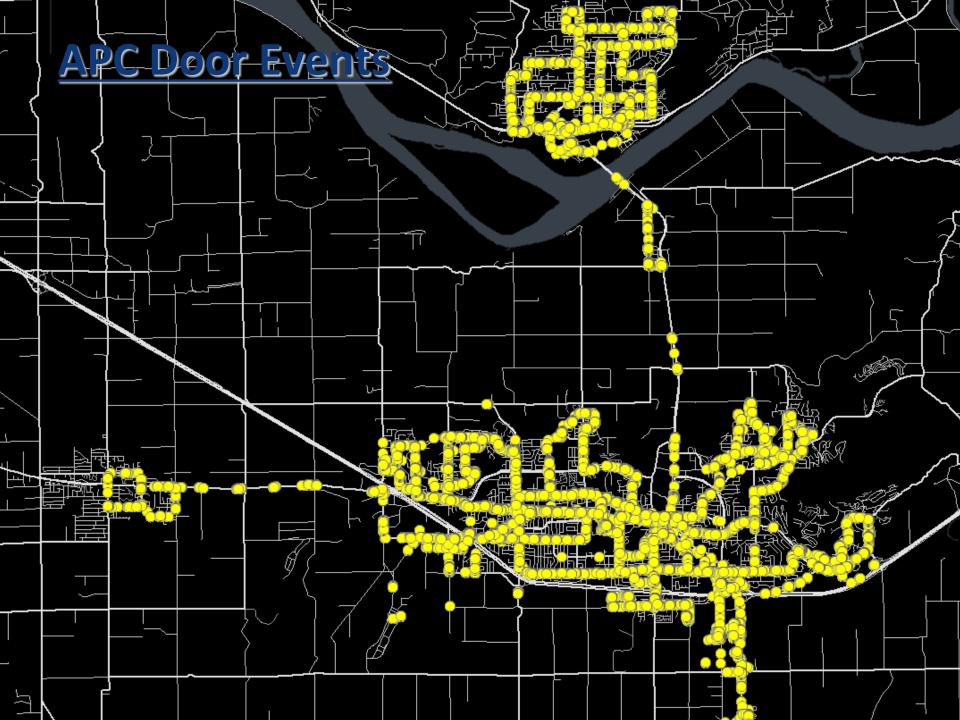
- Use unique IDs from GFI Farebox
- Link GFI in APC equipped vehicles by datetime to APC data to get coordinates
- Link GFI in non APC equipped vehicles to vehicle/block assignments to APC data by block and datetime estimates

