Internship Project- Rack to retail spread

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Content

Outline of Dashboard Goal for Project 1

Project 1:
 - **Topic:** To build a rack-to-retail spread tool
   - **Terminology**:
     Rack-to-retail spread is the differences between rack average and retail prices, i.e., retail-rack average

 - **Goal:** To use data from GasBuddy and DTN/OPIS to help the sales team obtain insights into the rack-to-retail
       spreads in all U.S. markets

 - **Method:** I used SQL and Alteryx to build the source data in Snowflake. I subsequently used the data source in a
       Tableau tool for the sales team

 - **Dashboard links:**
https://public.tableau.com/app/profile/kai.wen.lee5873/viz/Racktoretailspreadmap/RacktoRetailSpreadMaps
https://public.tableau.com/app/profile/kai.wen.lee5873/viz/Thepricetrendofracktoretailspread/ThePriceTrendofRacktoRetailSpread

Project Details: Rack-to-Retail Spreads

Purpose: This project aims to establish a rack-to-retail spread tool to decide which markets would be profitable for selling the Commercial Fueling Network (CFN) cards. It will serve as an important indicator for conventional sales and provide insights needed to decide prices for all markets

Data Source:
- DTN_price_public_MV
- Retail_public_US
- Mapping table

Create a mapping table:
- Processed data by creating matches between cities and DTN markets
- Used mapping table to discover relationships between retail and DTN markets
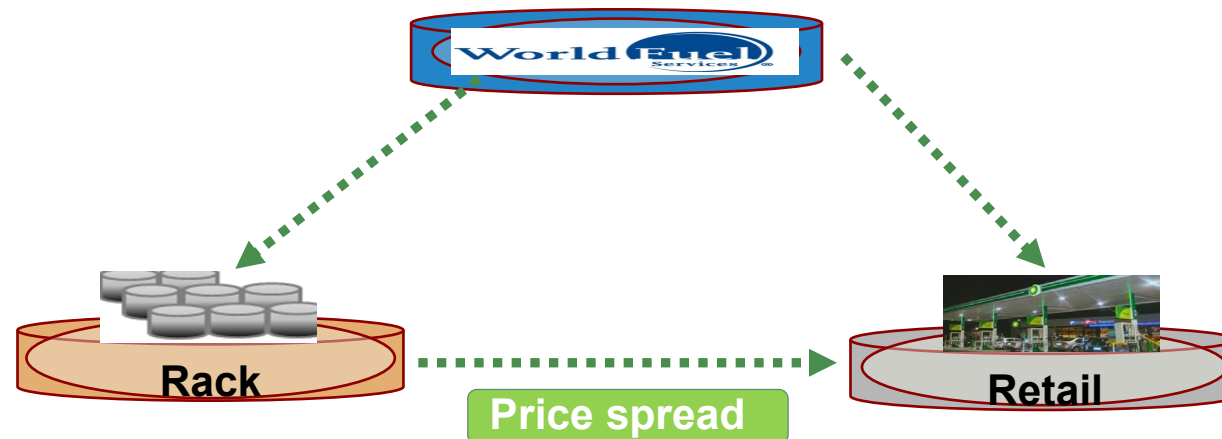
City (Retail)	TERMINAL_CITY_NAME (DTN)	MARKET (DTN)
Abilene	Abilene	Abilene, TX
Akron	Akron	Canton/Akron, OH
Albany	Albany	Albany, NY
Albuquerque	Albuquerque	Albuquerque, NM
Alexandria	Alexandria	Fairfax, VA
Altoona	Altoona	Altoona, PA
Amarillo	Amarillo	Amarillo, TX
Asheville	Asheville	Spartanburg, SC
Athens	Athens	Athens, GA
Atlanta	Atlanta	Atlanta, GA

What is a mapping table:

o Also called lookup table. It is created to map two column values between two tables

o I used the **terminal city** as the key to connect city in retail table and market on DTN market table. For the remaining unmapped market, I used Tableau and Google Map to manually assign a market to the unmapped city name

