

Generate Freeway Origin-Destination Matrices Interactively

In DB4IoT with INRIX Trips
May 2019

There are three types of points in the INRIX Trips data; Origin points, Waypoints and Destination points. Trips start at an origin point, generate data at a number of waypoints and end at a destination point. In DB4IoT with INRIX Trips you can select all waypoints on a specific road and generate an Origin-Destination Matrix for all trips passing through that road. In addition, the platform provides routing information (via waypoints) that visualize the route that was used by a trip.

If you manage a freeway system you are interested in trip routing details, rather than simply the origins and destinations of the trips. For instance, you may want to know when and where vehicles entered your freeway system and when and where they exited the freeway. This data helps to better understand travel patterns on the freeway - where a significant weave may occur or where an auxiliary lane may provide benefit. Freeway operators and planners have a need to generate O/D matrices from on-ramp to off-ramp. We recently created this functionality in DB4IoT with INRIX Trips for a project in Clark County (WA) where DKS Associates, a traffic engineering firm from Portland, OR, is using DB4IoT with INRIX Trips.

For this project DKS identified all the on-ramps (entry points) and off-ramps (exit points) for Interstate 205 (I-205) in Clark County, WA. The entry point where I-205 crossed into Clark County was also marked as an entry point. Exit points where I-205 crossed out of Clark County were marked as off-ramps. Two columns were added to DB4IoT; a column for on-ramps and one for off-ramps. These columns are shown in the DB4IoT user interface and operate in the same way as any other filterable attributes. With a single mouse click you can choose to look only at trips that passed through a specific on-ramp or off-ramp. On-ramp and off-ramp filters can be combined with any other filters such as the Day of the Week, Time of Day, Vehicle Weight Class etc.

