

An aerial photograph of a wide city street during sunset. The street is lined with tall trees and has several lanes of traffic, including cars, a van, and a truck. On the right side of the street, there are several cyclists riding in different directions. The sun is low on the horizon, casting long shadows and creating a warm, golden glow. Overlaid on this image is the text "STRAVA | METRO" in large, white, sans-serif letters. The "STRAVA" part is on the left, and the "METRO" part is on the right, separated by a vertical line. Below this, the words "Introductory Training" are written in a slightly smaller but also prominent white font.

STRAVA | METRO

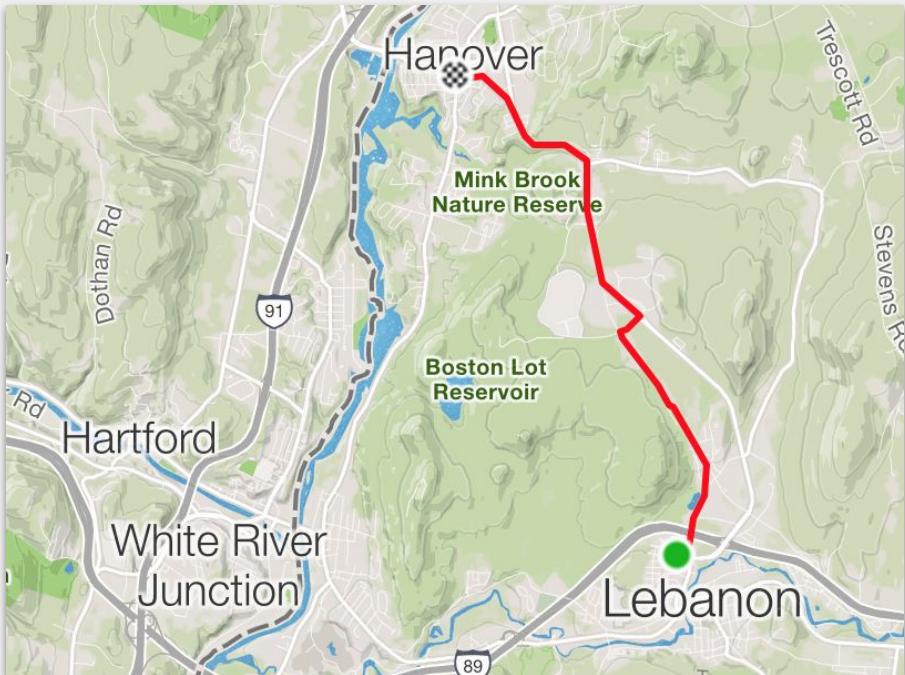
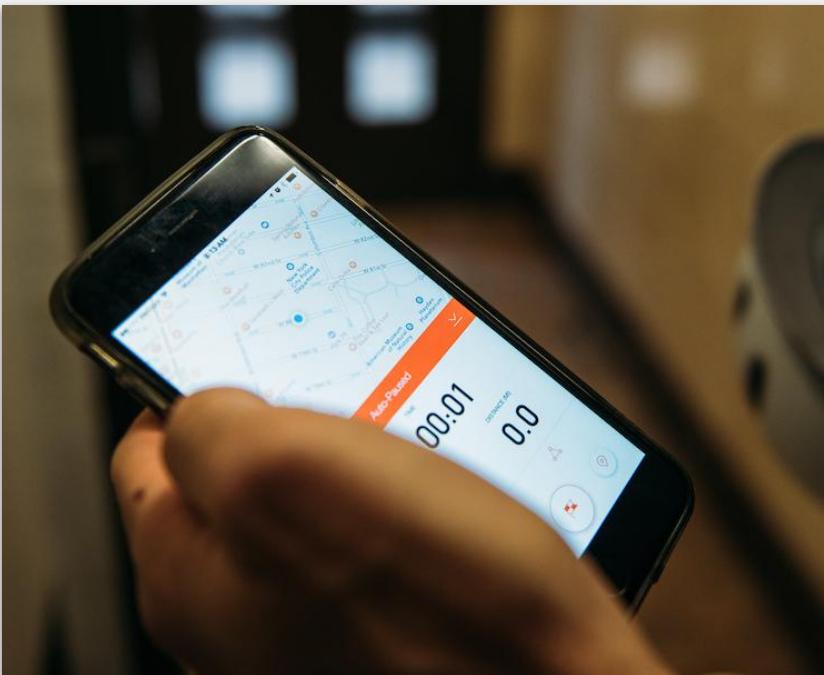
Introductory Training

Agenda

1. Overview of Strava and Strava Metro
2. The Strava Metro Product
3. Working with the Rollups
4. Working with the Hourly Files
5. Case Studies

Overview of Strava and Strava Metro

What is Strava?





Tens of Millions of users around the world (80% outside the US)

About 190 employees: San Francisco (CA), Denver (CO), Hanover (NH), and Bristol (UK)

More than 10 million activities uploaded every week

16 activities uploaded every second

Over 2 billion activities worldwide

The Strava Community

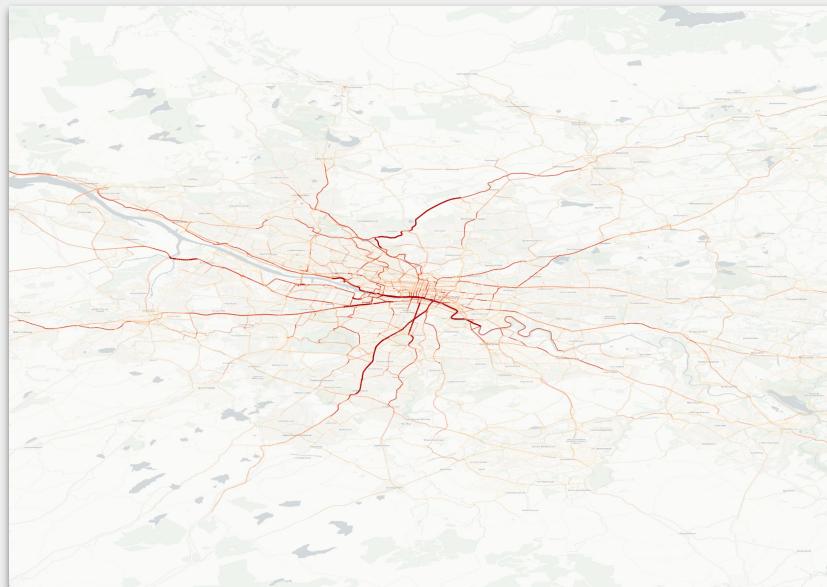


Metro's Mission

To make active transportation accessible,
safe, and efficient for everyone.

What is Metro?

- Aggregated, de-identified activity data from Strava's tens of millions of users
- Allows for analysis of popular or avoided routes, peak commute times, intersection behavior times, and origin/destination zones



Commutes



Between **40% - 60%** of activities in urban areas are commutes

In cities, commute rides and recreation rides show high correlation in route choice

Commutes

- Commute survey - showed a range of “commute” definitions
 - US Census - home-to-work / work-to-home journeys
 - Utilitarian - running errands
 - Any time on a bike instead of in a car, bus, subway, etc
- Detecting commutes in Strava Metro data
 - **Point-to-point activities** where start and end are more than 1km apart
- Can be filtered using the Strava Metro data
 - Time of day
 - Day of week

The Strava Metro product

Edges (Streets)

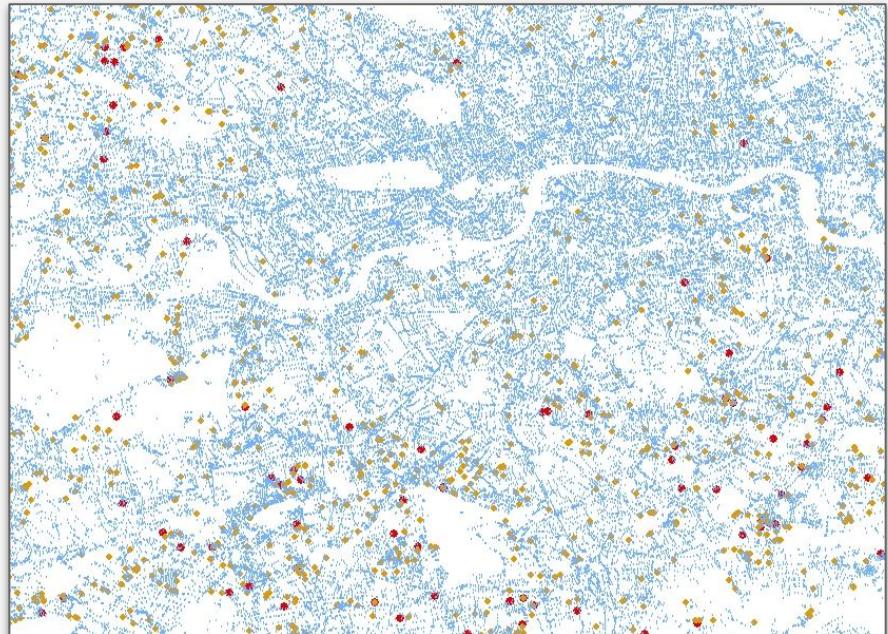
Activities
Athletes
Commutes
Time (seconds)

Bi-directional data reported on single line segment



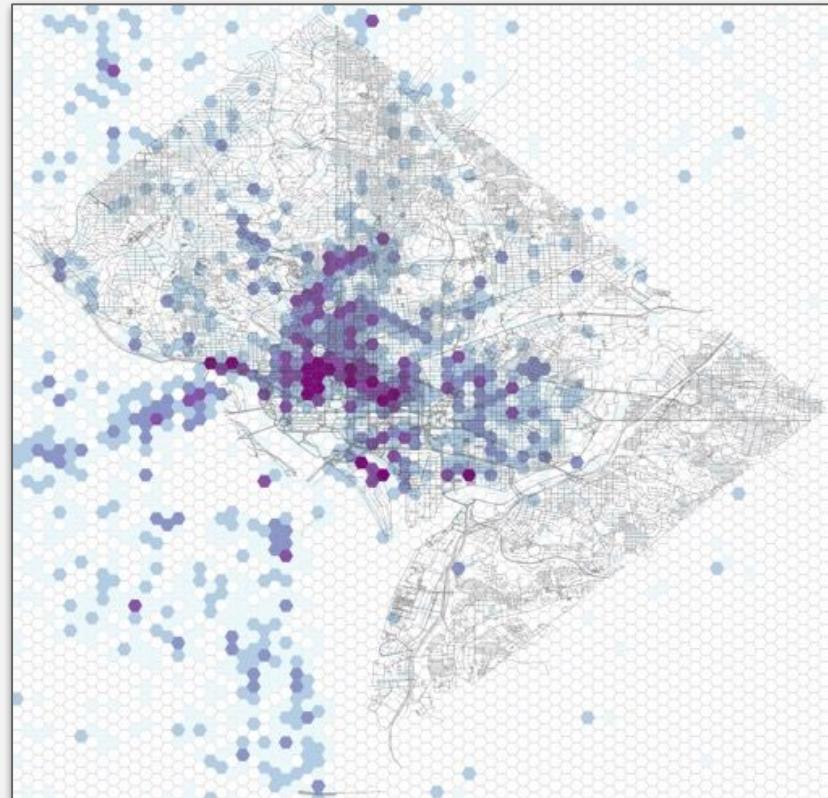
Nodes (Intersections)

Activities
Athletes
Commutes
Time spent within buffer at intersection



Origin/Destination (OD)

Origin/Destination pairs
Activities
Athletes
Commutes
Median Distance
Median Duration



Demographics

Activities
Athletes
Age/Gender
Average/Median Distance (meters)
Average/Median Time (seconds)

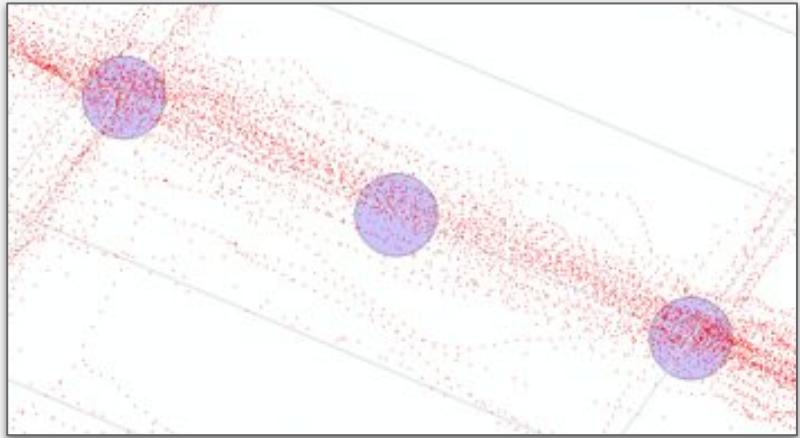
```
Metro Demographics
Date Run: 2016-07-16 09:56:38 +0000

Athlete ID Count: 59358
Activity Count: 1303412
Average Distance: 35115.241848821168
Median Distance: 27502
Average Time: 7335.9583949686938886
Median Time: 5899
Male Count: 47072
Male Count Under 25: 4038
Male Count 25 - 34: 10044
Male Count 35 - 44: 9862
Male Count 45 - 54: 8418
Male Count 55 - 64: 3498
Male Count 65 - 74: 591
Male Count 75 - 84: 47
Male Count 85 - 94: 11
Male Count No Bday: 10535
Female Count: 8565
Female Count Under 25: 781
Female Count 25 - 34: 2096
Female Count 35 - 44: 1441
Female Count 45 - 54: 1344
Female Count 55 - 64: 500
Female Count 65 - 74: 72
Female Count 75 - 84: 8
Female Count 85 - 94: 1
Female Count No Bday: 2317
Blank Gender Count: 3594
Average Uploads: 176.5568246908588564
Commute Counts: 377804
```

How We Build It

Edges

- Overlay activity GPS points on basemap
- Streets broken into segments - from intersection to intersection
- Matching algorithm chooses segment path of best-fit based on activity route



Origin/Destination

- 350 meter hex grid
- Overlay activity paths
- Determine intersected polygons for start and end of activity



Privacy

- Focus on streets and O/D zones, and **not** on individuals
- **Privacy zones** set by Strava users
- **Opt out** toggle in privacy settings
- Counts must meet minimum of **3 users**
- All counts are rounded up to the **nearest multiple of 5**



Data Restrictions & Use

- The data **cannot** be posted online for public use
 - Summary results of using the data, such as static maps, charts, and graphs, are fine for public display
- Contract is built to allow collaboration throughout your organization
 - Employees of your organization can work with the Strava Metro data without an additional data license

Working with the Rollups

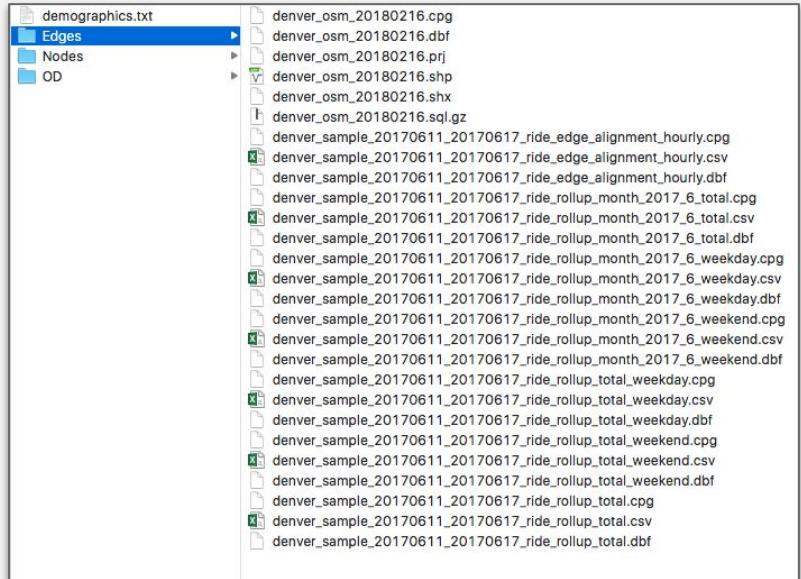
File Structure

Edges (streets/trails), Nodes (intersections), and OD (origin/destination polygons)