Retail table

State	StateCode	City	Regular	Mid Grade	Premium	Diesel	Scrape Date
Idaho	ID	State Average	$4.419	$4.612	$4.822	$5.143	2022-04-04 14:19:48.000
Idaho	ID	Boise City	$4.541	$4.700	$4.902	$5.184	2022-04-04 14:19:49.000
Idaho	ID	Coeur D'Alene	$4.074	$4.284	$4.544	$5.066	2022-04-04 14:19:49.000
Idaho	ID	Franklin	$4.376	$4.661	$4.781	$5.093	2022-04-04 14:19:49.000
Idaho	ID	Idaho Falls	$4.354	$4.522	$4.754	$5.066	2022-04-04 14:19:49.000
Idaho	ID	Lewiston	$4.123	$4.318	$4.507	$5.173	2022-04-04 14:19:49.000
Idaho	ID	Pocatello	$4.424	$4.614	$4.777	$5.012	2022-04-04 14:19:49.000
Idaho	ID	Twin Falls	$4.510	$4.669	$4.877	$5.125	2022-04-04 14:19:49.000
Maryland	MD	State Average	$3.794	$4.271	$4.536	$4.687	2022-04-04 14:19:49.000
Maryland	MD	Annapolis	$3.777	$4.299	$4.532	$4.672	2022-04-04 14:19:49.000
Maryland	MD	Baltimore	$3.770	$4.227	$4.484	$4.625	2022-04-04 14:19:49.000

DTN market table

	ETL_LOAD_DATE	PRICE_DATE	MARKET	SUPPLIER	TERMINAL	TCN
1	2022-08-02 08:09:31.168	2013-09-19	Sacramento, CA	Texaco	Chevron	T-68-CA-4621
2	2022-08-02 08:09:31.168	2014-09-26	Spartanburg, SC	Marathon	MagellanN	T-57-SC-2076
3	2022-08-02 08:09:31.168	2021-10-21	Pittsburgh, PA	Husky	Buckeye E	T-25-PA-1792
4	2022-08-02 08:09:31.168	2018-04-19	Scranton, PA	Buckeye	Lucknow	T-23-PA-1707
5	2022-08-02 08:09:31.168	2021-07-09	Selma, NC	Valero	KMEP S	T-56-NC-2033
6	2022-08-02 08:09:31.168	2015-04-24	Flint/Owosso, MI	Shell	Sunoco	T-38-MI-3029
7	2022-08-02 08:09:31.168	2018-06-30	Bangor, ME	Valero	Buckeye	T-01-ME-1000
8	2022-08-02 08:09:31.168	2017-08-15	Bettendorf, IA	Cenex	Magellan	T-42-IA-3471
9	2022-08-02 08:09:31.168	2013-05-15	Minneapolis/Saint Paul, MN	Cenex	FlintHills	T-41-MN-3407
10	2022-08-02 08:09:31.168	2016-06-10	Springfield, MO	PSX	Magellan	T-43-MO-3718