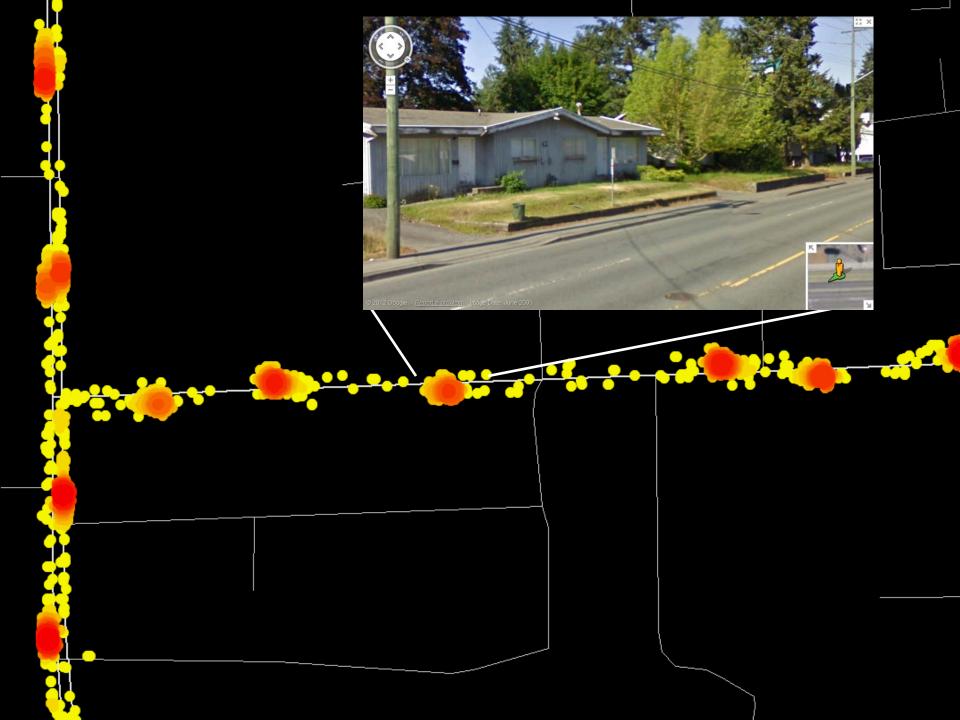




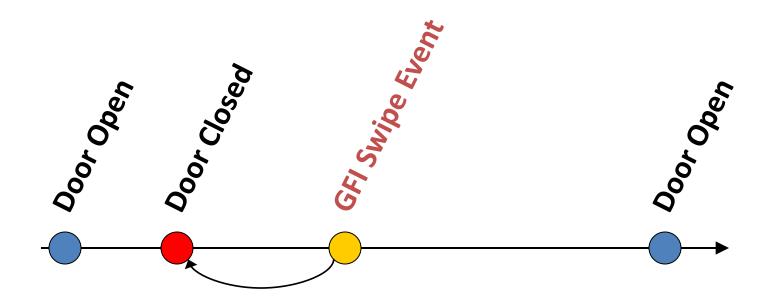








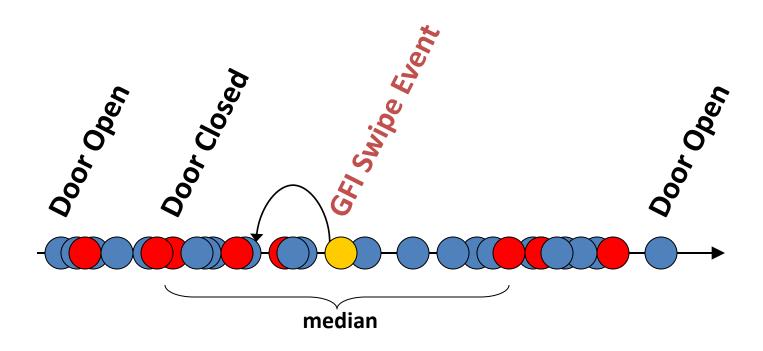
## Assigning a time to a point – APC Bus