- **Shapefile**
- **Rollups**
 - Monthly
 - *Region_Date_Activity_Rollup_Month_Year_{MonthNumber}_total*
 - *Region_Date_Activity_Rollup_Month_Year_{MonthNumber}_weekend*
 - *Region_Date_Activity_Rollup_Month_Year_{MonthNumber}_weekday*
 - Seasonal
 - *Region_Date_Activity_Rollup_Season_total*
 - *Region_Date_Activity_Rollup_Season_weekend*
 - *Region_Date_Activity_Rollup_Season_weekday*
 - Total
 - *Region_Date_Activity_Rollup_total*
 - *Region_Date_Activity_Rollup_weekend*
 - *Region_Date_Activity_Rollup_weekday*
- **Hourly Files**
 - *Region_Date_Activity_Edge_Hourly.csv*
 - *Region_Date_Activity_Node_Hourly.csv*
 - *Region_Date_Activity_OD_Hourly.csv*

Edges

Working with the Rollups



Edge Rollups

EDGE_ID	ATHCNT_0	RATHCNT_0	ACTCNT_0	RACTCNT_0	TATHCNT_0	TACTCNT_0	ACTTIME_0	RACTTIME_0	CMTCNT_0	RCMTCNT_0	TCMTCNT_0
322464	10.00000000...	10.00000000...	20.00000000...	15.00000000...	15.00000000...	30.00000000...	38.50000000...	30.00000000...	10.00000000...	10.00000000...	20.00000000...
322465	10.00000000...	10.00000000...	20.00000000...	10.00000000...	15.00000000...	30.00000000...	29.50000000...	26.50000000...	10.00000000...	10.00000000...	20.00000000...
354816	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	3.0000000000		5.0000000000	0.0000000000	5.0000000000
356742	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	42.50000000...	39.50000000...	5.0000000000	10.00000000...	15.00000000...
356743	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	40.00000000...	42.00000000...	5.0000000000	10.00000000...	10.00000000...
356744	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	52.50000000...	45.00000000...	5.0000000000	5.0000000000	10.00000000...
356745	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	29.00000000...	24.00000000...	10.00000000...	5.0000000000	15.00000000...
383494	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	39.00000000...		5.0000000000	0.0000000000	5.0000000000

ATHCNT	RATHCNT	ACTCNT	RACTCNT	TATHCNT	TACTCNT	ACTTIME	RACTTIME	CMTCNT	RCMTCNT	TCMTCNT
1855.000000...	1855.000000...	3660.000000...	3540.000000...	2295.000000...	5780.000000...	32.00000000...	31.00000000...	1910.000000...	1810.000000...	3575.000000...
1710.000000...	1835.000000...	3295.000000...	3525.000000...	2240.000000...	5605.000000...	25.00000000...	23.00000000...	1760.000000...	1830.000000...	3475.000000...
305.000000...	305.00000000...	530.00000000...	540.00000000...	345.00000000...	780.00000000...	3.0000000000	2.0000000000	250.00000000...	255.00000000...	470.00000000...
1745.000000...	1860.000000...	3355.000000...	3615.000000...	2250.000000...	5615.000000...	37.00000000...	33.00000000...	1750.000000...	1865.000000...	3465.000000...
1720.000000...	1840.000000...	3255.000000...	3620.000000...	2210.000000...	5485.000000...	35.00000000...	32.00000000...	1605.000000...	1865.000000...	3335.000000...
1595.000000...	1800.000000...	2940.000000...	3495.000000...	2145.000000...	5185.000000...	46.00000000...	43.00000000...	1415.000000...	1785.000000...	3090.000000...
1680.000000...	1720.000000...	3215.000000...	3350.000000...	2120.000000...	5245.000000...	26.00000000...	23.00000000...	1570.000000...	1685.000000...	3145.000000...
275.000000...	290.00000000...	475.00000000...	505.00000000...	320.00000000...	710.00000000...	32.50000000...	31.00000000...	215.00000000...	240.00000000...	420.00000000...

Edge Rollups

EDGE_ID: join field with the shapefile

EDGE_ID	ATHCNT_0	RATHCNT_0	ACTCNT_0	RACTCNT_0	TATHCNT_0	TACTCNT_0	ACTTIME_0	RACTTIME_0	CMTCNT_0	RCMTCNT_0	TCMTCNT_0
322464	10.00000000...	10.00000000...	20.00000000...	15.00000000...	15.00000000...	30.00000000...	38.50000000...	30.00000000...	10.00000000...	10.00000000...	20.00000000...
322465	10.00000000...	10.00000000...	20.00000000...	10.00000000...	15.00000000...	30.00000000...	29.50000000...	26.50000000...	10.00000000...	10.00000000...	20.00000000...
354816	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	3.0000000000		5.0000000000	0.0000000000	5.0000000000
356742	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	42.50000000...	39.50000000...	5.0000000000	10.00000000...	15.00000000...
356743	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	40.00000000...	42.00000000...	5.0000000000	10.00000000...	10.00000000...
356744	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	52.50000000...	45.00000000...	5.0000000000	5.0000000000	10.00000000...
356745	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	29.00000000...	24.00000000...	10.00000000...	5.0000000000	15.00000000...
383494	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	39.00000000...		5.0000000000	0.0000000000	5.0000000000

ATHCNT	RATHCNT	ACTCNT	RACTCNT	TATHCNT	TACTCNT	ACTTIME	RACTTIME	CMTCNT	RCMTCNT	TCMTCNT
1855.000000...	1855.000000...	3660.000000...	3540.000000...	2295.000000...	5780.000000...	32.00000000...	31.00000000...	1910.000000...	1810.000000...	3575.000000...
1710.000000...	1835.000000...	3295.000000...	3525.000000...	2240.000000...	5605.000000...	25.00000000...	23.00000000...	1760.000000...	1830.000000...	3475.000000...
305.000000...	305.00000000...	530.00000000...	540.00000000...	345.00000000...	780.00000000...	3.0000000000	2.0000000000	250.00000000...	255.00000000...	470.00000000...
1745.000000...	1860.000000...	3355.000000...	3615.000000...	2250.000000...	5615.000000...	37.00000000...	33.00000000...	1750.000000...	1865.000000...	3465.000000...
1720.000000...	1840.000000...	3255.000000...	3620.000000...	2210.000000...	5485.000000...	35.00000000...	32.00000000...	1605.000000...	1865.000000...	3335.000000...
1595.000000...	1800.000000...	2940.000000...	3495.000000...	2145.000000...	5185.000000...	46.00000000...	43.00000000...	1415.000000...	1785.000000...	3090.000000...
1680.000000...	1720.000000...	3215.000000...	3350.000000...	2120.000000...	5245.000000...	26.00000000...	23.00000000...	1570.000000...	1685.000000...	3145.000000...
275.000000...	290.00000000...	475.00000000...	505.00000000...	320.00000000...	710.00000000...	32.50000000...	31.00000000...	215.00000000...	240.00000000...	420.00000000...

Athlete Counts

Edge Rollups

EDGE_ID	ATHCNT_0 ▼	RATHCNT_0	ACTCNT_0	RACTCNT_0	TATHCNT_0	TACTCNT_0	ACTTIME_0	RACTTIME_0	CMTCNT_0	RCMTCNT_0	TCMTCNT_0
322464	10.00000000...	10.00000000	20.00000000...	15.00000000...	15.00000000...	30.00000000...	38.50000000...	30.00000000...	10.00000000...	10.00000000...	20.00000000...
322465	10.00000000...	10.00000000...	20.00000000...	10.00000000...	15.00000000...	30.00000000...	29.50000000...	26.50000000...	10.00000000...	10.00000000...	20.00000000...
354816	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	3.0000000000		5.0000000000	0.0000000000	5.0000000000
356742	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	42.50000000...	39.50000000...	5.0000000000	10.00000000...	15.00000000...
356743	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	40.00000000...	42.00000000...	5.0000000000	10.00000000...	10.00000000...
356744	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	52.50000000...	45.00000000...	5.0000000000	5.0000000000	10.00000000...
356745	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	29.00000000...	24.00000000...	10.00000000...	5.0000000000	15.00000000...
383494	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	39.00000000...		5.0000000000	0.0000000000	5.0000000000

ATHCNT	RATHCNT	ACTCNT	RACTCNT	TATHCNT	TACTCNT	ACTTIME	RACTTIME	CMTCNT	RCMTCNT	TCMTCNT
1855.000000...	1855.000000...	3660.000000...	3540.000000...	2295.000000...	5780.000000...	32.00000000...	31.00000000...	1910.000000...	1810.000000...	3575.000000...
1710.000000...	1835.000000...	3295.000000...	3525.000000...	2240.000000...	5605.000000...	25.00000000...	23.00000000...	1760.000000...	1830.000000...	3475.000000...
305.000000...	305.00000000...	530.00000000...	540.00000000...	345.00000000...	780.00000000...	3.0000000000	2.0000000000	250.00000000...	255.00000000...	470.00000000...
1745.000000...	1860.000000...	3355.000000...	3615.000000...	2250.000000...	5615.000000...	37.00000000...	33.00000000...	1750.000000...	1865.000000...	3465.000000...
1720.000000...	1840.000000...	3255.000000...	3620.000000...	2210.000000...	5485.000000...	35.00000000...	32.00000000...	1605.000000...	1865.000000...	3335.000000...
1595.000000...	1800.000000...	2940.000000...	3495.000000...	2145.000000...	5185.000000...	46.00000000...	43.00000000...	1415.000000...	1785.000000...	3090.000000...
1680.000000...	1720.000000...	3215.000000...	3350.000000...	2120.000000...	5245.000000...	26.00000000...	23.00000000...	1570.000000...	1685.000000...	3145.000000...
275.000000...	290.00000000...	475.00000000...	505.00000000...	320.00000000...	710.00000000...	32.50000000...	31.00000000...	215.00000000...	240.00000000...	420.00000000...

Activity Counts

Edge Rollups

EDGE_ID	ATHCNT_0	RATHCNT_0	ACTCNT_0	RACTCNT_0	TATHCNT_0	TACTCNT_0	ACTTIME_0	RACTTIME_0	CMTCNT_0	RCMTCNT_0	TCMTCNT_0
322464	10.00000000...	10.00000000...	20.00000000...	15.00000000...	15.00000000...	30.00000000...	38.50000000...	30.00000000...	10.00000000...	10.00000000...	20.00000000...
322465	10.00000000...	10.00000000...	20.00000000...	10.00000000...	15.00000000...	30.00000000...	29.50000000...	26.50000000...	10.00000000...	10.00000000...	20.00000000...
354816	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	3.0000000000		5.0000000000	0.0000000000	5.0000000000
356742	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	42.50000000...	39.50000000...	5.0000000000	10.00000000...	15.00000000...
356743	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	40.00000000...	42.00000000...	5.0000000000	10.00000000...	10.00000000...
356744	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	52.50000000...	45.00000000...	5.0000000000	5.0000000000	10.00000000...
356745	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	29.00000000...	24.00000000...	10.00000000...	5.0000000000	15.00000000...
383494	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	39.00000000...		5.0000000000	0.0000000000	5.0000000000

ATHCNT	RATHCNT	ACTCNT	RACTCNT	TATHCNT	TACTCNT	ACTTIME	RACTTIME	CMTCNT	RCMTCNT	TCMTCNT
1855.000000...	1855.000000...	3660.000000...	3540.000000...	2295.000000...	5780.000000...	32.00000000...	31.00000000...	1910.000000...	1810.000000...	3575.000000...
1710.000000...	1835.000000...	3295.000000...	3525.000000...	2240.000000...	5605.000000...	25.00000000...	23.00000000...	1760.000000...	1830.000000...	3475.000000...
305.000000...	305.00000000...	530.00000000...	540.00000000...	345.00000000...	780.00000000...	3.0000000000	2.0000000000	250.00000000...	255.00000000...	470.00000000...
1745.000000...	1860.000000...	3355.000000...	3615.000000...	2250.000000...	5615.000000...	37.00000000...	33.00000000...	1750.000000...	1865.000000...	3465.000000...
1720.000000...	1840.000000...	3255.000000...	3620.000000...	2210.000000...	5485.000000...	35.00000000...	32.00000000...	1605.000000...	1865.000000...	3335.000000...
1595.000000...	1800.000000...	2940.000000...	3495.000000...	2145.000000...	5185.000000...	46.00000000...	43.00000000...	1415.000000...	1785.000000...	3090.000000...
1680.000000...	1720.000000...	3215.000000...	3350.000000...	2120.000000...	5245.000000...	26.00000000...	23.00000000...	1570.000000...	1685.000000...	3145.000000...
275.000000...	290.00000000...	475.00000000...	505.00000000...	320.00000000...	710.00000000...	32.50000000...	31.00000000...	215.00000000...	240.00000000...	420.00000000...

Edge Rollups

Activity Time (in seconds)

EDGE_ID	ATHCNT_0	RATHCNT_0	ACTCNT_0	RACTCNT_0	TATHCNT_0	TACTCNT_0	ACTTIME_0	RACTTIME_0	CMTCNT_0	RCMTCNT_0	TCMTCNT_0
322464	10.00000000...	10.00000000...	20.00000000...	15.00000000...	15.00000000...	30.00000000...	38.50000000...	30.00000000...	10.00000000...	10.00000000...	20.00000000...
322465	10.00000000...	10.00000000...	20.00000000...	10.00000000...	15.00000000...	30.00000000...	29.50000000...	26.50000000...	10.00000000...	10.00000000...	20.00000000...
354816	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	3.0000000000		5.0000000000	0.0000000000	5.0000000000
356742	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	42.50000000...	39.50000000...	5.0000000000	10.00000000...	15.00000000...
356743	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	40.00000000...	42.00000000...	5.0000000000	10.00000000...	10.00000000...
356744	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	52.50000000...	45.00000000...	5.0000000000	5.0000000000	10.00000000...
356745	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	29.00000000...	24.00000000...	10.00000000...	5.0000000000	15.00000000...
383494	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	39.00000000...		5.0000000000	0.0000000000	5.0000000000

ATHCNT	RATHCNT	ACTCNT	RACTCNT	TATHCNT	TACTCNT	ACTTIME	RACTTIME	CMTCNT	RCMTCNT	TCMTCNT
1855.000000...	1855.000000...	3660.000000...	3540.000000...	2295.000000...	5780.000000...	32.00000000...	31.00000000...	1910.000000...	1810.000000...	3575.000000...
1710.000000...	1835.000000...	3295.000000...	3525.000000...	2240.000000...	5605.000000...	25.00000000...	23.00000000...	1760.000000...	1830.000000...	3475.000000...
305.000000...	305.00000000...	530.00000000...	540.00000000...	345.00000000...	780.00000000...	3.0000000000	2.0000000000	250.00000000...	255.00000000...	470.00000000...
1745.000000...	1860.000000...	3355.000000...	3615.000000...	2250.000000...	5615.000000...	37.00000000...	33.00000000...	1750.000000...	1865.000000...	3465.000000...
1720.000000...	1840.000000...	3255.000000...	3620.000000...	2210.000000...	5485.000000...	35.00000000...	32.00000000...	1605.000000...	1865.000000...	3335.000000...
1595.000000...	1800.000000...	2940.000000...	3495.000000...	2145.000000...	5185.000000...	46.00000000...	43.00000000...	1415.000000...	1785.000000...	3090.000000...
1680.000000...	1720.000000...	3215.000000...	3350.000000...	2120.000000...	5245.000000...	26.00000000...	23.00000000...	1570.000000...	1685.000000...	3145.000000...
275.000000...	290.00000000...	475.00000000...	505.00000000...	320.00000000...	710.00000000...	32.50000000...	31.00000000...	215.00000000...	240.00000000...	420.00000000...