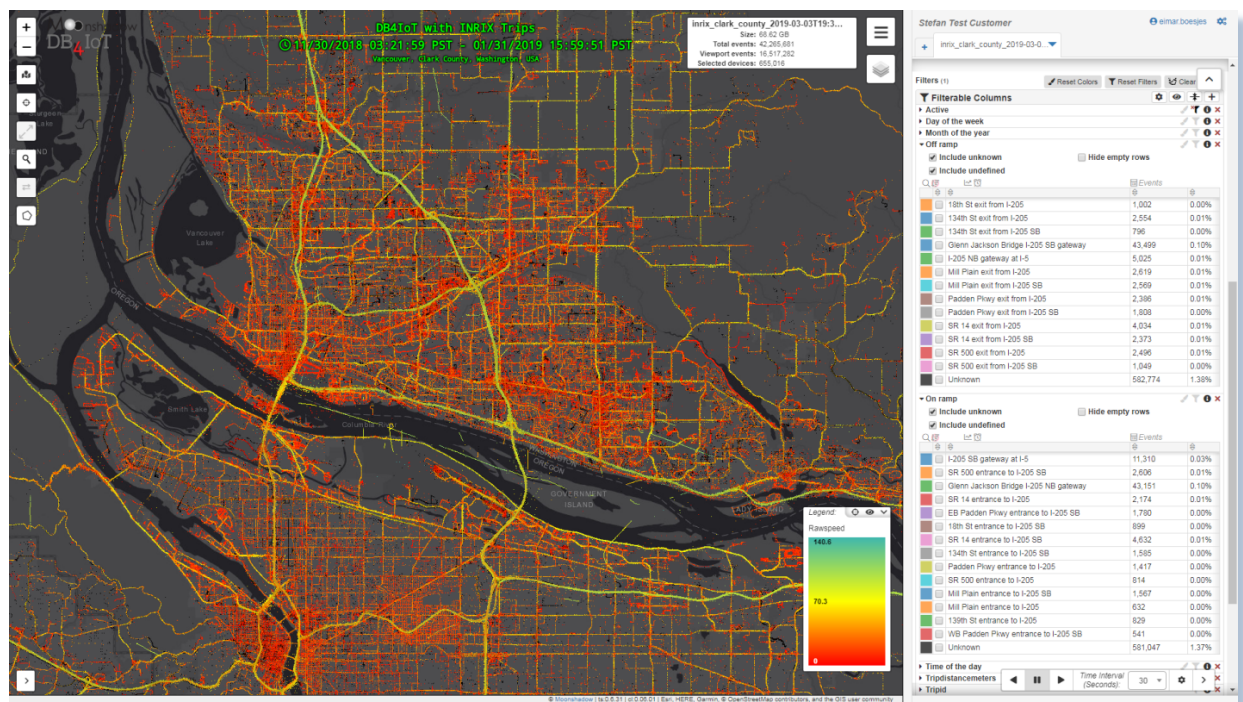


Figure 1. DB4IoT with INRIX Trips – I-205 On-ramps and Off-ramps are selectors in the side panel

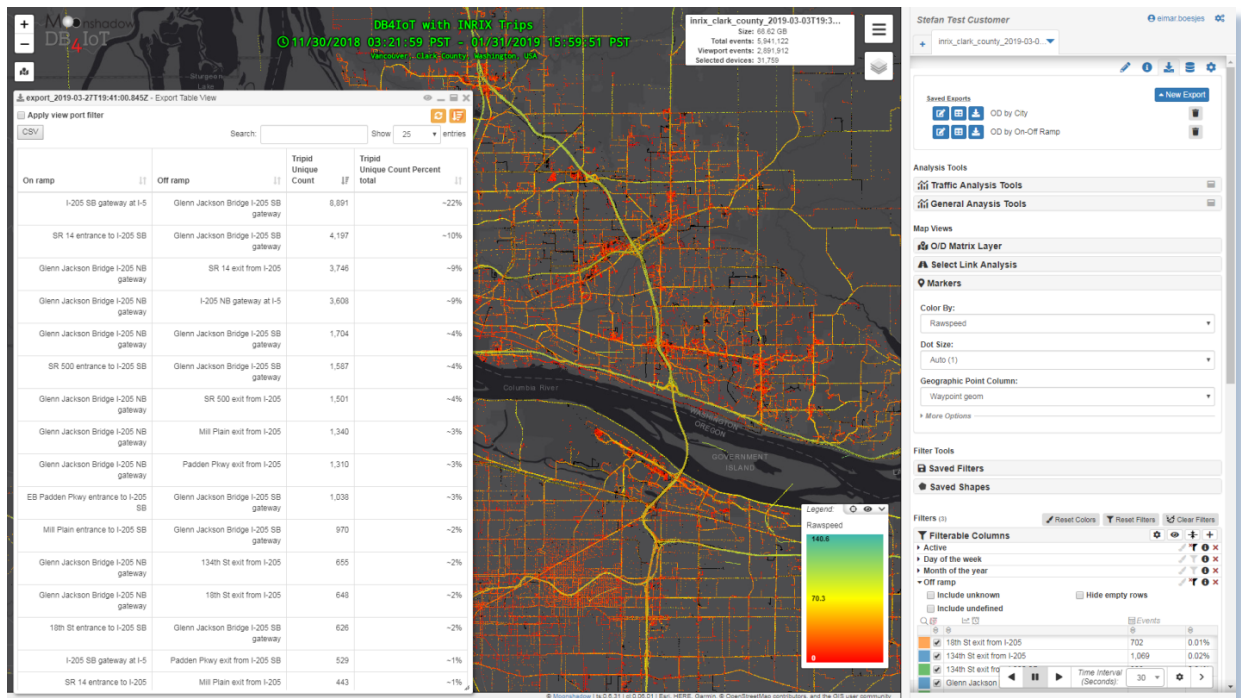


Figure 2. On-ramp to Off-ramp Origin-Destination Pairs
Data shown is for demonstration purposes only.

With a few clicks you can generate on-ramp to off-ramp Origin-Destination pairs as shown in Figure 2. Generation of these 'Freeway' O/D pairs usually takes just a few seconds. O/D pair data can be exported as a CSV for use in Excel. DB4IoT can also generate the 'Freeway O/D Matrix'.