Project Process
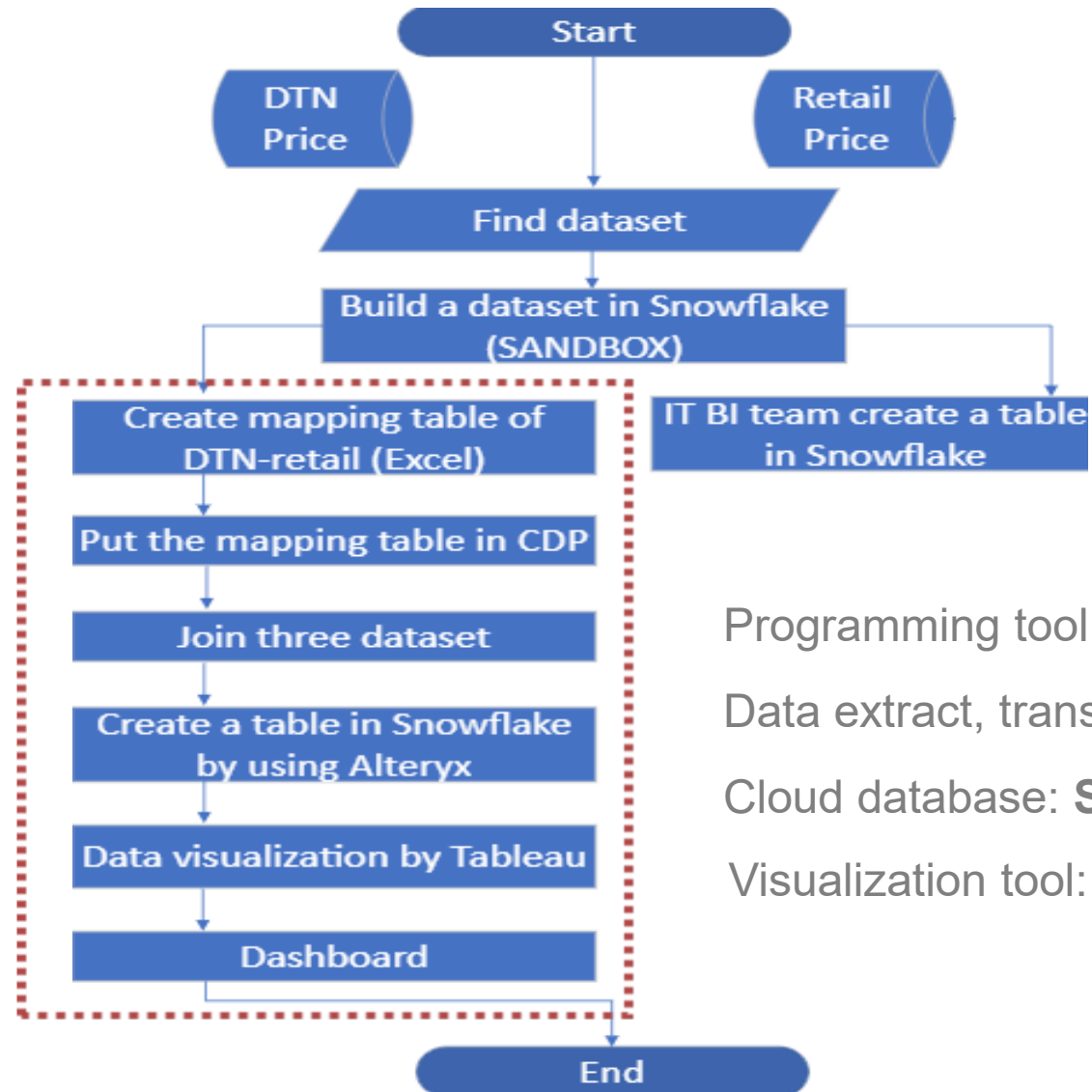
Programming tool: **SQL**

Data extract, transform and load: **Alteryx**

Cloud database: **Snowflake**

Visualization tool: **Tableau**

Data Building

Three methods to build data in Tableau:

a.

Snowflake → **Import data** / **Create a table** → Tableau Desktop → Tableau Server

b.

Snowflake → **Connect data** / **Custom query** → Tableau Desktop → Tableau Server

c.