Edge Rollups

Commute Counts

EDGE_ID	ATHCNT_0	RATHCNT_0	ACTCNT_0	RACTCNT_0	TATHCNT_0	TACTCNT_0	ACTTIME_0	RACTTIME_0	CMTCNT_0	RCMTCNT_0	TCMTCNT_0
322464	10.00000000...	10.00000000...	20.00000000...	15.00000000...	15.00000000...	30.00000000...	38.50000000...	30.00000000...	10.00000000...	10.00000000...	20.00000000...
322465	10.00000000...	10.00000000...	20.00000000...	10.00000000...	15.00000000...	30.00000000...	29.50000000...	26.50000000...	10.00000000...	10.00000000...	20.00000000...
354816	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	3.0000000000		5.0000000000	0.0000000000	5.0000000000
356742	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	42.50000000...	39.50000000...	5.0000000000	10.00000000...	15.00000000...
356743	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	40.00000000...	42.00000000...	5.0000000000	10.00000000...	10.00000000...
356744	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	52.50000000...	45.00000000...	5.0000000000	5.0000000000	10.00000000...
356745	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	29.00000000...	24.00000000...	10.00000000...	5.0000000000	15.00000000...
383494	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	39.00000000...		5.0000000000	0.0000000000	5.0000000000

ATHCNT	RATHCNT	ACTCNT	RACTCNT	TATHCNT	TACTCNT	ACTTIME	RACTTIME	CMTCNT	RCMTCNT	TCMTCNT
1855.000000...	1855.000000...	3660.000000...	3540.000000...	2295.000000...	5780.000000...	32.00000000...	31.00000000...	1910.000000...	1810.000000...	3575.000000...
1710.000000...	1835.000000...	3295.000000...	3525.000000...	2240.000000...	5605.000000...	25.00000000...	23.00000000...	1760.000000...	1830.000000...	3475.000000...
305.000000...	305.00000000...	530.00000000...	540.00000000...	345.00000000...	780.00000000...	3.0000000000	2.0000000000	250.00000000...	255.00000000...	470.00000000...
1745.000000...	1860.000000...	3355.000000...	3615.000000...	2250.000000...	5615.000000...	37.00000000...	33.00000000...	1750.000000...	1865.000000...	3465.000000...
1720.000000...	1840.000000...	3255.000000...	3620.000000...	2210.000000...	5485.000000...	35.00000000...	32.00000000...	1605.000000...	1865.000000...	3335.000000...
1595.000000...	1800.000000...	2940.000000...	3495.000000...	2145.000000...	5185.000000...	46.00000000...	43.00000000...	1415.000000...	1785.000000...	3090.000000...
1680.000000...	1720.000000...	3215.000000...	3350.000000...	2120.000000...	5245.000000...	26.00000000...	23.00000000...	1570.000000...	1685.000000...	3145.000000...
275.000000...	290.00000000...	475.00000000...	505.00000000...	320.00000000...	710.00000000...	32.50000000...	31.00000000...	215.00000000...	240.00000000...	420.00000000...

Edge Rollups

R: “reverse” - opposite of digitization direction

EDGE_ID	ATHCNT_0	RATHCNT_0	ACTCNT_0	RACTCNT_0	TATHCNT_0	TACTCNT_0	ACTTIME_0	RACETIME_0	CMTCNT_0	RCMTCNT_0	TCMTCNT_0
322464	10.00000000...	10.00000000	20.00000000...	15.00000000...	15.00000000...	30.00000000...	38.50000000...	30.00000000...	10.00000000...	10.00000000...	20.00000000...
322465	10.00000000...	10.00000000...	20.00000000...	10.00000000...	15.00000000...	30.00000000...	29.50000000...	26.50000000...	10.00000000...	10.00000000...	20.00000000...
354816	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	3.0000000000		5.0000000000	0.0000000000	5.0000000000
356742	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	42.50000000...	39.50000000...	5.0000000000	10.00000000...	15.00000000...
356743	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	40.00000000...	42.00000000...	5.0000000000	10.00000000...	10.00000000...
356744	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	52.50000000...	45.00000000...	5.0000000000	5.0000000000	10.00000000...
356745	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	29.00000000...	24.00000000...	10.00000000...	5.0000000000	15.00000000...
383494	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	39.00000000...		5.0000000000	0.0000000000	5.0000000000

ATHCNT	RATHCNT	ACTCNT	RACTCNT	TATHCNT	TACTCNT	ACTTIME	RACETIME	CMTCNT	RCMTCNT	TCMTCNT
1855.000000...	1855.000000...	3660.000000...	3540.000000...	2295.000000...	5780.000000...	32.00000000...	31.00000000...	1910.000000...	1810.000000...	3575.000000...
1710.000000...	1835.000000...	3295.000000...	3525.000000...	2240.000000...	5605.000000...	25.00000000...	23.00000000...	1760.000000...	1830.000000...	3475.000000...
305.000000...	305.00000000...	530.00000000...	540.00000000...	345.00000000...	780.00000000...	3.0000000000	2.0000000000	250.00000000...	255.00000000...	470.00000000...
1745.000000...	1860.000000...	3355.000000...	3615.000000...	2250.000000...	5615.000000...	37.00000000...	33.00000000...	1750.000000...	1865.000000...	3465.000000...
1720.000000...	1840.000000...	3255.000000...	3620.000000...	2210.000000...	5485.000000...	35.00000000...	32.00000000...	1605.000000...	1865.000000...	3335.000000...
1595.000000...	1800.000000...	2940.000000...	3495.000000...	2145.000000...	5185.000000...	46.00000000...	43.00000000...	1415.000000...	1785.000000...	3090.000000...
1680.000000...	1720.000000...	3215.000000...	3350.000000...	2120.000000...	5245.000000...	26.00000000...	23.00000000...	1570.000000...	1685.000000...	3145.000000...
275.000000...	290.00000000...	475.00000000...	505.00000000...	320.00000000...	710.00000000...	32.50000000...	31.00000000...	215.00000000...	240.00000000...	420.00000000...

Edge Rollups

Total Athlete and Total Activity Counts

EDGE_ID	ATHCNT_0	RATHCNT_0	ACTCNT_0	RACTCNT_0	TATHCNT_0	TACTCNT_0	ACTTIME_0	RACTTIME_0	CMTCNT_0	RCMTCNT_0	TCMTCNT_0
322464	10.00000000...	10.00000000...	20.00000000...	15.00000000...	15.00000000...	30.00000000...	38.50000000...	30.00000000...	10.00000000...	10.00000000...	20.00000000...
322465	10.00000000...	10.00000000...	20.00000000...	10.00000000...	15.00000000...	30.00000000...	29.50000000...	26.50000000...	10.00000000...	10.00000000...	20.00000000...
354816	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	3.0000000000		5.0000000000	0.0000000000	5.0000000000
356742	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	42.50000000...	39.50000000...	5.0000000000	10.00000000...	15.00000000...
356743	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	40.00000000...	42.00000000...	5.0000000000	10.00000000...	10.00000000...
356744	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	52.50000000...	45.00000000...	5.0000000000	5.0000000000	10.00000000...
356745	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	29.00000000...	24.00000000...	10.00000000...	5.0000000000	15.00000000...
383494	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	39.00000000...		5.0000000000	0.0000000000	5.0000000000

ATHCNT	RATHCNT	ACTCNT	RACTCNT	TATHCNT	TACTCNT	ACTTIME	RACTTIME	CMTCNT	RCMTCNT	TCMTCNT
1855.000000...	1855.000000...	3660.000000...	3540.000000...	2295.000000...	5780.000000...	32.00000000...	31.00000000...	1910.000000...	1810.000000...	3575.000000...
1710.000000...	1835.000000...	3295.000000...	3525.000000...	2240.000000...	5605.000000...	25.00000000...	23.00000000...	1760.000000...	1830.000000...	3475.000000...
305.000000...	305.00000000...	530.00000000...	540.00000000...	345.00000000...	780.00000000...	3.0000000000	2.0000000000	250.00000000...	255.00000000...	470.00000000...
1745.000000...	1860.000000...	3355.000000...	3615.000000...	2250.000000...	5615.000000...	37.00000000...	33.00000000...	1750.000000...	1865.000000...	3465.000000...
1720.000000...	1840.000000...	3255.000000...	3620.000000...	2210.000000...	5485.000000...	35.00000000...	32.00000000...	1605.000000...	1865.000000...	3335.000000...
1595.000000...	1800.000000...	2940.000000...	3495.000000...	2145.000000...	5185.000000...	46.00000000...	43.00000000...	1415.000000...	1785.000000...	3090.000000...
1680.000000...	1720.000000...	3215.000000...	3350.000000...	2120.000000...	5245.000000...	26.00000000...	23.00000000...	1570.000000...	1685.000000...	3145.000000...
275.000000...	290.00000000...	475.00000000...	505.00000000...	320.00000000...	710.00000000...	32.50000000...	31.00000000...	215.00000000...	240.00000000...	420.00000000...

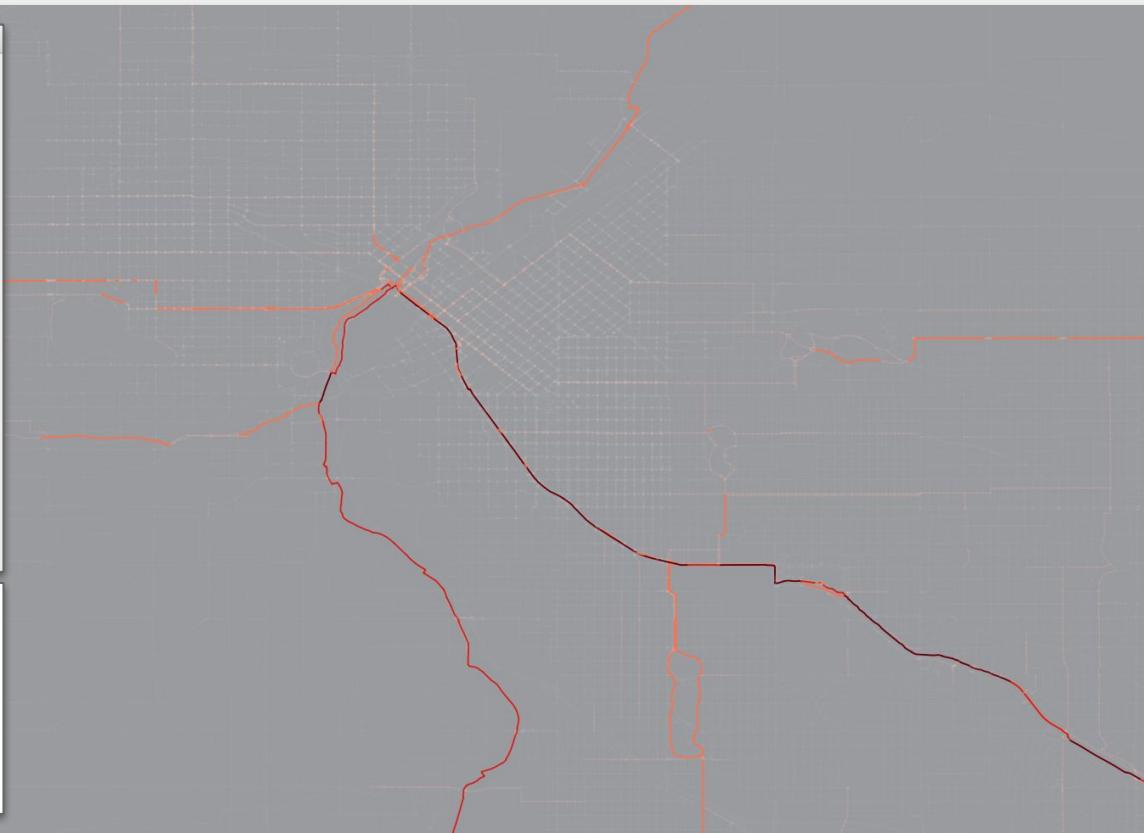
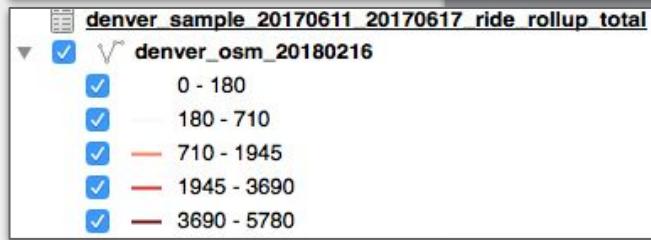
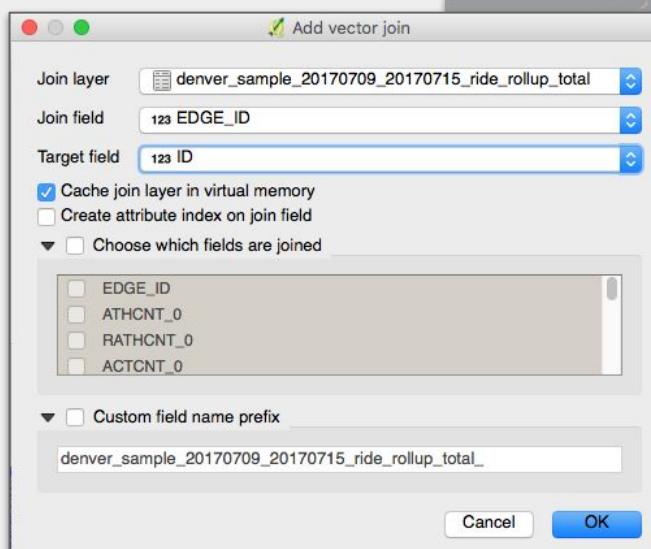
Edge Rollups