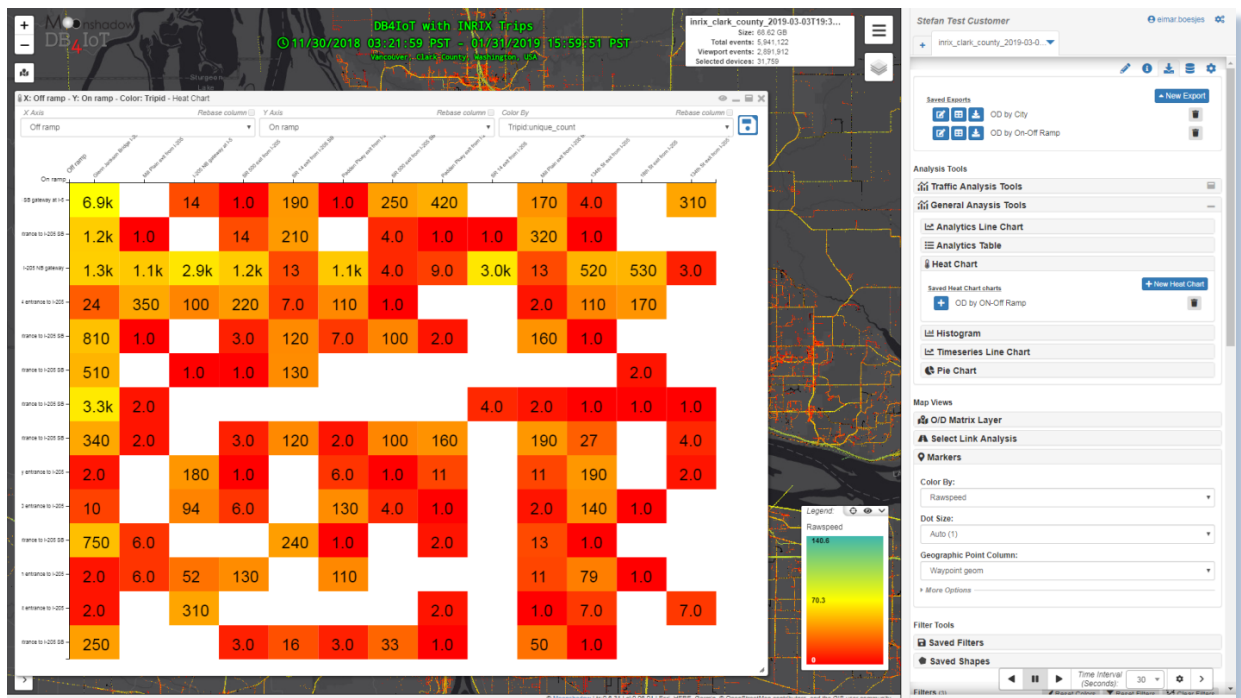


Figure 3. Freeway Origin-Destination Matrix from On-ramp to Off-ramp
Data shown is for demonstration purposes only.

Sum of Trips	Unique Count	Off ramp												
On ramp	134th St exit from I-205	134th St exit from I-205 SB	18th St exit from I-205	Glenn Jackson Bridge I-205 SB gateway	I-205 NB gateway at I-5	Mill Plain exit from I-205	Mill Plain exit from I-205 SB	Padden Pkwy exit from I-205	Padden Pkwy exit from I-205 SB	SR 14 exit from I-205	SR 14 exit from I-205 SB	SR 500 exit from I-205	SR 500 exit from I-205 SB	Grand Total
134th St entrance to I-205 SB	36	5		439	1	2	240	2	189		151	3	138	1206
139th St entrance to I-205	11	8		2	399		1		2					423
18th St entrance to I-205 SB			4	626	1						156	1		788
EB Padden Pkwy entrance to I-205 SB	1			1038		1	209	9	3		149	4	126	1540
Glenn Jackson Bridge I-205 NB gateway	655	3	648	1704	3608	1340	14	1310	12	3746	17	1501	4	14562
I-205 SB gateway at I-5	5	381		8891	19		221	2	529		262	2	290	10602
Mill Plain entrance to I-205	95		1	2	72	7	12	136				169	1	495
Mill Plain entrance to I-205 SB	1			970		8	19	1	2		311		1	1313
Padden Pkwy entrance to I-205	222	2		3	233	1	11	7	21			2	2	504
SR 14 entrance to I-205	141		208	33	127	443	2	137			11	272	1	1375
SR 14 entrance to I-205 SB	1	1	2	4197		2	2	1		7	2			4215
SR 500 entrance to I-205	174		1	13	121		2	151	1			6	4	473
SR 500 entrance to I-205 SB	1			1587		1	401		1	1	260	16	4	2272
WB Padden Pkwy entrance to I-205 SB	1			292			57	4	1		20	3	41	419
Grand Total	1344	400	864	19797	4581	1805	1191	1760	761	3754	1339	1979	612	40187