Tableau Desktop → **Download and combine Excel** → Excel → **Upload to Tableau** → Tableau Desktop
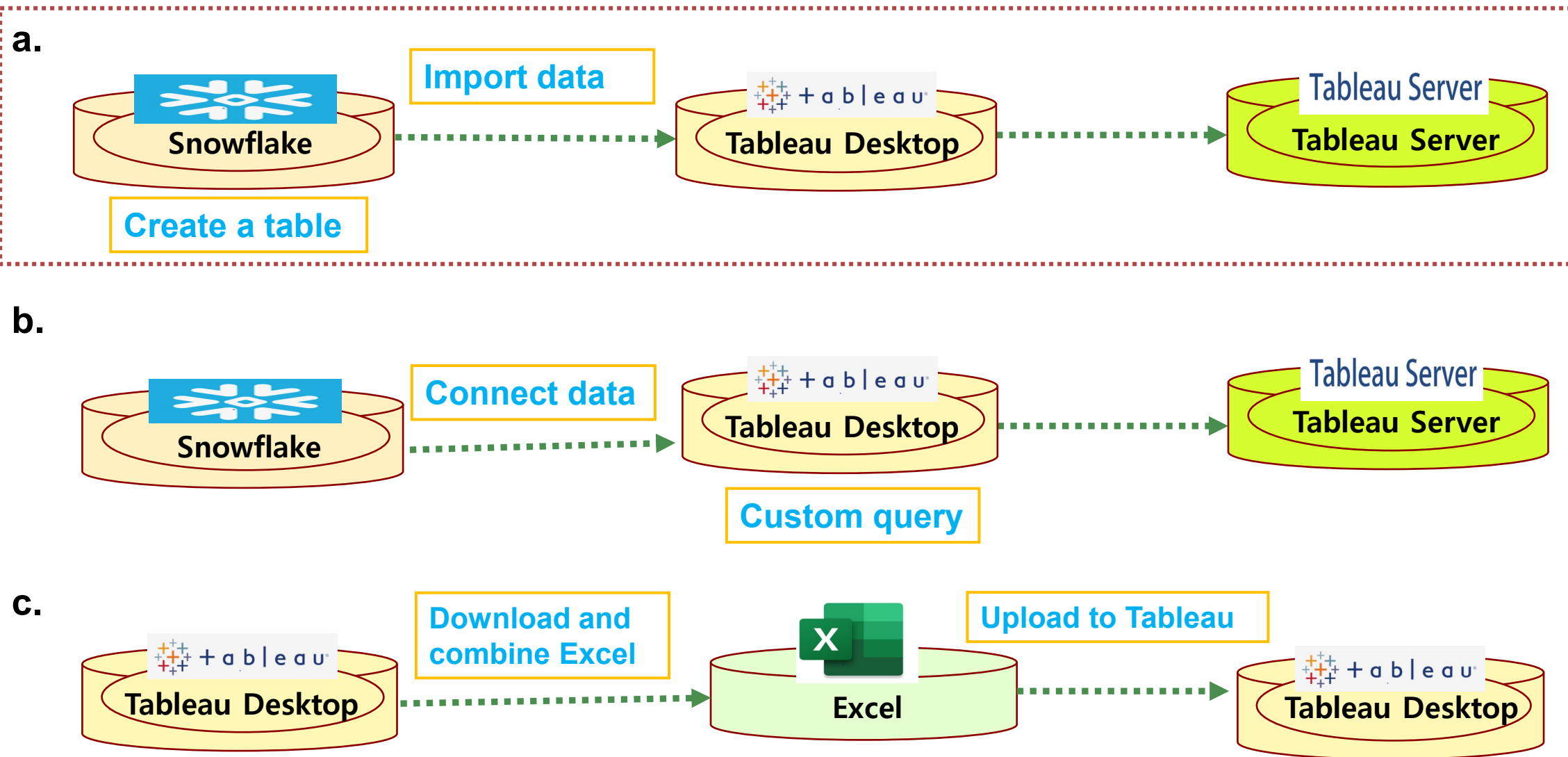
Data Building

Why choose the first method:

a.

Snowflake → **Import data** → Tableau Desktop → Tableau Server

Create a table

Reasons

- **Dealing with large data:** Using the mapping table is the best way to deal with large data, therefore reduce redundant data and effectively clean and integrate large data