Hourly Rollups

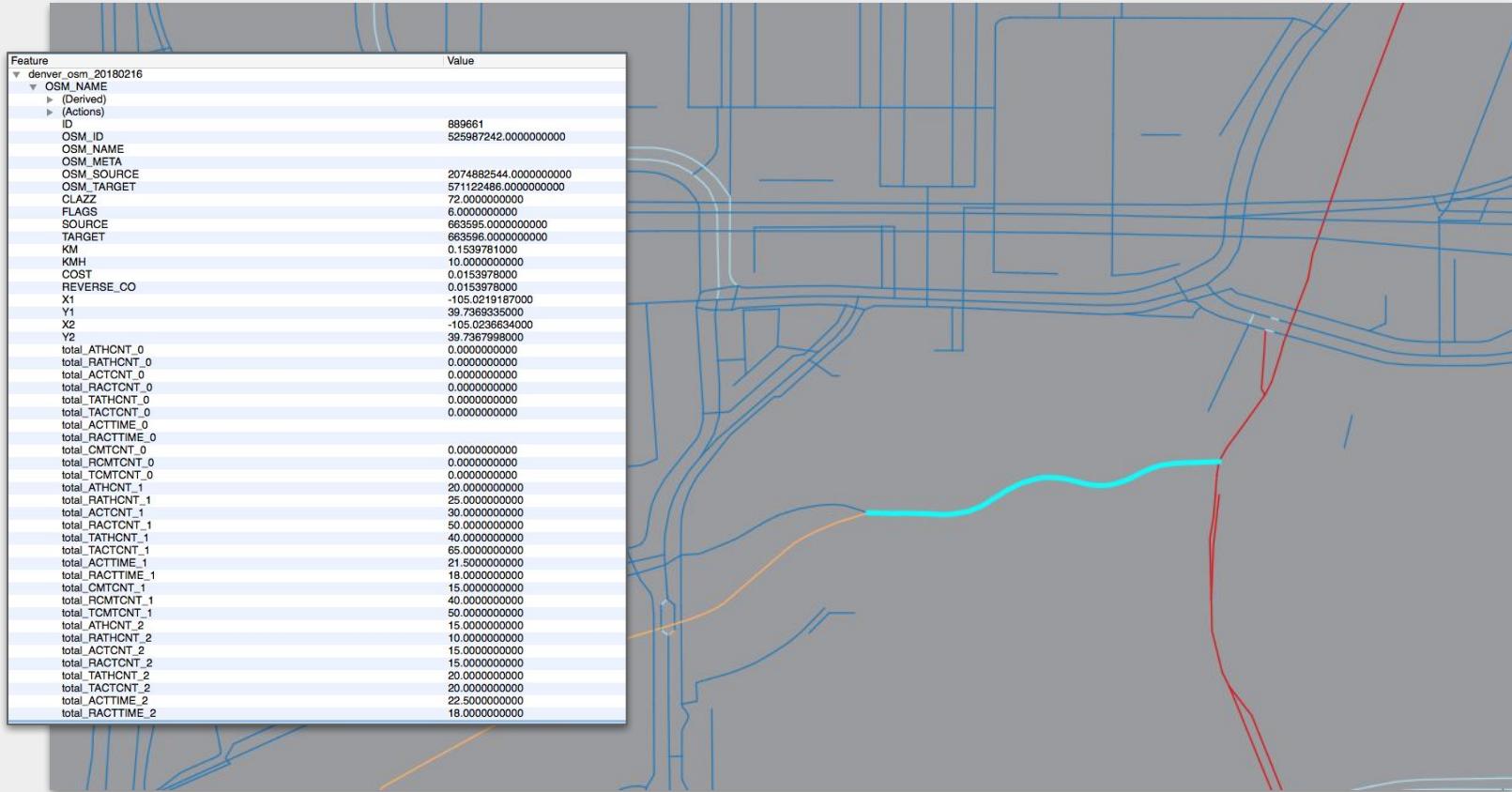
EDGE_ID	ATHCNT	RATHCNT	ACTCNT	RACTCNT	TATHCNT	TACTCNT	ACTTIME	RACTTIME	CMTCNT	RCMTCNT	TCMTCNT
322464	10.00000000...	10.00000000...	20.00000000...	15.00000000...	15.00000000...	30.00000000...	38.50000000...	30.00000000...	10.00000000...	10.00000000...	20.00000000...
322465	10.00000000...	10.00000000...	20.00000000...	10.00000000...	15.00000000...	30.00000000...	29.50000000...	26.50000000...	10.00000000...	10.00000000...	20.00000000...
354816	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	3.0000000000		5.0000000000	0.0000000000	5.0000000000
356742	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	42.50000000...	39.50000000...	5.0000000000	10.00000000...	15.00000000...
356743	10.00000000...	10.00000000...	15.00000000...	10.00000000...	15.00000000...	25.00000000...	40.00000000...	42.00000000...	5.0000000000	10.00000000...	10.00000000...
356744	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	52.50000000...	45.00000000...	5.0000000000	5.0000000000	10.00000000...
356745	10.00000000...	10.00000000...	15.00000000...	10.00000000...	20.00000000...	25.00000000...	29.00000000...	24.00000000...	10.00000000...	5.0000000000	15.00000000...
383494	10.00000000...	0.0000000000	15.00000000...	0.0000000000	10.00000000...	15.00000000...	39.00000000...		5.0000000000	0.0000000000	5.0000000000

ATHCNT	RATHCNT	ACTCNT	RACTCNT	TATHCNT	TACTCNT	ACTTIME	RACTTIME	CMTCNT	RCMTCNT	TCMTCNT
1855.000000...	1855.000000...	3660.000000...	3540.000000...	2295.000000...	5780.000000...	32.00000000...	31.00000000...	1910.000000...	1810.000000...	3575.000000...
1710.000000...	1835.000000...	3295.000000...	3525.000000...	2240.000000...	5605.000000...	25.00000000...	23.00000000...	1760.000000...	1830.000000...	3475.000000...
305.000000...	305.00000000...	530.00000000...	540.00000000...	345.00000000...	780.00000000...	3.0000000000	2.0000000000	250.00000000...	255.00000000...	470.00000000...
1745.000000...	1860.000000...	3355.000000...	3615.000000...	2250.000000...	5615.000000...	37.00000000...	33.00000000...	1750.000000...	1865.000000...	3465.000000...
1720.000000...	1840.000000...	3255.000000...	3620.000000...	2210.000000...	5485.000000...	35.00000000...	32.00000000...	1605.000000...	1865.000000...	3335.000000...
1595.000000...	1800.000000...	2940.000000...	3495.000000...	2145.000000...	5185.000000...	46.00000000...	43.00000000...	1415.000000...	1785.000000...	3090.000000...
1680.000000...	1720.000000...	3215.000000...	3350.000000...	2120.000000...	5245.000000...	26.00000000...	23.00000000...	1570.000000...	1685.000000...	3145.000000...
275.000000...	290.00000000...	475.00000000...	505.00000000...	320.00000000...	710.00000000...	32.50000000...	31.00000000...	215.00000000...	240.00000000...	420.00000000...

Edge Rollups and Joins



Edge Rollups



Edges: Calculate Speed

- Join rollup Edge_ID -> shapefile ID
- Recalculate length
 - If using **miles**, choose a CRS that is in **feet**
 - If using **kilometers**, choose a CRS that is in **meters**
- Create 2 new fields: **Speed** and **R_Speed** as type double
- **Field Calculator:** $\text{length}/((\text{activity time in seconds}/60)/60)$
 - *Remember to change the length to either miles or kilometers!*

Edges: Subset of Data

- Join edge rollup to the shapefile
- Symbolize by **TATHCNT**
- Notice how areas of extremely high use overshadow the rest of the data



Edges: Subset of Data

- Select a subset in a region you're interested in studying
- Export as a **new shapefile**
- Join the rollup to the new, smaller region
- Re-symbolize by **TATHCNT**
 - The areas of high use within this region will now be more prominent



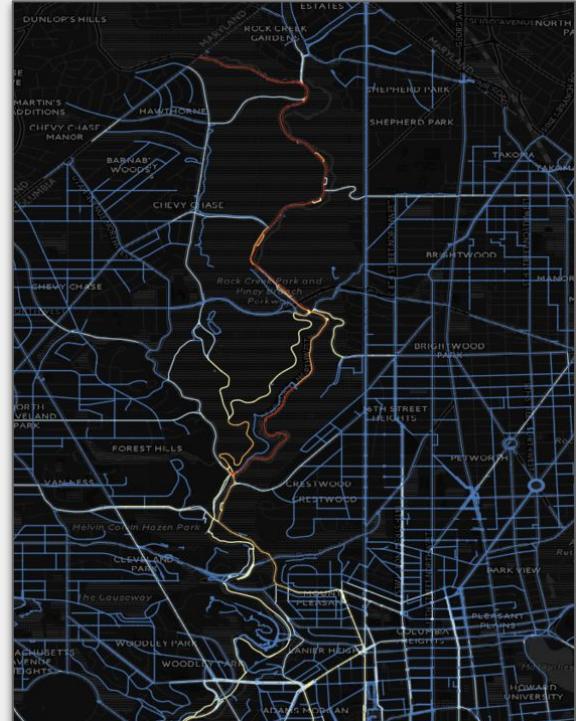
Edges Example

Rock Creek Park, Washington, DC

- Rock Creek Park is closed to cars on weekends and holidays
- Many more activities on safer roads when cars not present