**Time** 

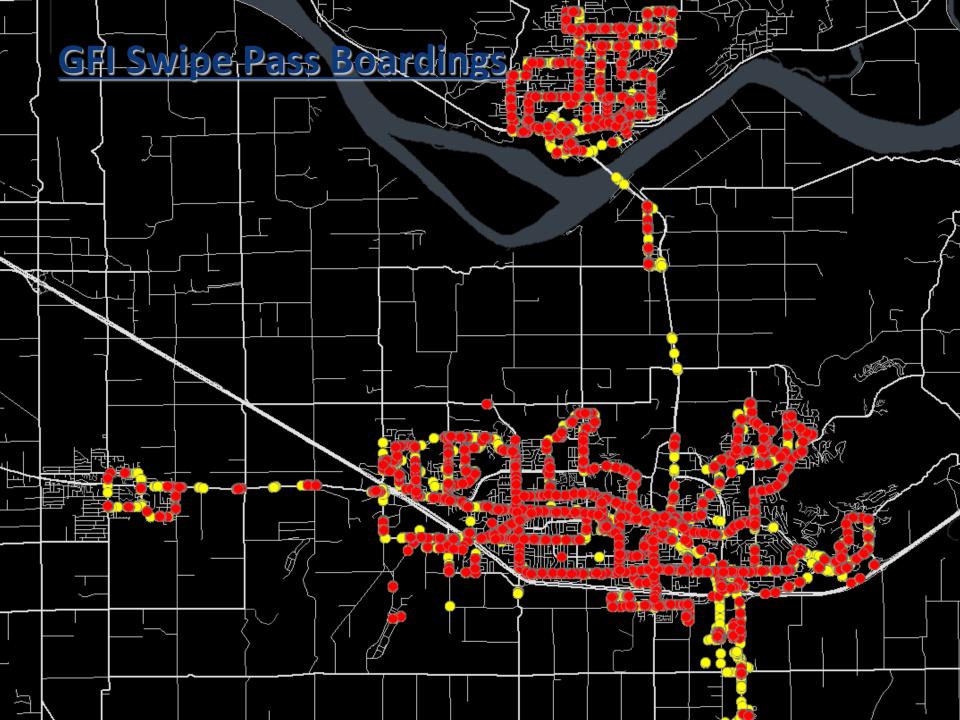


### Assigning a time to a point - Non APC Bus



#### **Time**





## **Proof Of Concept – Part 2**





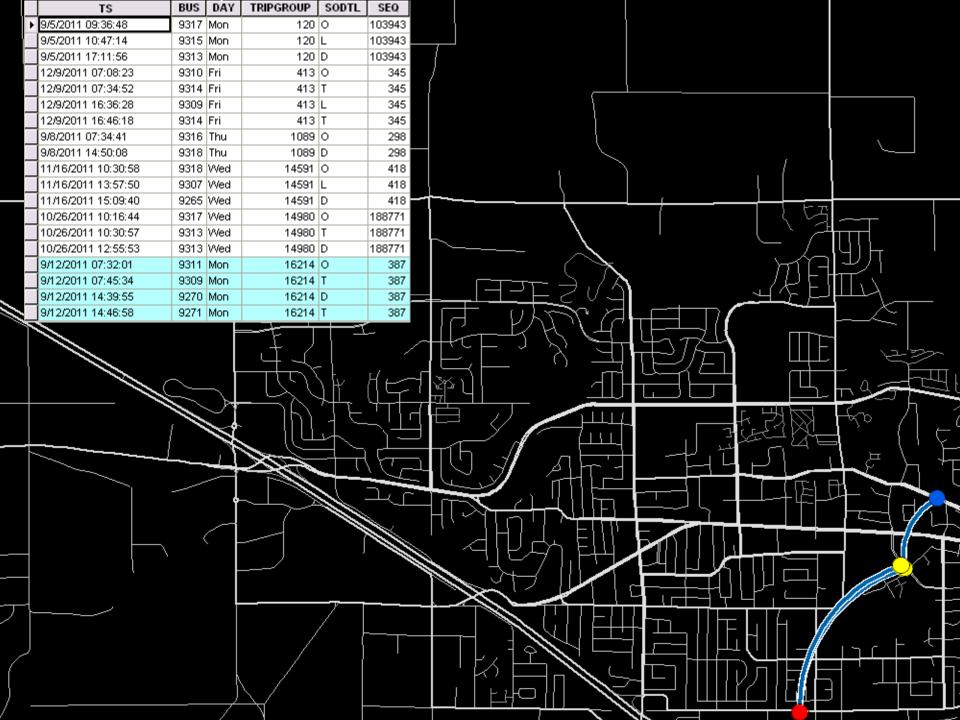
#### **Travel Behaviour**

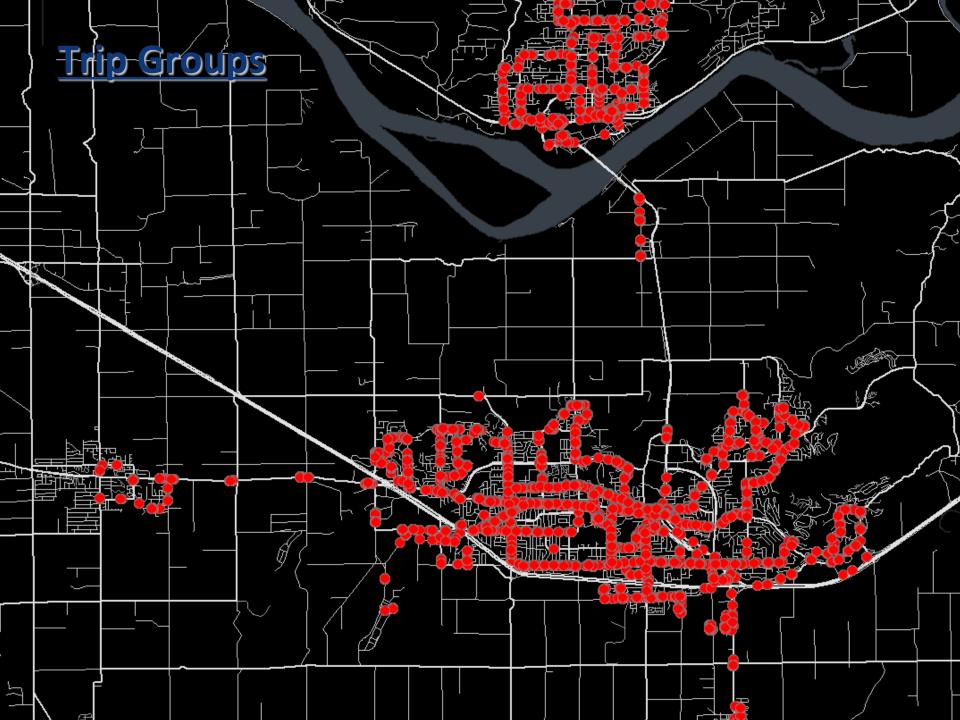
- S Single use
- O Origin
- T Transfer
- L Link in trip chain
- D Destination