Figure 4. Freeway Origin-Destination Matrix from On-ramp to Off-ramp in Excel
Data shown is for demonstration purposes only.

We can refine the data and look at detailed traffic patterns. The example below shows all traffic that entered Clark County over the Glenn Jackson Bridge and exited on Mill Plains Blvd on Tuesday-Thursday.

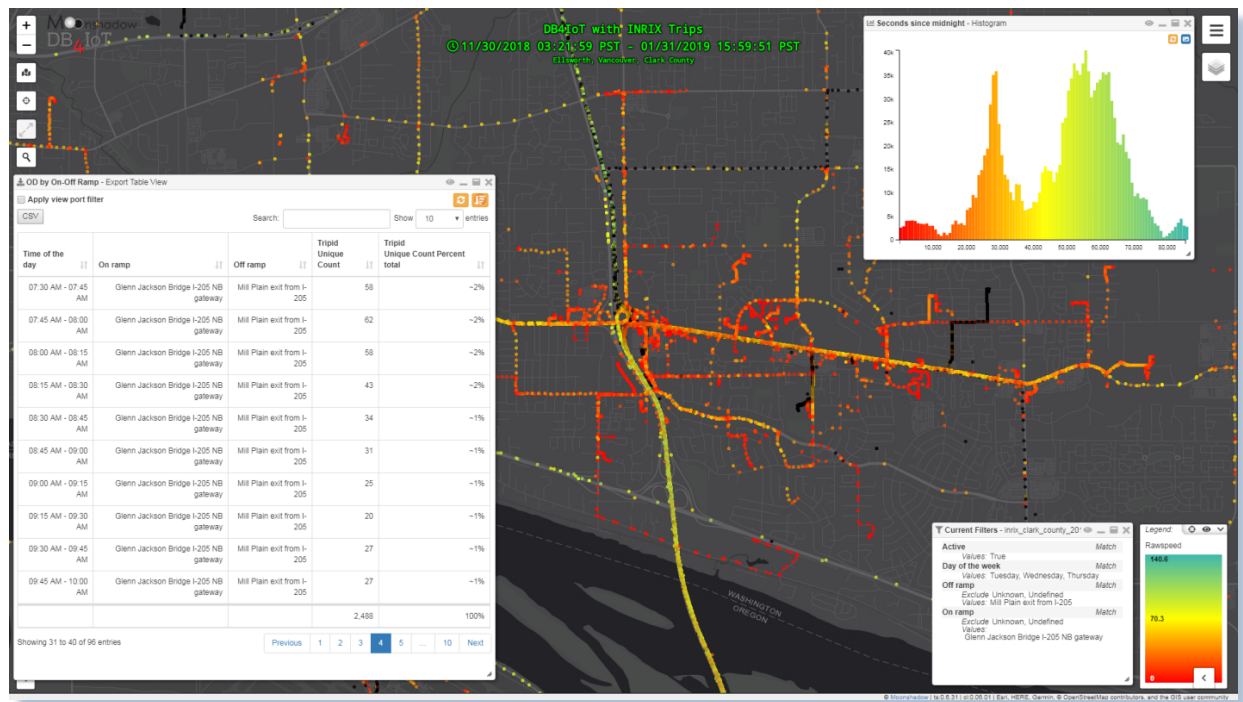


Figure 5. Glenn Jackson Bridge to Mill Plains Blvd Exit Traffic over the Time of Day
Data shown is for demonstration purposes only.