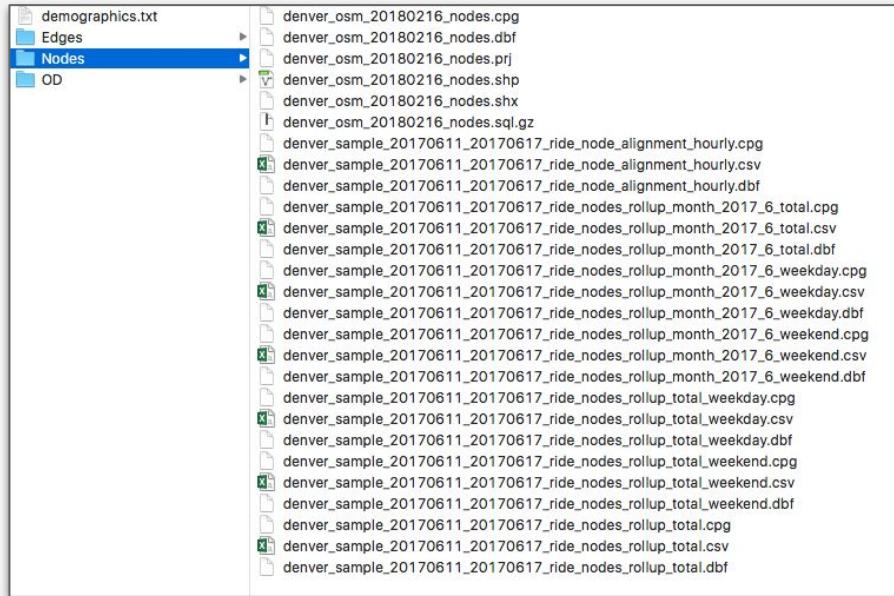
Weekday



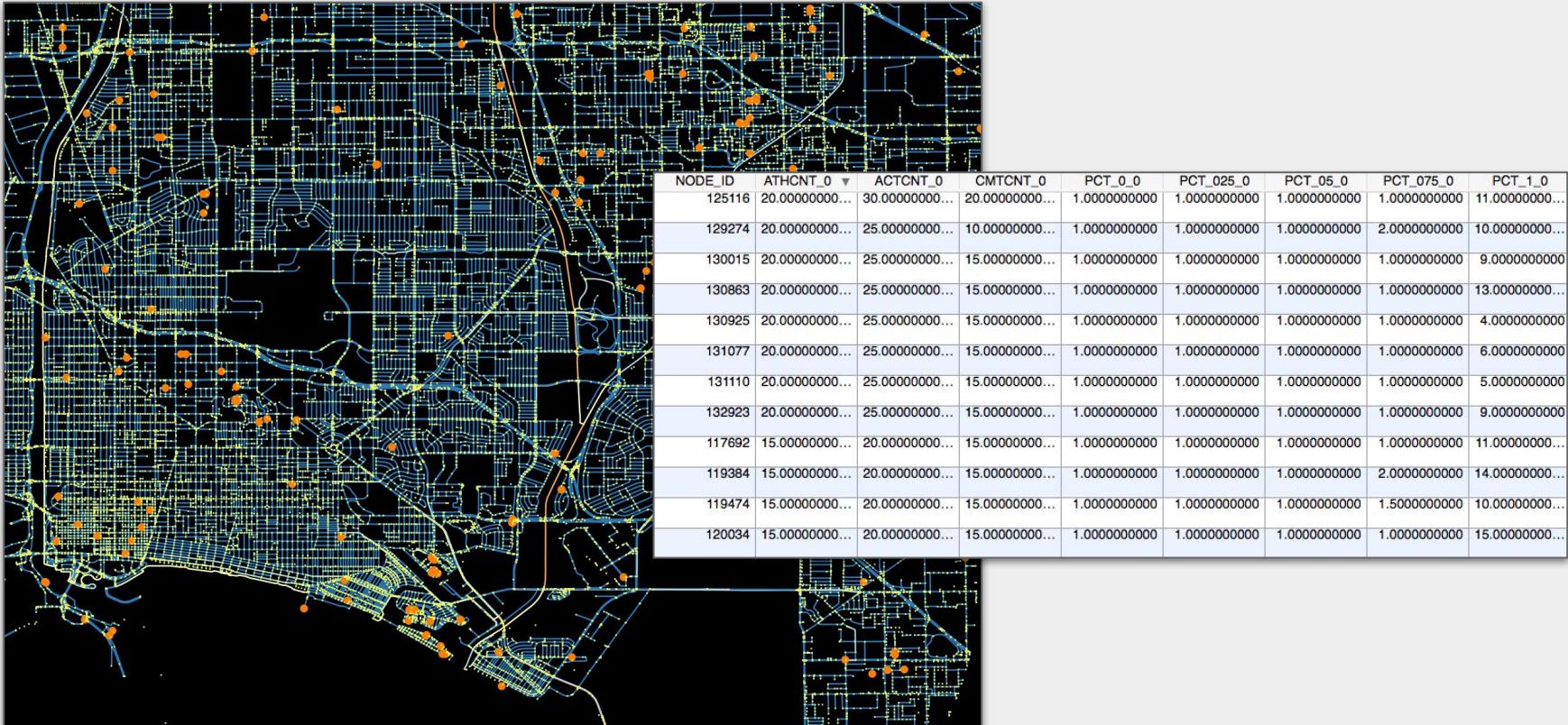
Weekend

Nodes

Working with the Rollups

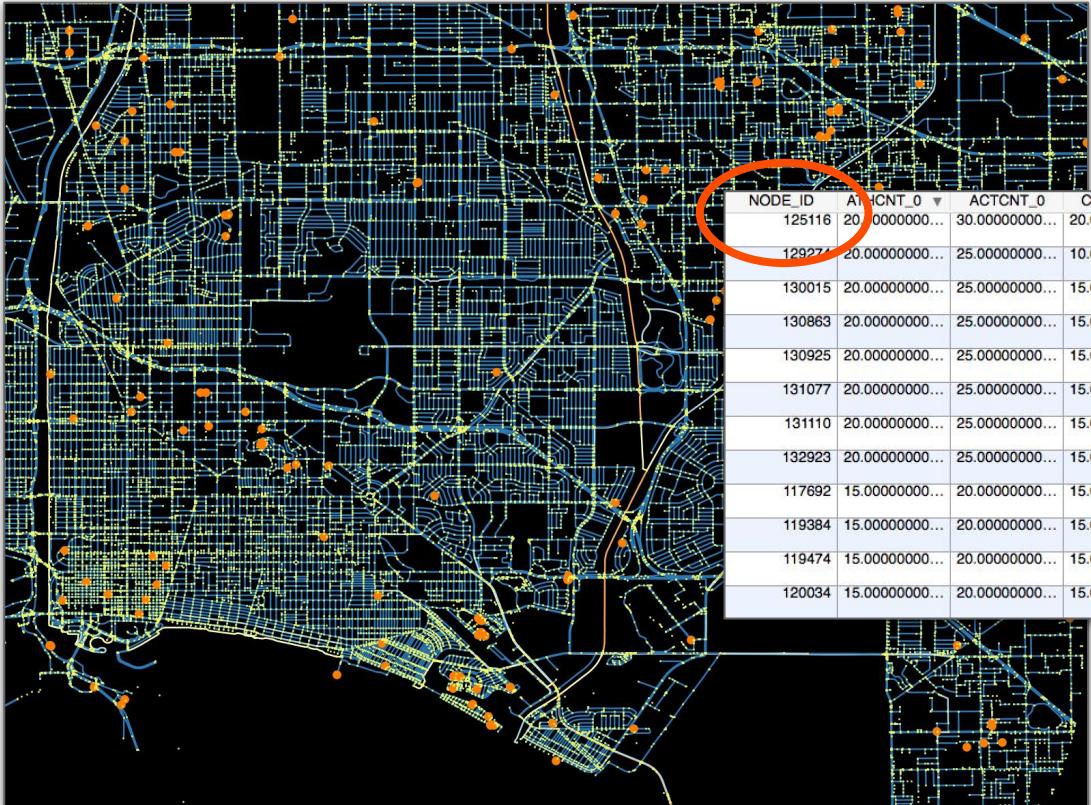


Node Rollups



Node Rollups

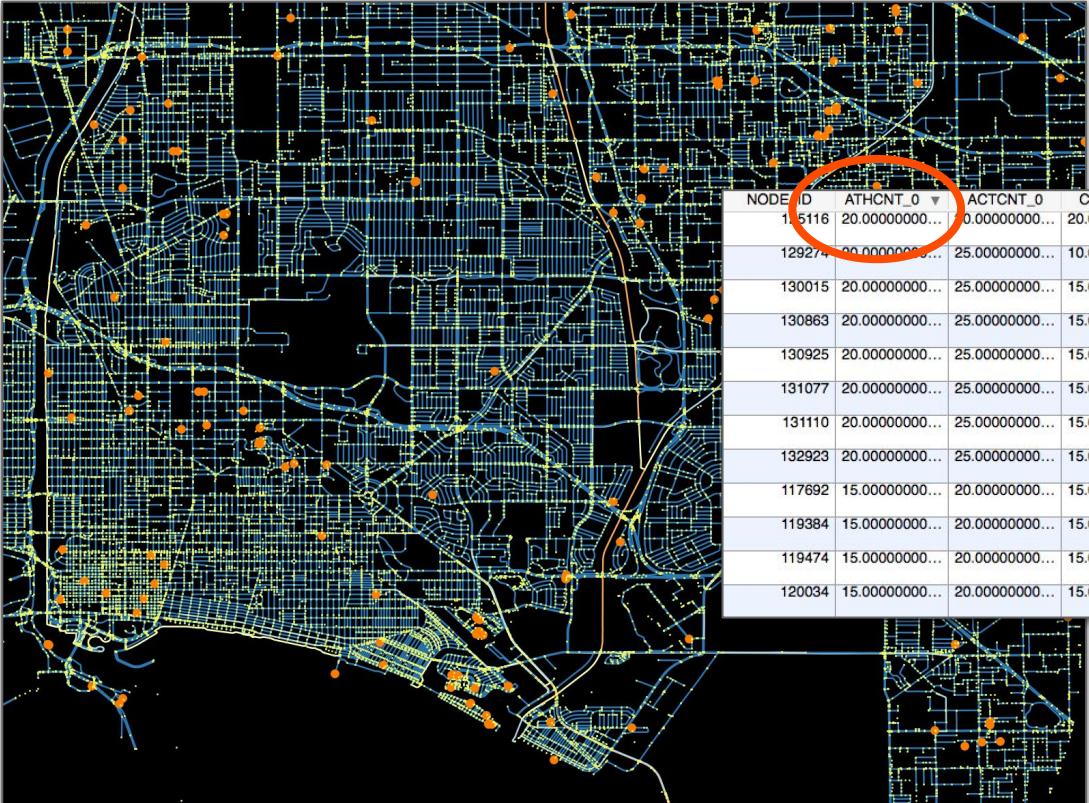
NODE_ID: join field with the shapefile



NODE_ID	ACTCNT_0	ACTCNT_0	CMTCNT_0	PCT_0_0	PCT_025_0	PCT_05_0	PCT_075_0	PCT_1_0
125116	20.00000000...	30.00000000...	20.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	11.00000000...
129274	20.00000000...	25.00000000...	10.00000000...	1.0000000000	1.0000000000	1.0000000000	2.0000000000	10.00000000...
130015	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	9.0000000000
130863	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	13.00000000...
130925	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	4.0000000000
131077	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	6.0000000000
131110	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	5.0000000000
132923	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	9.0000000000
117692	15.00000000...	20.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	11.00000000...
119384	15.00000000...	20.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	2.0000000000	14.00000000...
119474	15.00000000...	20.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.5000000000	10.00000000...
120034	15.00000000...	20.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	15.00000000...

Node Rollups

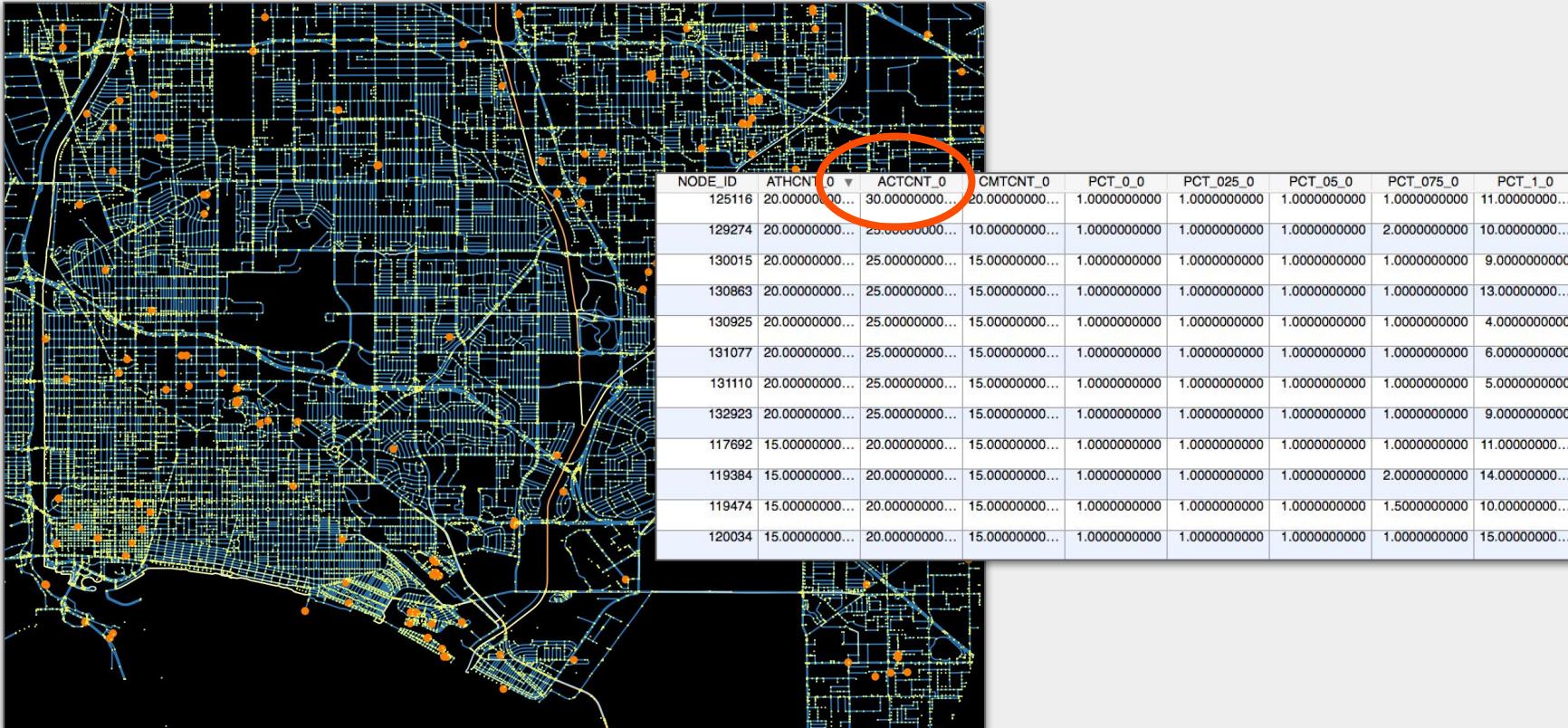
Athlete Count



NODE_ID	ATHCNT_0	ACTCNT_0	CMTCNT_0	PCT_0_0	PCT_025_0	PCT_05_0	PCT_075_0	PCT_1_0
1_5116	20.00000000...	0.00000000...	20.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	11.00000000...
129274	20.00000000...	25.00000000...	10.00000000...	1.0000000000	1.0000000000	1.0000000000	2.0000000000	10.00000000...
130015	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	9.0000000000
130863	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	13.00000000...
130925	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	4.0000000000
131077	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	6.0000000000
131110	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	5.0000000000
132923	20.00000000...	25.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	9.0000000000
117692	15.00000000...	20.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	11.00000000...
119384	15.00000000...	20.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	2.0000000000	14.00000000...
119474	15.00000000...	20.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.5000000000	10.00000000...
120034	15.00000000...	20.00000000...	15.00000000...	1.0000000000	1.0000000000	1.0000000000	1.0000000000	15.00000000...