- **Permanently save data and easily access:** Saving data to Snowflake can avoid losing data and allow other colleagues to access the dataset from the Data Cloud
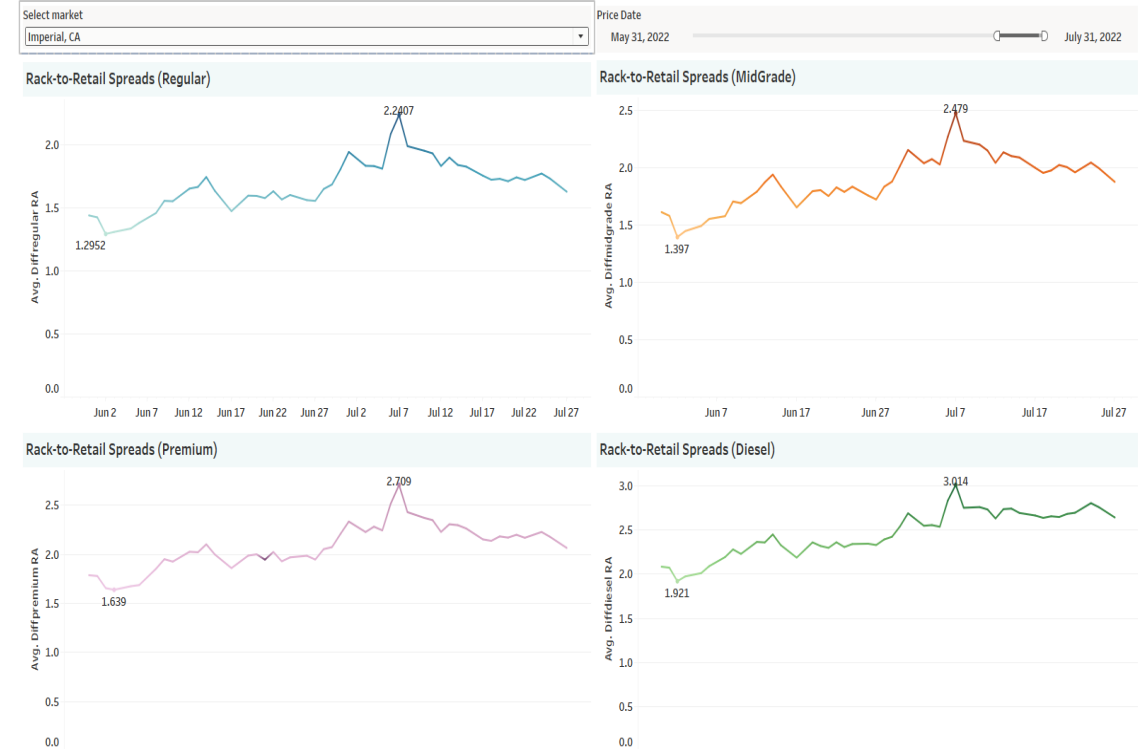
Data Analysis and Data Visualization