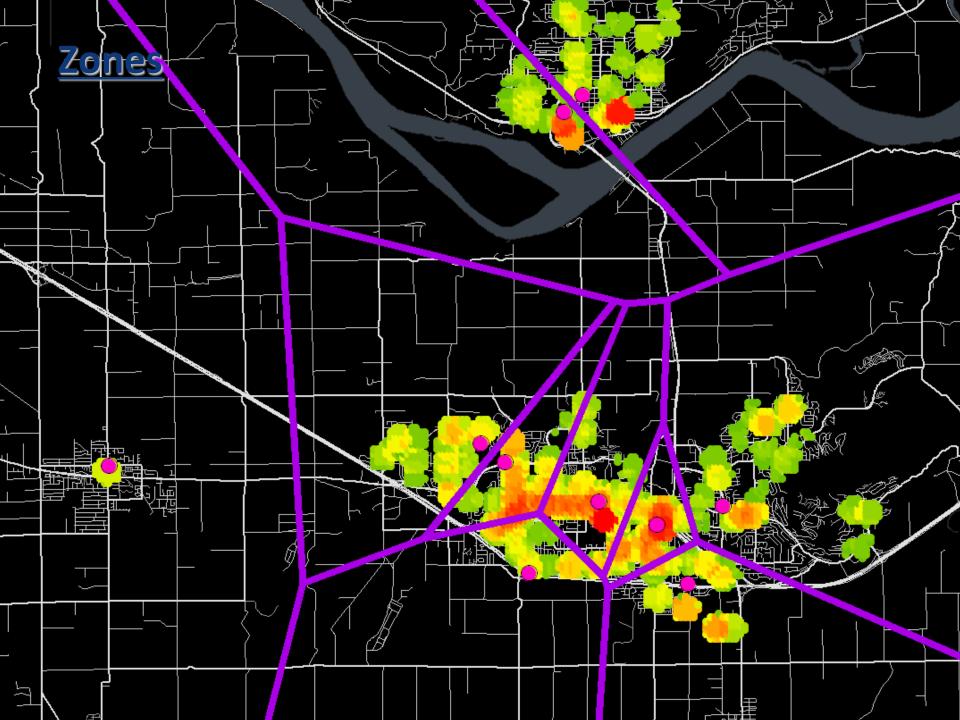


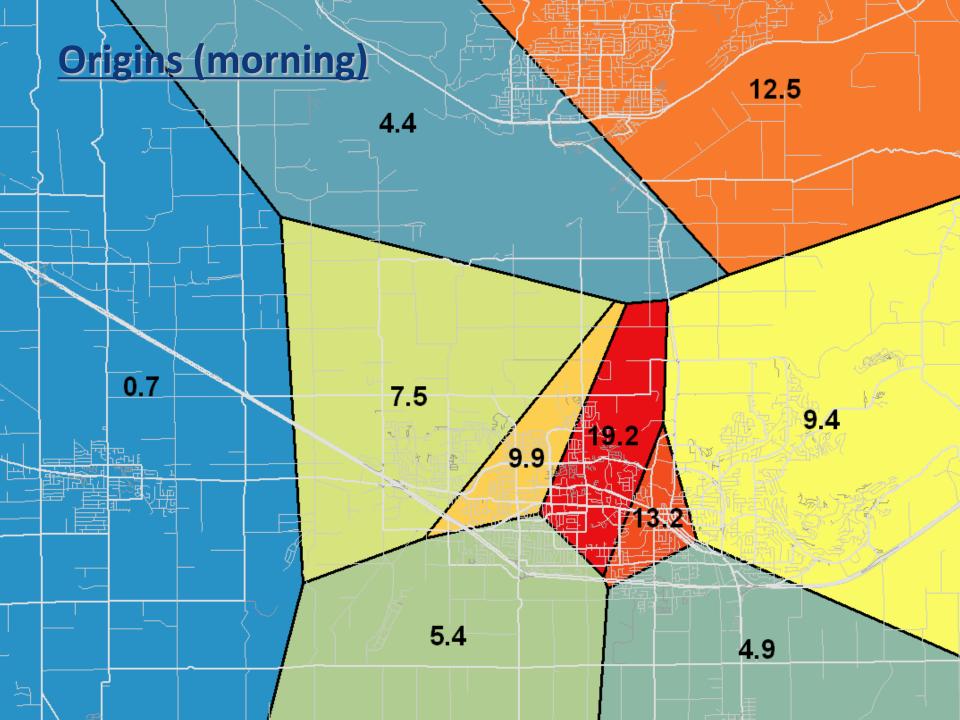
	TS	BUS	DAY	TRIPGROUP	SODTL	SEQ	
F	9/5/2011 09:36:48	9317	Mon	120	0	103943	
	9/5/2011 10:47:14	9315	Mon	120	L	103943	<del>,  </del>
	9/5/2011 17:11:56	9313	Mon	120	D	103943	
	12/9/2011 07:08:23	9310	Fri	413	0	345	/
	12/9/2011 07:34:52	9314	Fri	413	T	345	
	12/9/2011 16:36:28	9309	Fri	413	L	345	
	12/9/2011 16:46:18	9314	Fri	413	T	345	
	9/8/2011 07:34:41	9316	Thu	1089	0	298	,
	9/8/2011 14:50:08	9318	Thu	1089	D	298	
	11/16/2011 10:30:58	9318	Wed	14591	0	418	
	11/16/2011 13:57:50	9307	Wed	14591	L	418	
	11/16/2011 15:09:40	9265	Wed	14591	D	418	
	10/26/2011 10:16:44	9317	Wed	14980	0	188771	\
	10/26/2011 10:30:57	9313	Wed	14980	Т	188771	
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	9/12/2011 07:32:01	9311	Mon	16214	0	387	