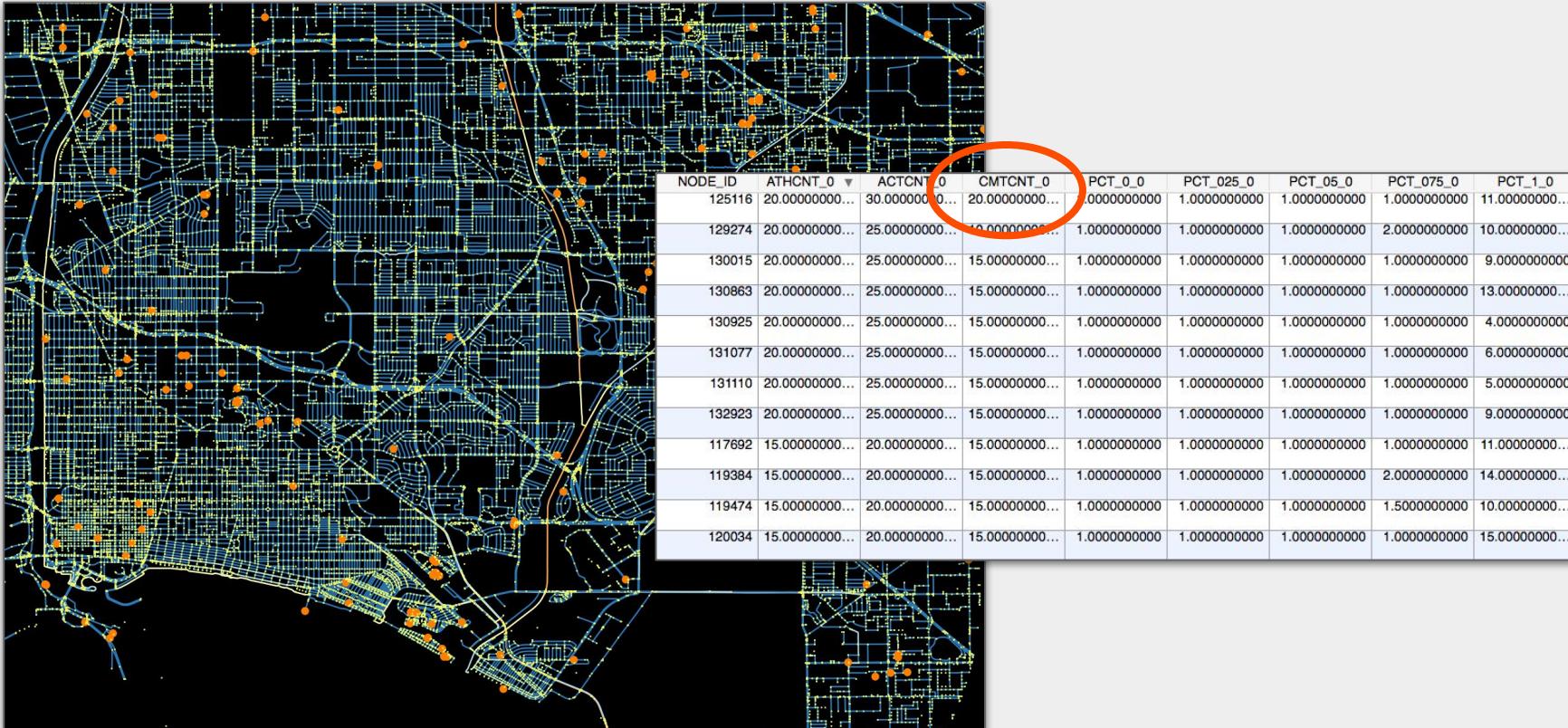
Node Rollups

Activity Count



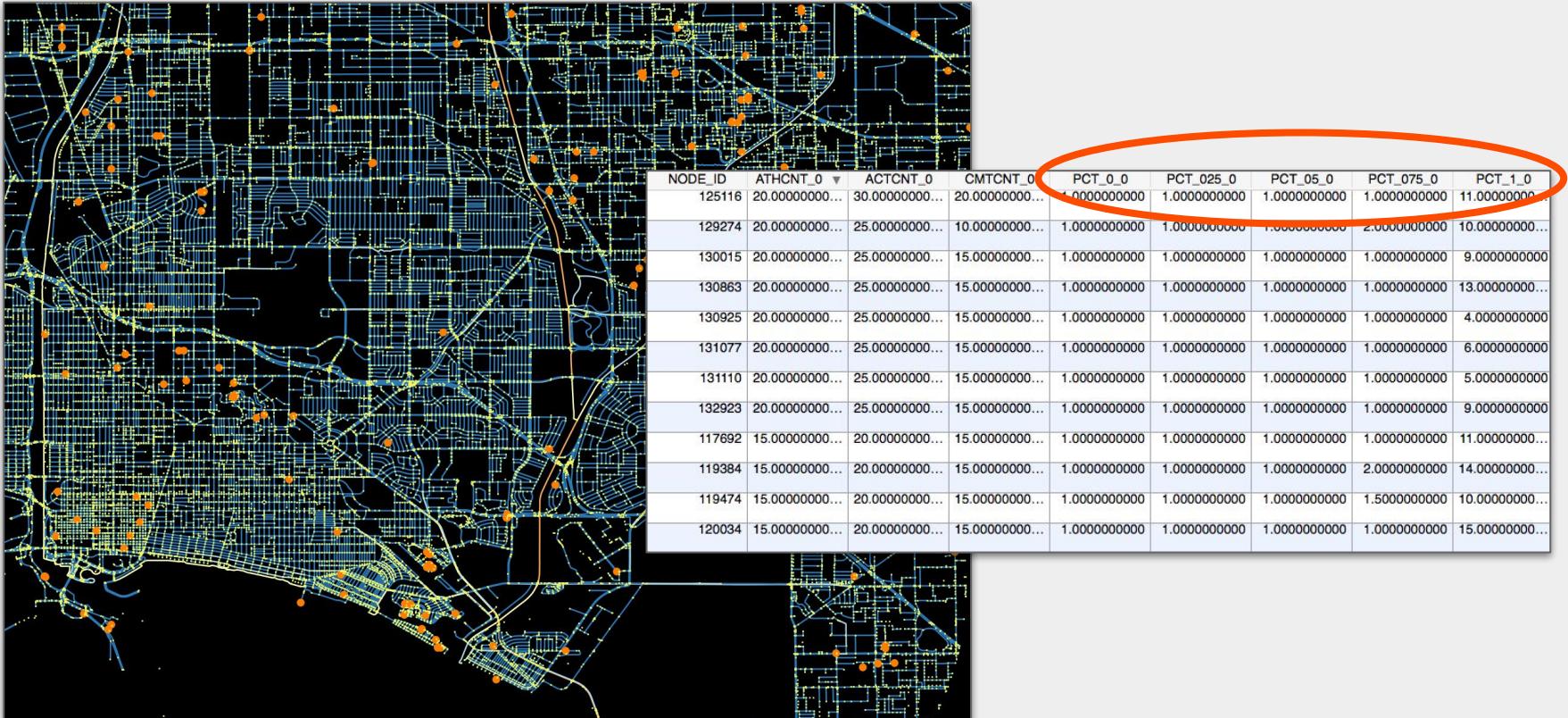
Commute Count

Node Rollups

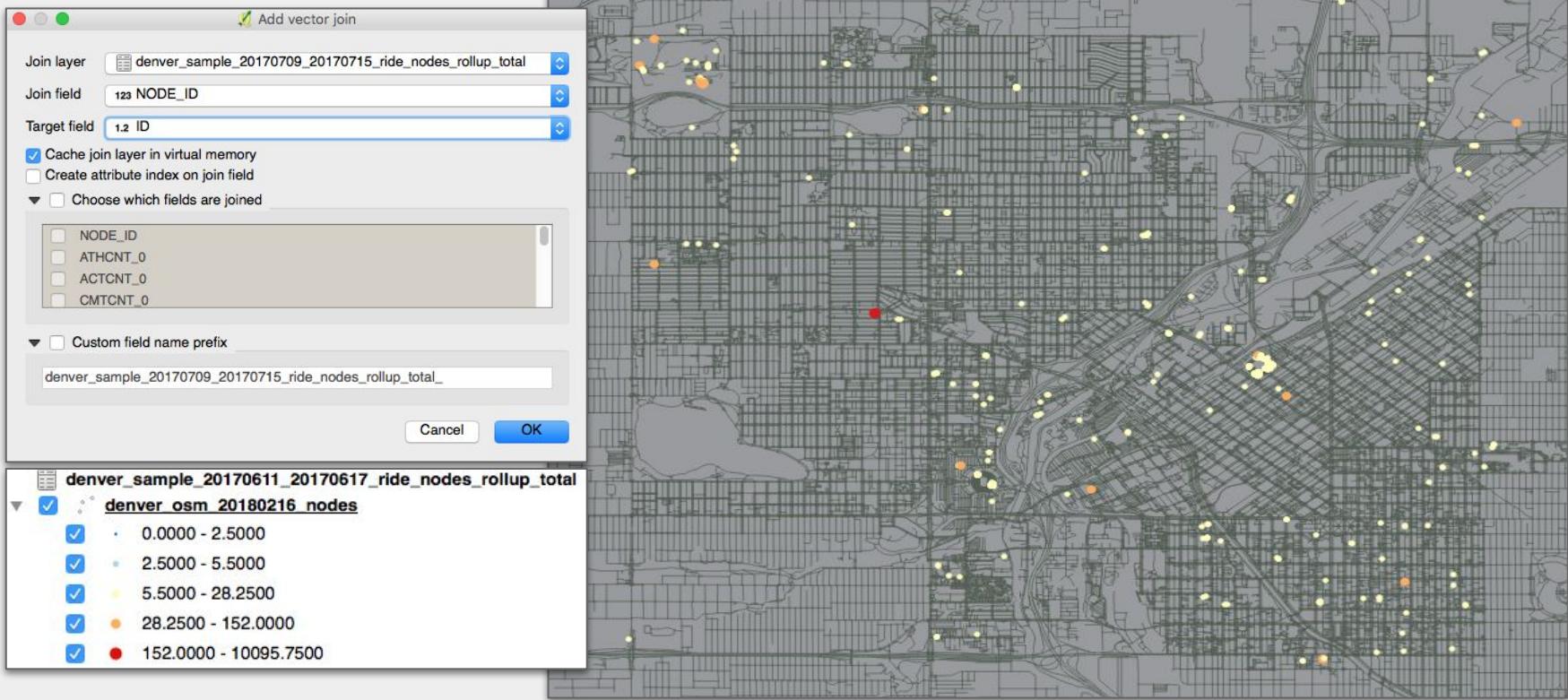


Node Rollups

Percentiles of time spent at the intersection

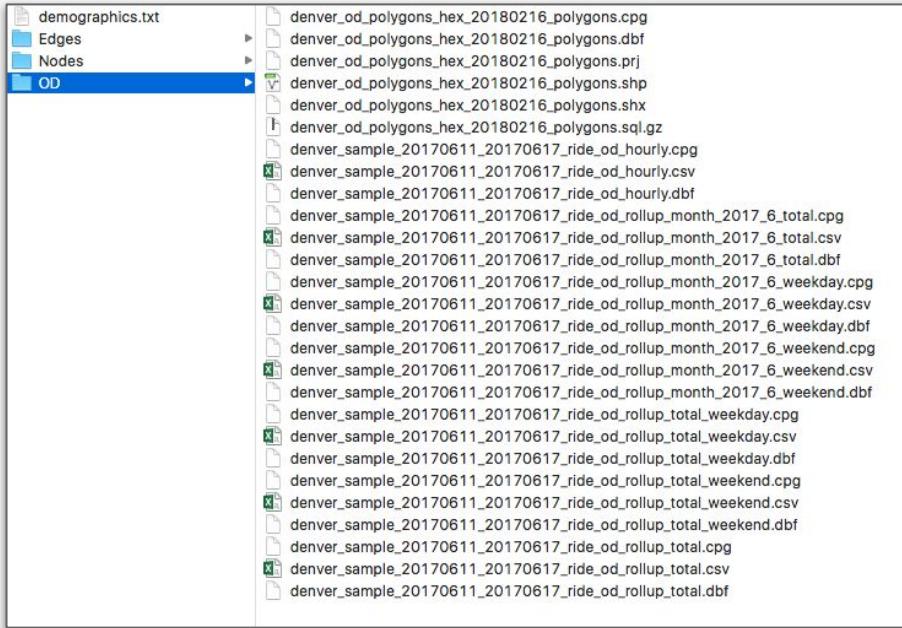


Node Rollups



Origin/Destination

Working with the Rollups



OD Rollups

Ideal for:

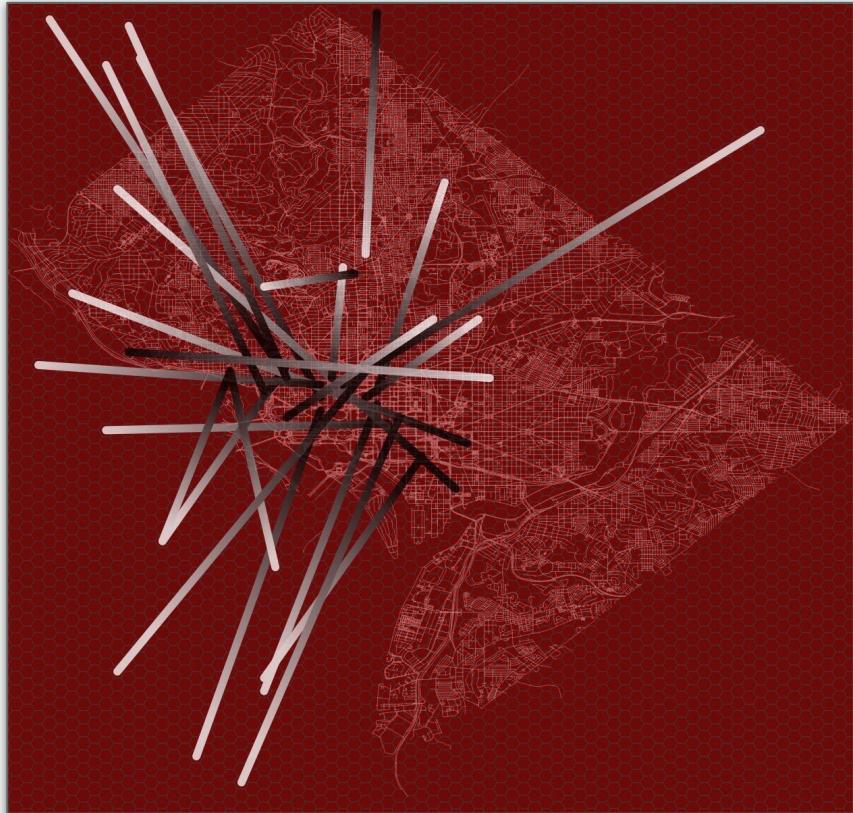
- Flow mapping
- O/D modeling via trip table matrix format

ORIGIN	DESTINATIO	ATHCNT ▼	ACTCNT	CMTCNT
2538	2538	610.0000000...	830.0000000...	0
3522	3522	455.0000000...	580.0000000...	0
12261	13530	300.0000000...	305.0000000...	301
1390	1390	270.0000000...	365.0000000...	0

OD Rollups

Washington, DC

- Morning commutes with more than 5 activities between the origin/destination pair
- Moving in the direction from light to dark
- 1 week of data



Working with the Hourly Files

Edges

Working with the Hourly Files

Edges

Many-to-One Relationship

edge_id	year	day	hour	athlete_count	rev_athlete_count	activity_count	rev_activity_count	total_athlete_count	total_activity_count	activity_time	rev_activity_time	commute_count
340892	2017	175	6	380	0	385	0	380	385	43		385
340890	2017	175	6	375	0	380	0	375	380	15		380
340891	2017	175	6	370	0	380	0	370	380	0		375
802289	2017	175	6	370	0	375	0	370	375	6		375
802292	2017	175	6	370	0	375	0	370	375	12		375
802295	2017	175	6	370	0	375	0	370	375	1		375
802296	2017	175	6	370	0	375	0	370	375	6		375
807084	2017	175	6	370	0	380	0	370	380	15		380
802290	2017	175	6	365	0	370	0	365	370	10		370
704152	2017	175	6	360	0	365	0	360	365	5		365
703807	2017	175	6	335	0	345	0	335	345	48		340
703809	2017	175	6	335	0	340	0	335	340	34		340

Edges

Part 1: Load the data into a Relational Database

Create Table

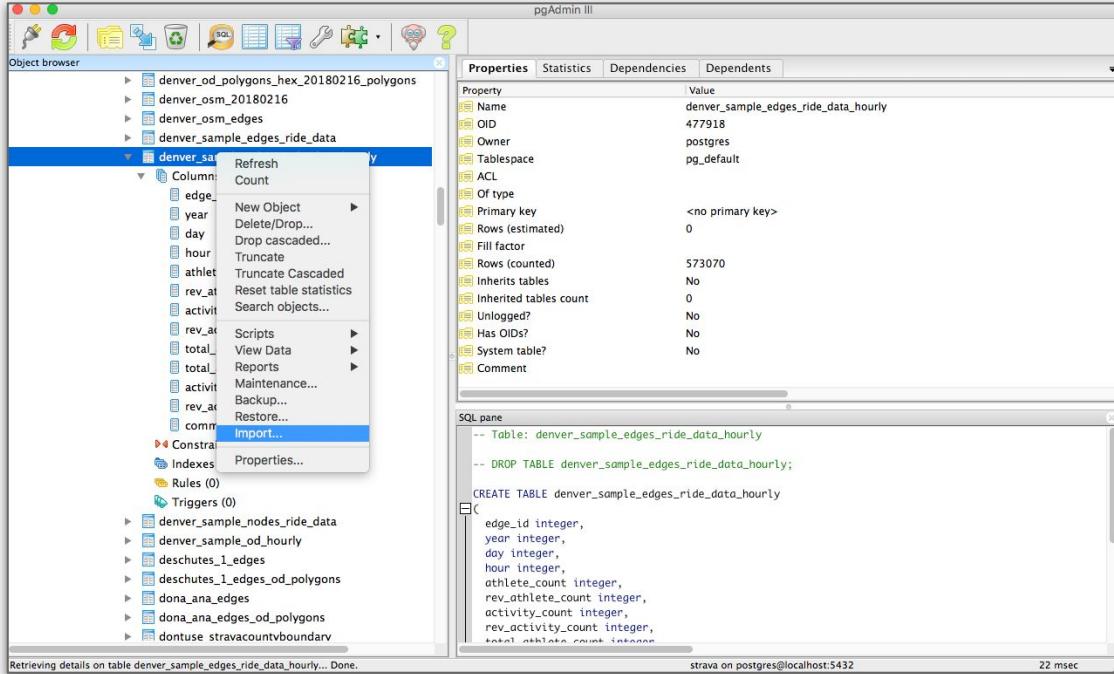
- Column Names
- Column Types

```
CREATE TABLE denver_sample_edges_ride_data
(edge_id INTEGER,
year INTEGER,
day INTEGER,
hour INTEGER,
minute INTEGER,
athlete_count INTEGER,
rev_athlete_count INTEGER,
activity_count INTEGER,
rev_activity_count INTEGER,
total_athlete_count  INTEGER,
total_activity_count INTEGER,
activity_time NUMERIC,
rev_activity_time NUMERIC,
commute_count INTEGER);
```

Edges

Part 1: Load the data into a Relational Database

Import Data



Edges

Part 1: Load the data into a Relational Database

Create Datetime Column

```
ALTER TABLE denver_sample_edges_ride_data  
ADD COLUMN datetime TIMESTAMP WITHOUT TIME ZONE;
```

Populate Datetime Column

```
UPDATE denver_sample_edges_ride_data  
SET datetime = CAST(TIMESTAMP '2017-12-31' +  
interval '1 day' * day + interval '1 hour' *  
hour as TIMESTAMP)  
WHERE year = 2018;
```

Edges

Part 1: Load the data into a Relational Database

Create Indexes

```
CREATE INDEX denver_sample_datetime_idx  
ON denver_sample_edges_ride_data  
USING btree (datetime);
```

```
CREATE INDEX denver_sample_edge_id_idx  
ON denver_sample_edges_ride_data  
USING btree (edge_id);
```

```
CREATE INDEX denver_sample_hour_idx  
ON denver_sample_edges_ride_data  
USING btree (hour);
```

Edges

Part 2: Query the data

```
SELECT day, count(*)  
FROM denver_sample_edges_ride_data  
GROUP BY day  
ORDER BY day;
```

Counts by Day

Check that your data is loaded for the full timeframe

The screenshot shows a PostgreSQL client interface with two panes. The top pane is the SQL Editor, containing the following SQL code:

```
select day, count(*)  
from la_c_201507_201606_ride_data  
group by day  
order by day
```

The bottom pane is the Output pane, which displays the results of the query as a table:

day	count
1	468659
2	587939
3	571401
4	205728
5	44611
6	64995
7	207901
8	348062
9	616751
10	530738
11	280495
12	381177

Below the table, the status bar indicates "Unix Ln 4, Col 13, Ch 81" and "365 rows. 02:06 minute".

Edges

Part 2: Query the data

Sum Activity Counts by Day on Specific Edge

```
SELECT day, SUM(total_activity_count)
FROM denver_sample_edges_ride_data_hourly
WHERE edge_id = 33
GROUP BY day
ORDER BY day;
```

The screenshot shows a PostgreSQL client interface with the following details:

- Query Editor:** Displays the SQL query:

```
SELECT day, SUM(total_activity_count)
FROM denver_sample_edges_ride_data_hourly
WHERE edge_id = 33
GROUP BY day
ORDER BY day;
```
- Data Output:** Shows the results of the query in a table format:

day	sum
integer	bigint
1	162
2	25
3	35
4	75
5	35
6	20
7	100
8	105
9	70
10	55
11	50
12	65
13	155
14	105
15	20
16	50
17	145
- Statistics:** At the bottom right, it says "19 rows." and "118 msec."