- **Dashboards:** Rack-to-retail spread maps; an illustration of the price trend of rack-to-retail spreads
- **Period of time:** Two months (May to July in 2022)
- **Functions:** Set up parameters and create calculated fields to appraise the rack-to-retail spread (**retail - rack average**)
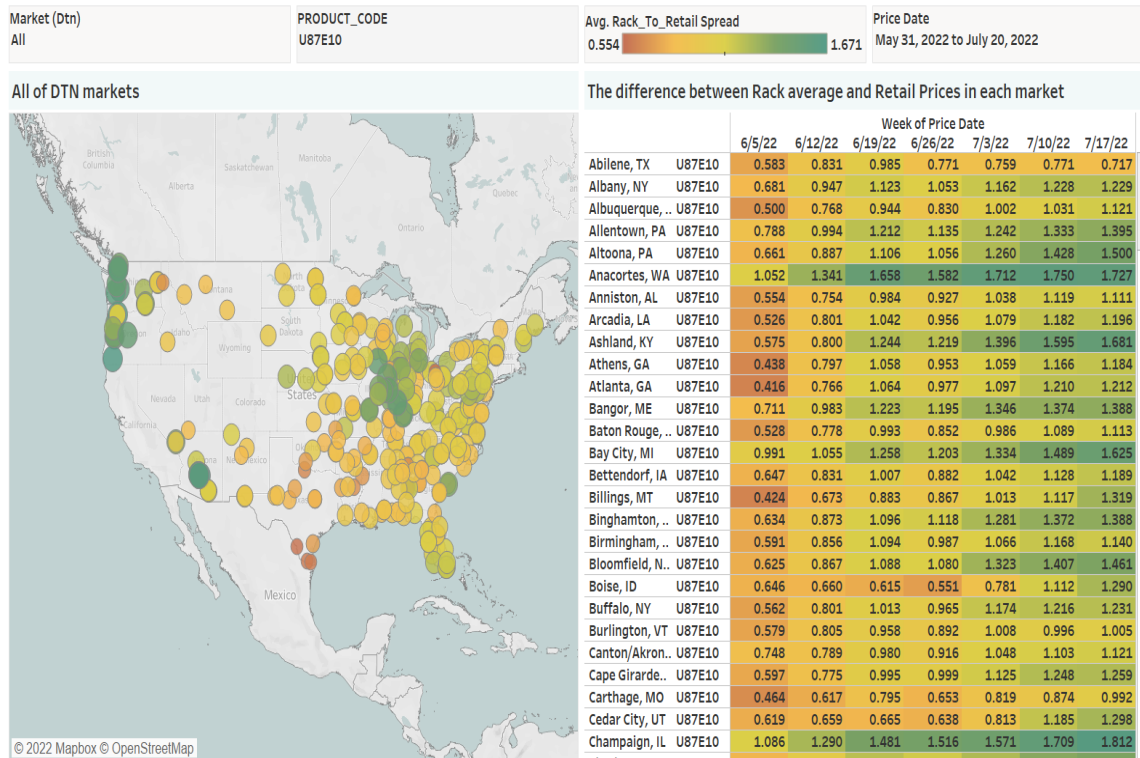
Data Analysis and Data Visualization
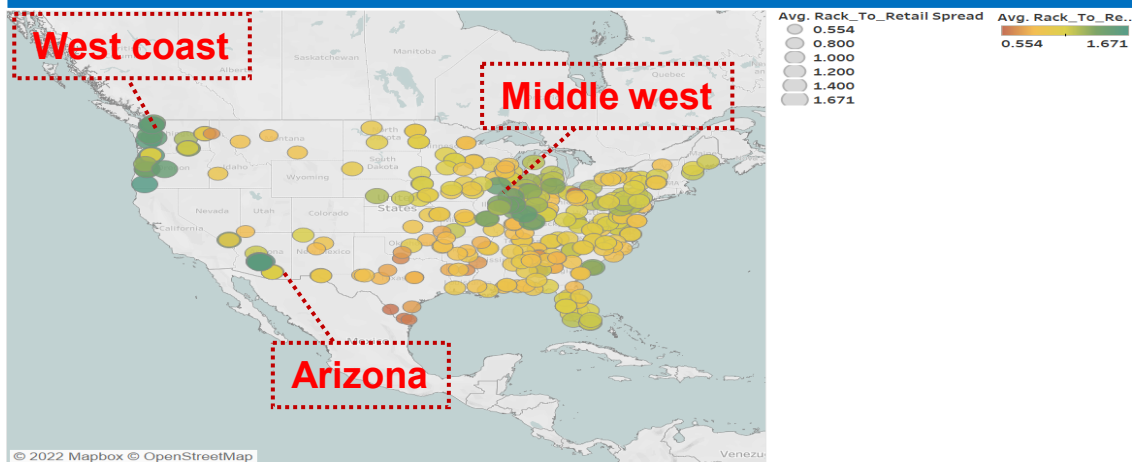
- Based on the map and the heat map, we can identify the rack-to-retail spread by the products at DTN markets across the country
- The rack-to-retail spread gives us the margin we have in order to work with a particular area in terms of selling CFN cards. A larger price difference implicates a greater potential to increase sales of CFN cards in a particular market
- Size of the dots in the map: Big size of dots have larger price differences; small size of dots have smaller price differences
- The color of the dots in the map: Green color means larger price differences; red color means smaller price differences
- As the following visuals, I identified potentially profitable areas for selling CFN cards in the highlighted areas in the map (Middle west and Arizona)
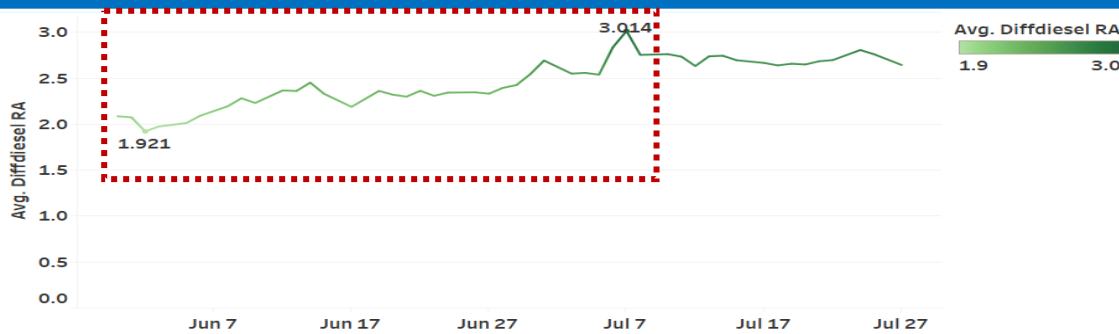
All of DTN markets