	9/12/2011 07:45:34	9309	Mon	16214	Т	387	$I  \Box \Box \Box \Box \rightarrow A  A  A \in \Box \Box$
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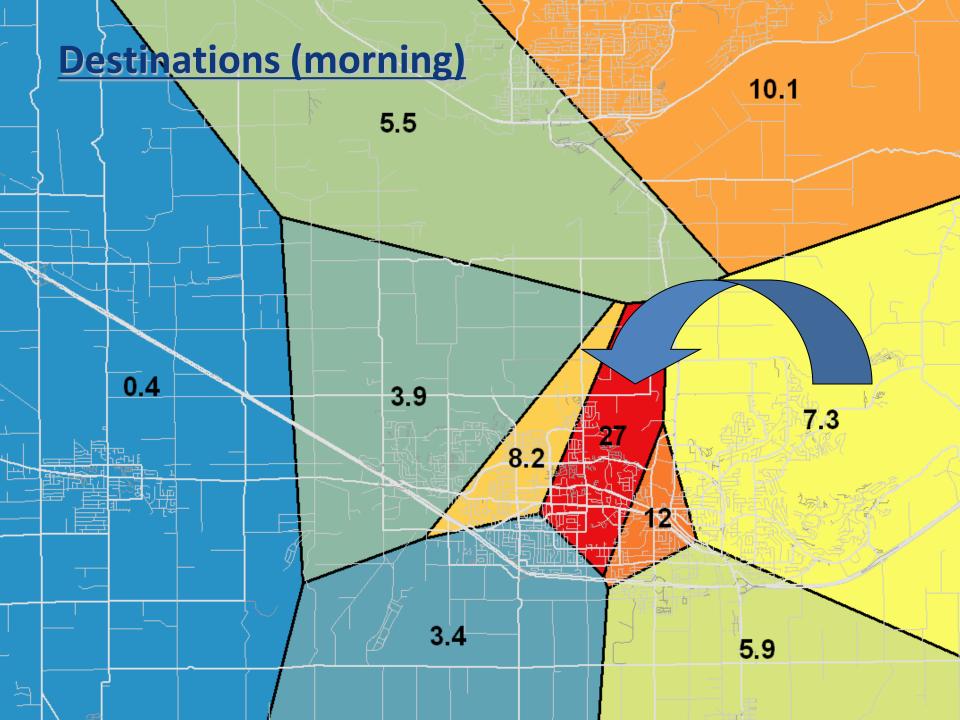
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12/9/2011 07:34:52	9314 Fri	413 T	345	
12/9/2011 16:36:28	9309 Fri	413 L	345	
12/9/2011 16:46:18	9314 Fri	413 T	345	
9/8/2011 07:34:41	9316 Thu	1089 O	298	
9/8/2011 14:50:08	9318 Thu	1089 D	298	
11/16/2011 10:30:58	9318 Wed	14591 O	418	
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9/12/2011 14:46:58	9271 Mon	16214 T	387	











#### Future Steps

- Improve GFI and APC data quality
- Review and test OD methodology
- Trip Diary to help interpret customer behaviour
- Develop more deliverables
- Complete GFI GPS link pilot



# Thank YouMichael Grant

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