The histogram in the top right corner shows the distribution of the traffic over the day. The morning peak, shown in orange, is brief, while the evening peak, shown in light green, has a longer duration. The Mills Plain exit gives access to a residential area and many residents work south of the river and commute back in the evening. The table shows the counts (samples) per 15 minute increments. This data can be exported to a spreadsheet for further analysis with a few more clicks.

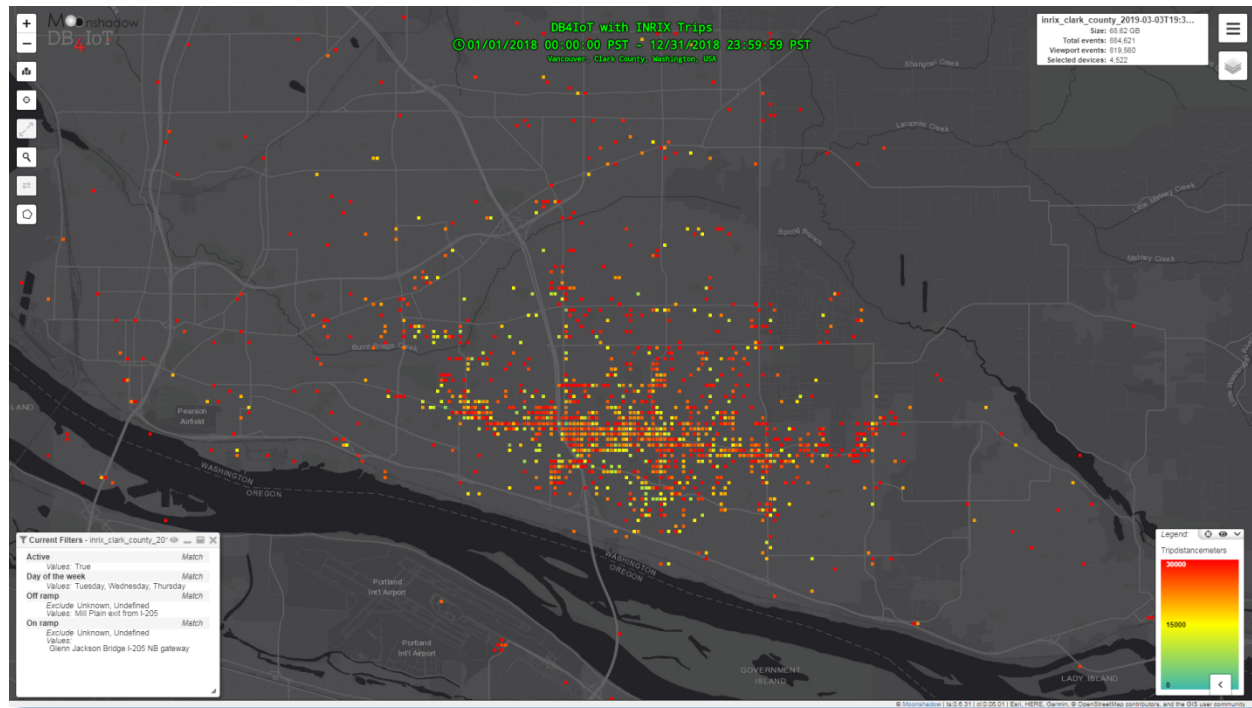


Figure 6. Weekday Destinations for Glenn Jackson Bridge to Mill Plains Blvd Exit Traffic

The above image shows the destinations of trips that entered Clark County on I-205 on the Glenn Jackson Bridge and exited on Mills Plains Blvd Tuesdays through Thursdays in 2018. The destinations are colored by the length of the trip.

This use case shows that DB4IoT with INRIX Trips can now be used to generate Freeway O/D matrices interactively.

Contact Information:

Moonshadow Mobile, Inc.

859 Willamette

Suite 410

Eugene, OR 97401

541.343.4281

info@moonshadowmobile.com

moonshadowmobile.com

www.db4iot.com

NOTE: All data shown is based on raw sample data and is included for demonstration purposes only.