Avg. Rack_To_Retail Spread
- 0.554
- 0.800
- 1.000
- 1.200
- 1.400
- 1.671

Avg. Rack_To_Re..
0.554 — 1.671

Map based on Longitude (generated) and Latitude (generated). Color shows average of Rack_To_Retail Spread. Size shows average of Rack_To_Retail Spread. Details are shown for Country, State and Retail Site City. The data is filtered on PRODUCT_CODE, Market (Dtn) and Price Date Day. The PRODUCT_CODE filter keeps U87E10. The Market (Dtn) filter keeps 211 of 211 members. The Price Date Day filter ranges from May 31, 2022 to July 31, 2022. The view is filtered on Latitude (generated) and Longitude (generated). The Latitude (generated) filter keeps non-Null values only. The Longitude (generated) filter keeps non-Null values only.

Rack to Retail by markets

The difference between Rack average and Retail Prices in each market

		6/5/22	6/12/22	6/19/22	6/26/22	7/3/22	7/10/22	7/17/22
Abilene, TX	U87E10	0.583	0.831	0.985	0.771	0.759	0.771	0.717
Albany, NY	U87E10	0.681	0.947	1.123	1.053	1.162	1.228	1.229
Albuquerque, ..	U87E10	0.500	0.768	0.944	0.830	1.002	1.031	1.121
Allentown, PA	U87E10	0.788	0.994	1.212	1.135	1.242	1.333	1.395
Altoona, PA	U87E10	0.661	0.887	1.106	1.056	1.260	1.428	1.500
Anacortes, WA	U87E10	1.052	1.341	1.658	1.582	1.712	1.750	1.727
Anniston, AL	U87E10	0.554	0.754	0.984	0.927	1.038	1.119	1.111
Arcadia, LA	U87E10	0.526	0.801	1.042	0.956	1.079	1.182	1.196
Ashland, KY	U87E10	0.575	0.800	1.244	1.219	1.396	1.595	1.681
Athens, GA	U87E10	0.438	0.797	1.058	0.953	1.059	1.166	1.184
Atlanta, GA	U87E10	0.416	0.766	1.064	0.977	1.097	1.210	1.212
Bangor, ME	U87E10	0.711	0.983	1.223	1.195	1.346	1.374	1.388
Baton Rouge, ..	U87E10	0.528	0.778	0.993	0.852	0.986	1.089	1.113
Bay City, MI	U87E10	0.991	1.055	1.258	1.203	1.334	1.489	1.625
Bettendorf, IA	U87E10	0.647	0.831	1.007	0.882	1.042	1.128	1.189
Billings, MT	U87E10	0.424	0.673	0.883	0.867	1.013	1.117	1.319
Binghamton, ..	U87E10	0.634	0.873	1.096	1.118	1.281	1.372	1.388
Birmingham, ..	U87E10	0.591	0.856	1.094	0.987	1.066	1.168	1.140
Bloomfield, N..	U87E10	0.625	0.867	1.088	1.080	1.323	1.407	1.461
Boise, ID	U87E10	0.646	0.660	0.615	0.551	0.781	1.112	1.290
Buffalo, NY	U87E10	0.562	0.801	1.013	0.965	1.174	1.216	1.231
Burlington, VT	U87E10	0.579	0.805	0.958	0.892	1.008	0.996	1.005

West coast

Middle west

Arizona

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Data Analysis and Data Visualization