Edges

Part 2: Query the data

Sum Activity Counts on Specific Edge by Day of Week

```
SELECT EXTRACT(dow from datetime)dow,
       SUM(total_activity_count)
  FROM denver_sample_edges_ride_data_hourly
 WHERE edge_id = 33
 GROUP BY EXTRACT(dow from datetime)
 ORDER BY dow;
```

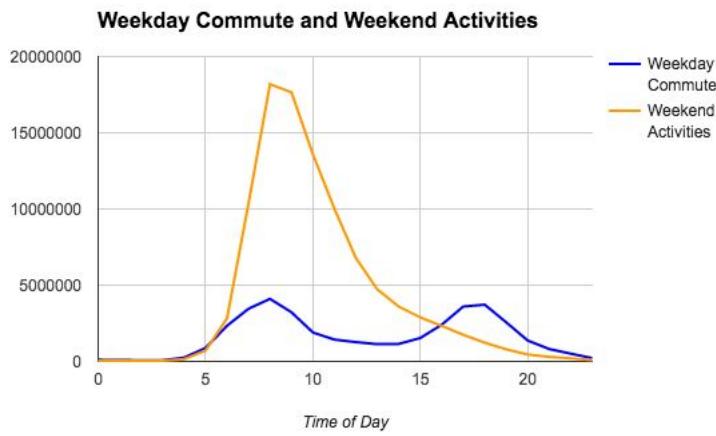
The screenshot shows a PostgreSQL client interface with the following details:

- SQL Editor Tab:** The current tab is "SQL Editor".
- Query Window:** The query is displayed in the main window:

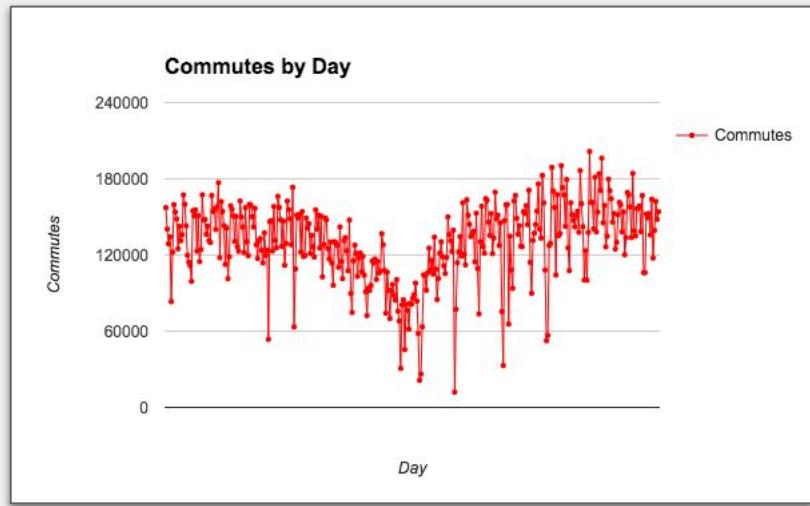
```
SELECT extract(dow from datetime)dow, sum(total_activity_count)
  FROM denver_sample_edges_ride_data_hourly
 WHERE edge_id = 33
 GROUP BY extract(dow from datetime)
 ORDER BY dow;
```
- Output Pane:** The "Data Output" tab is selected, showing the results of the query:

dow	sum
0	310
1	115
2	140
3	270
4	150
5	40
6	255
- Status Bar:** At the bottom right, it shows "Unix - Ln 2, Col 19, Ch 83", "7 rows.", and "140 msec".

Edges



Week to Week Trends



Yearly Commute Trends

Nodes

Working with the Hourly Files

Nodes

Part 1: Load the data into a Relational Database

Create Table

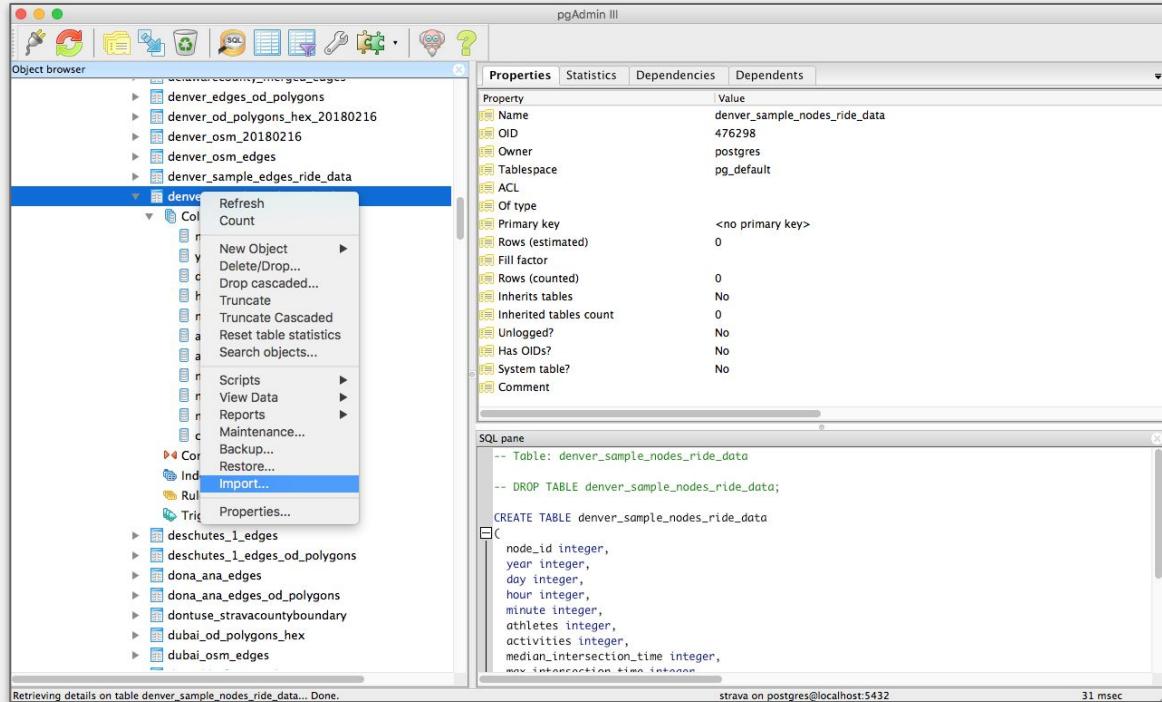
- Column Names
- Column Types

```
CREATE TABLE denver_sample_nodes_ride_data
(node_id INTEGER,
year INTEGER,
day INTEGER,
hour INTEGER,
minute INTEGER,
athletes INTEGER,
activities INTEGER,
median_intersection_time NUMERIC,
max_intersection_time NUMERIC,
min_intersection_time NUMERIC,
commute_count INTEGER);
```

Nodes

Part 1: Load the data into a Relational Database

Import Data



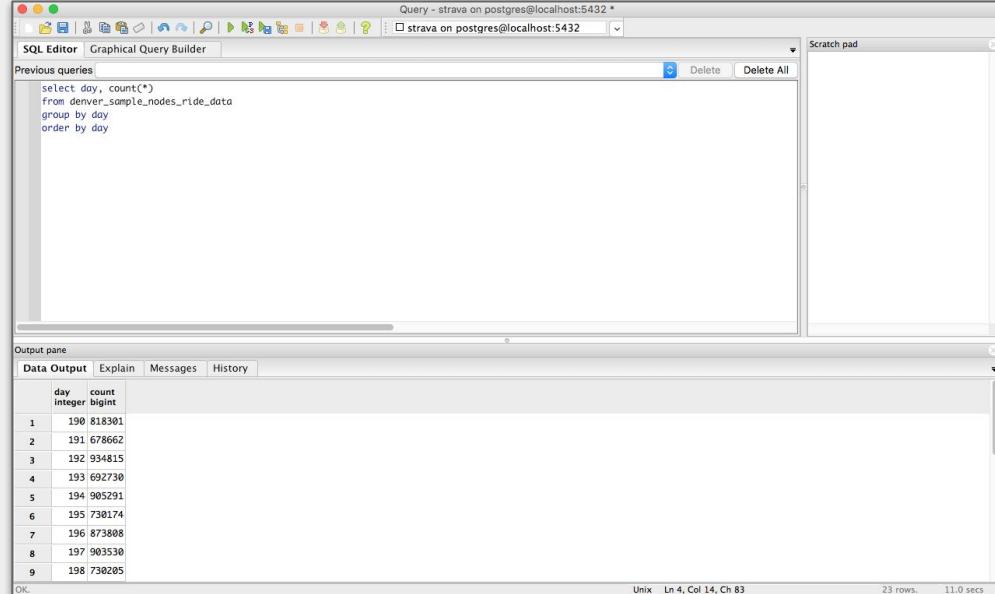
Nodes

Part 2: Query the data

Counts by Day

Check that your data is loaded for the full timeframe

```
SELECT day, count(*)
FROM denver_sample_nodes_ride_data
GROUP BY day
ORDER BY day
```



The screenshot shows a PostgreSQL client interface with the following details:

- SQL Editor Tab:** Contains the SQL query: `SELECT day, count(*) FROM denver_sample_nodes_ride_data GROUP BY day ORDER BY day;`
- Output pane:** Titled "Data Output". It displays the results of the query in a table format.
- Table Data:**

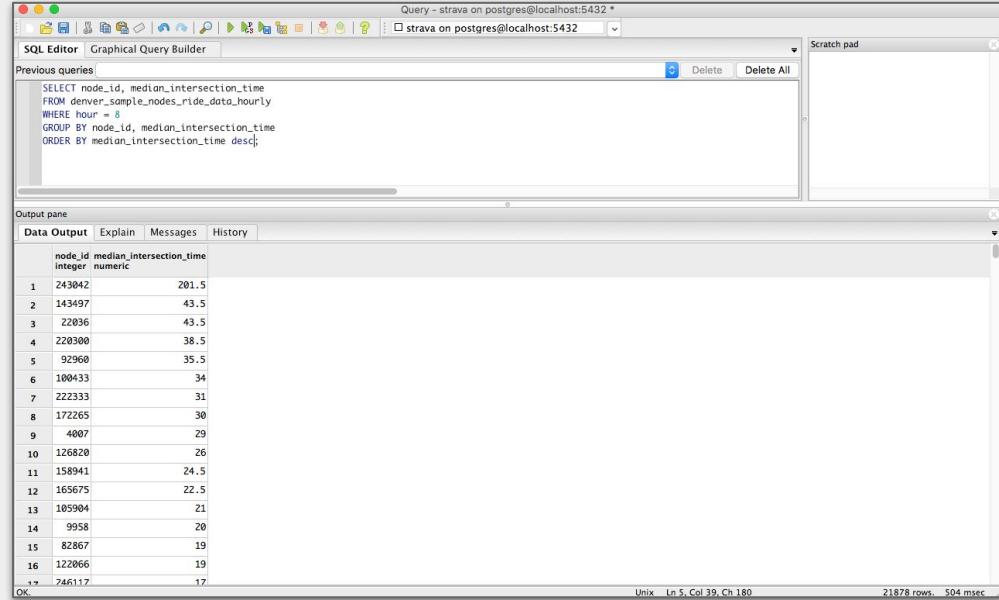
day	count
190	818301
191	678662
192	934815
193	692730
194	905291
195	730174
196	873808
197	908530
198	730205
- Status Bar:** Shows "Unix Ln 4, Col 14, Ch 83" and "23 rows. 11.0 secs".

Nodes

Part 2: Query the data

Median Intersection Times by Intersection at 8am

```
SELECT node_id, median_intersection_time
FROM denver_sample_nodes_ride_data_hourly
WHERE hour = 8
GROUP BY node_id, median_intersection_time
ORDER BY median_intersection_time desc;
```



The screenshot shows a PostgreSQL graphical query builder interface. The top pane displays the SQL query:`SELECT node_id, median_intersection_time
FROM denver_sample_nodes_ride_data_hourly
WHERE hour = 8
GROUP BY node_id, median_intersection_time
ORDER BY median_intersection_time desc;`

The bottom pane shows the output of the query, which is a table of 18 rows:

node_id	median_intersection_time
243842	201.5
143497	43.5
22036	43.5
229300	38.5
92960	35.5
100433	34
222333	31
172265	30
4007	29
126820	26
158941	24.5
165675	22.5
105904	21
9958	20
82867	19
122066	19
746117	17

Details from the bottom status bar: Unix Ls 5, Col 39, Ch 180, 21878 rows, 504 msec.

Origin / Destination

Working with the Hourly Files

Origin/Destination

Part 1: Load the data into a Relational Database

Create Table

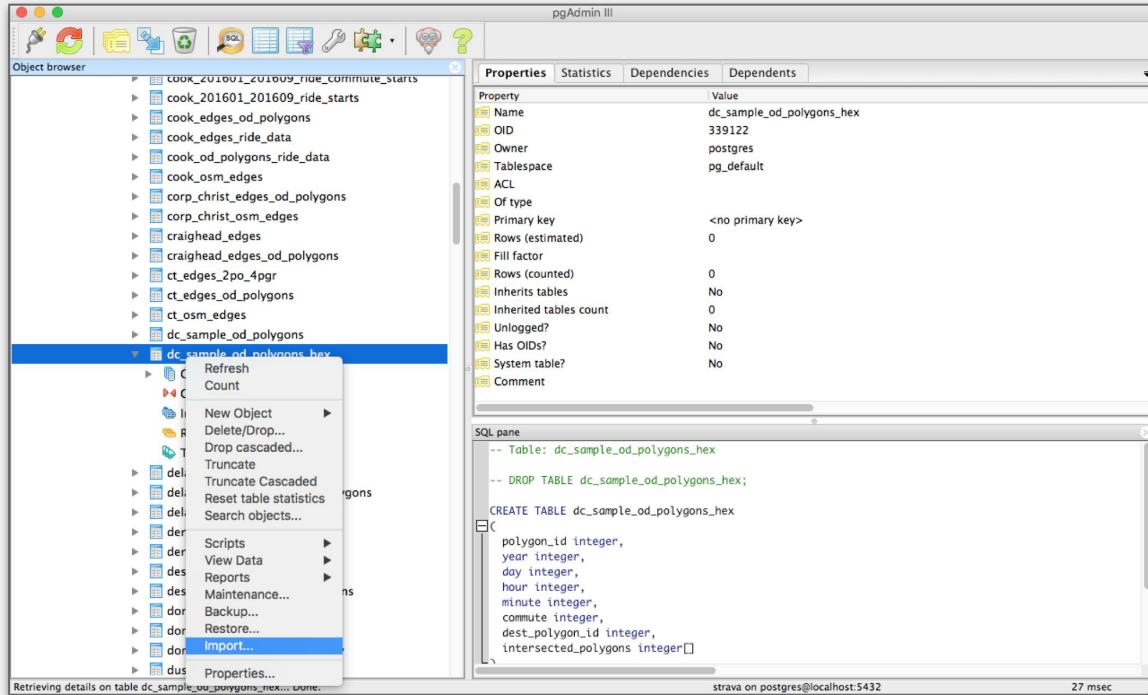
- Column Names
- Column Types

```
CREATE TABLE dc_sample_od_polygons_hex
(polygon_id INTEGER,
year INTEGER,
day INTEGER,
hour INTEGER,
minute INTEGER,
commute_count INTEGER,
athlete_count INTEGER,
activity_count INTEGER,
dest_polygon_id INTEGER,
distance NUMERIC,
duration INTEGER);
```

Origin/Destination

Part 1: Load the data into a Relational Database

Import Data

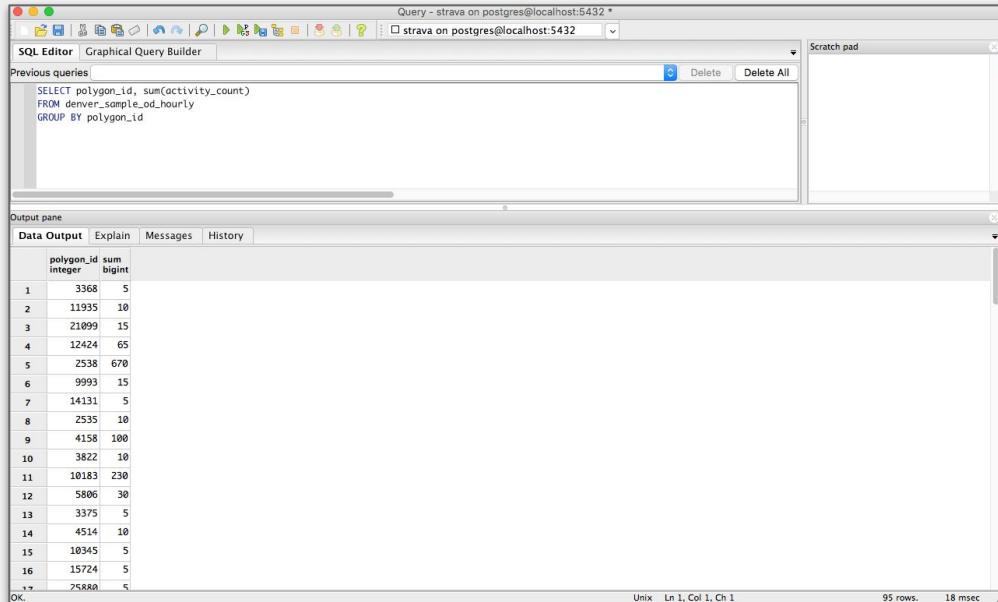


Origin/Destination

Part 2: Query the data

Counts by origin polygon

```
SELECT polygon_id, sum(activity_count)
FROM dc_sample_od_hourly
GROUP BY polygon_id
```



The screenshot shows a PostgreSQL client interface with the following details:

- SQL Editor Tab:** Contains the SQL query:

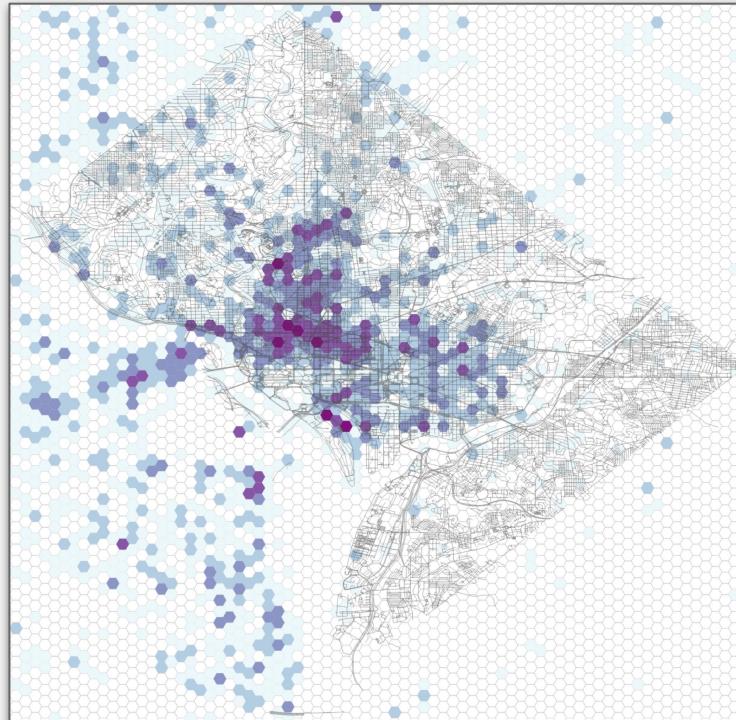
```
SELECT polygon_id, sum(activity_count)
FROM dc_sample_od_hourly
GROUP BY polygon_id
```
- Output pane:** Contains the results of the query, displayed as a table:

polygon_id	sum
3368	5
11935	10
21899	15
12424	65
2538	678
9993	15
14131	5
2535	10
4158	100
3822	10
10183	230
5806	30
3375	5
4514	10
10345	5
15724	5
25880	5
- Status:** Unix Ln 1, Col 1, Ch 1
- Timing:** 95 rows., 18 msec

Origin/Destination

Part 2: Query the data

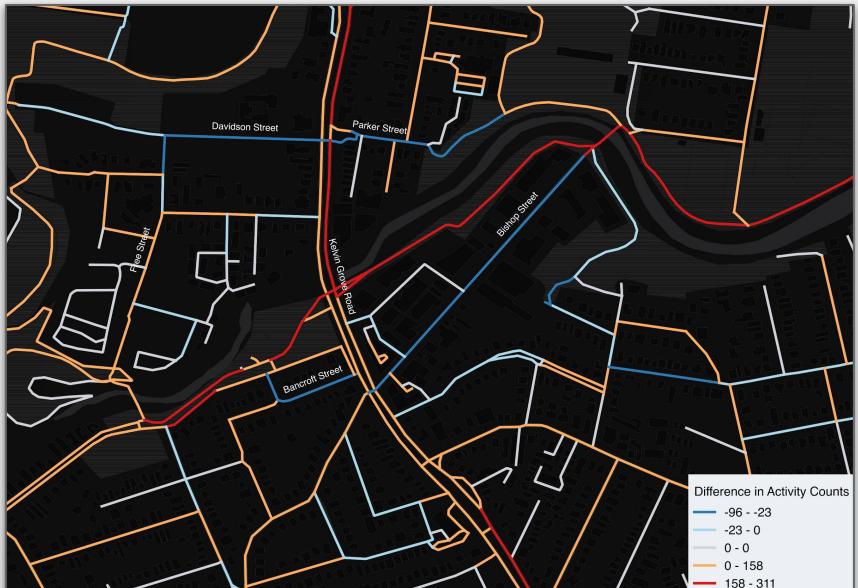
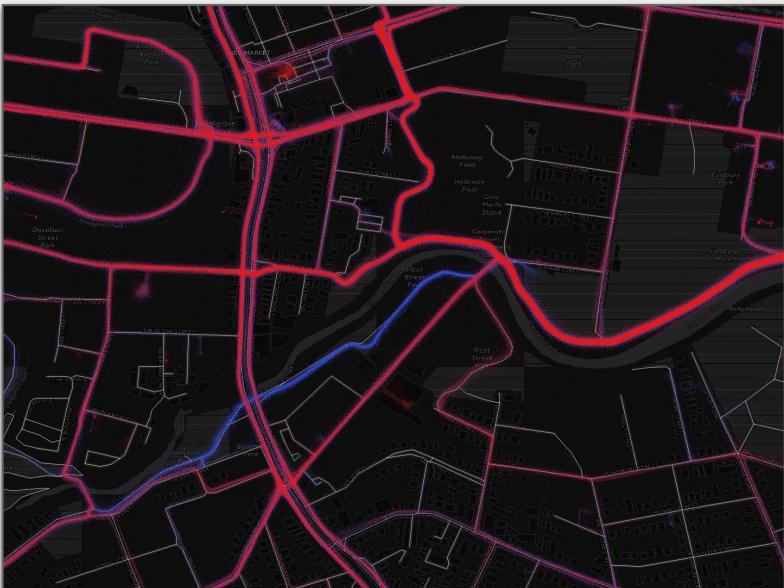
Symbolize by origin counts



Case Studies

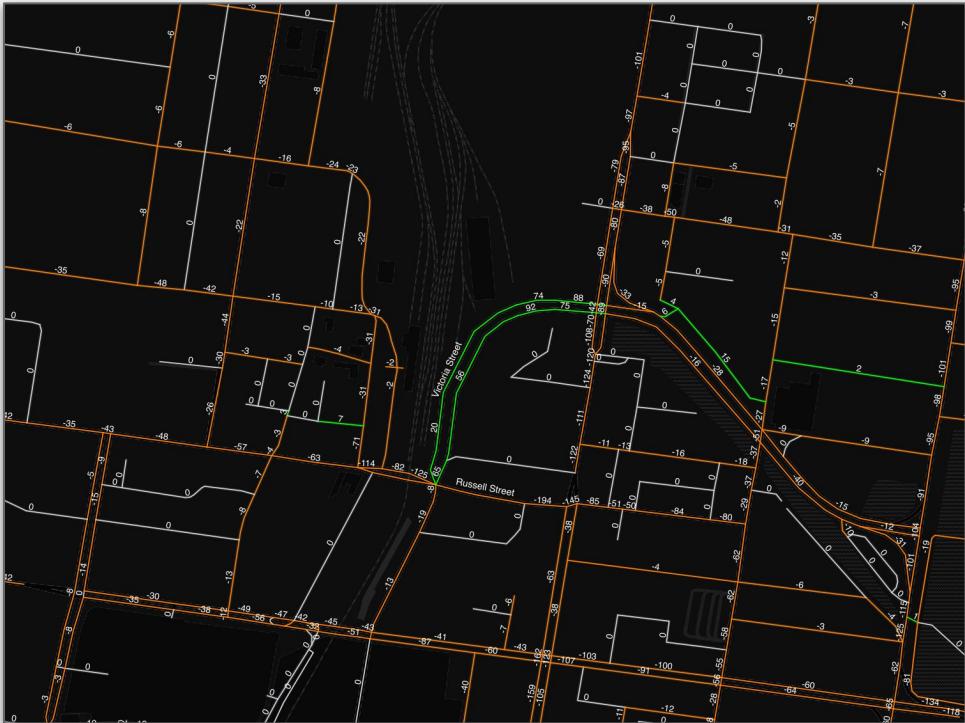
Delta Analysis

Queensland, Australia
Enoggera Creek Trail,
Kelvin Grove Road Underpass



Delta Analysis

Queensland, Australia
Victoria Street Extension



Bike Count Correlation

Seattle, Washington

- Strava Metro's impact is multiplied when used in conjunction with an established counting program
- Counting programs show saturation at a single point
- Strava Metro shows a sample of the whole network



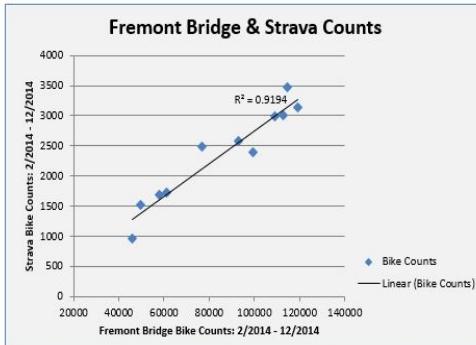
Bike Count Correlation

Seattle, Washington

Fremont Bridge Bike Counts



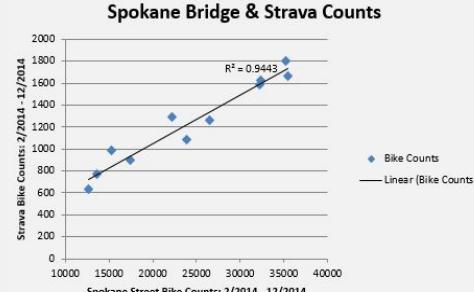
Strava: 25,980
Fremont Counter: 939,386
Percent of Strava to Population: 2.77%
R2: 0.9194



Spokane Bridge Bike Counts

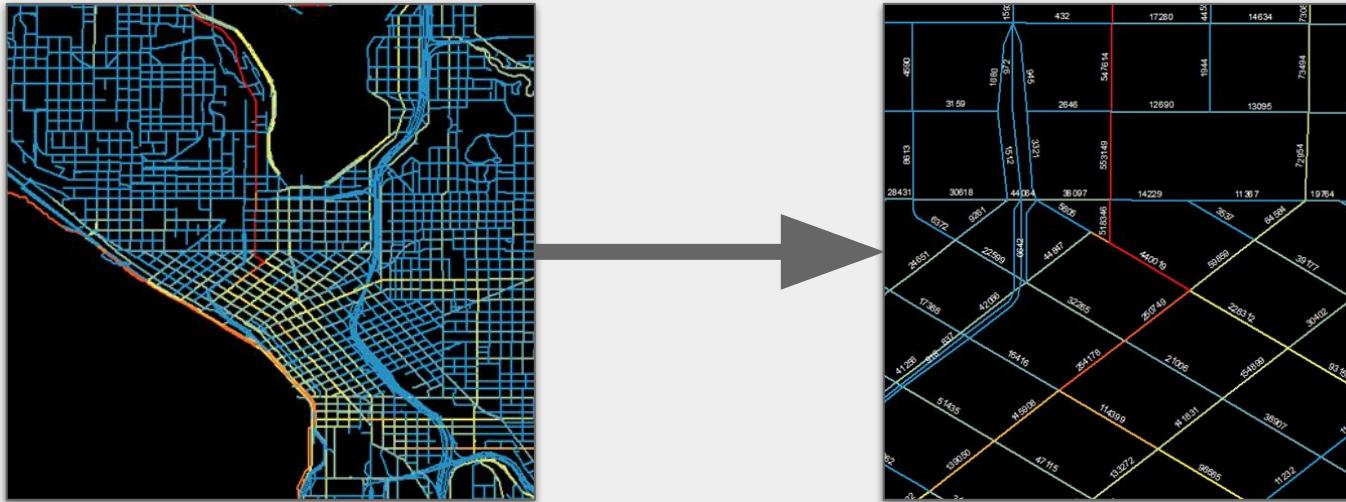


Strava: 13,602
Fremont Counter: 266,850
Percent of Strava to Population: 5.10%
R2: 0.9443



Bike Count Correlation

Seattle, Washington

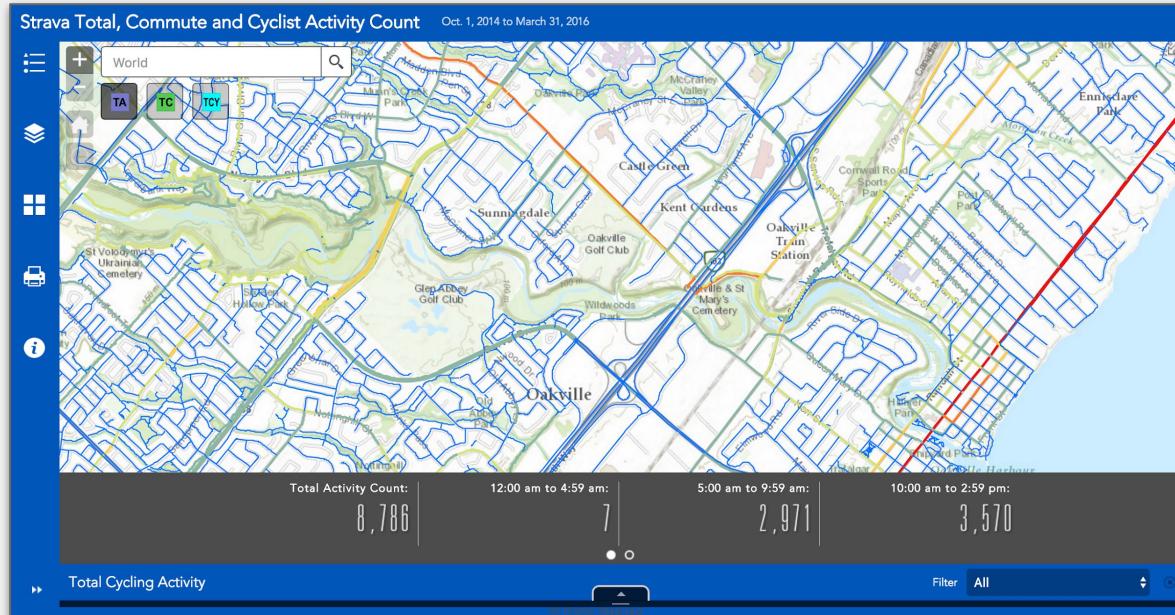


16,297 bike trips x 27 (multiplier) = 440,019 bike trips in 2014
63,253,198 bike miles traveled

Online Maps

Oakville, Ontario

- Display map for decision making
- Explain why new and improved infrastructure is justified
- Back up requests with data



Questions?



Thank you!