- The line charts exhibited the trend of change in rack-to-retail spreads by the products from May to July in 2022
- The goal is to obtain a better understanding of adjustment strategies for the retail price by following up on the trend of change
- Why the ups and drops?
  - Economical and political reasons, e.g., the price of oil was affected by economical sanctions against Russia, which affects the rack price, then the outside supply and demand. All would eventually affect retail prices
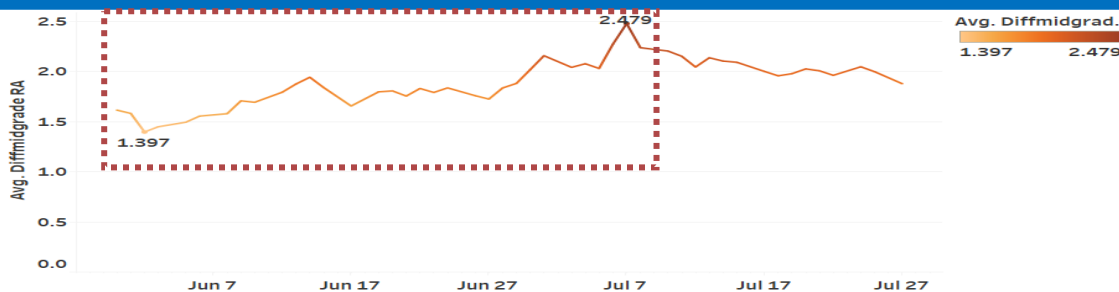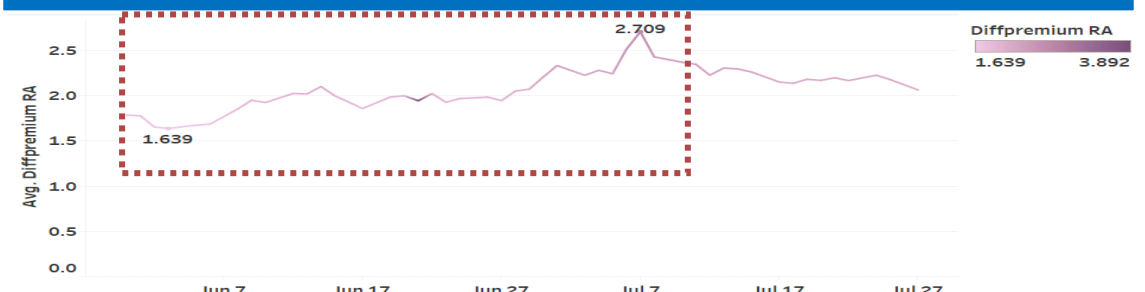
Rack-to-Retail Spreads (Diesel)

The trend of average of Diffdiesel RA for Price Date Day. Color shows average of Diffdiesel RA. The data is filtered on Market DTN filiter, which excludes Null. The view is filtered on Price Date Day, which ranges from May 31, 2022 to July 31, 2022.

Rack-to-Retail Spreads (Regular)

The trend of average of Diffregular RA for Price Date Day. Color shows average of Diffregular RA. The data is filtered on Market DTN filiter, which excludes Null. The view is filtered on Price Date Day, which ranges from May 31, 2022 to July 31, 2022.

Rack-to-Retail Spreads (Midgrade)

The trend of average of Diffmidgrade RA for Price Date Day. Color shows average of Diffmidgrade RA. The data is filtered on Market DTN filiter, which excludes Null. The view is filtered on Price Date Day, which ranges from May 31, 2022 to July 31, 2022.

Rack-to-Retail Spreads (Premium)

The trend of average of Diffpremium RA for Price Date Day. Color shows sum of Diffpremium RA. The data is filtered on Market DTN filiter, which excludes Null. The view is filtered on Price Date Day, which ranges from May 31, 2022 to July 31, 2022.

Conclusions and Recommendations

Conclusions

- The rack-to-retail spread tool is a great indicator for selling CFN cards. It helps the sales team understand the price trend on the market, adjust prices and other strategies based on the most updated data, and develop potential markets

Recommendations

- Data building tools, such as using the custom query function in Tableau, can be beneficial in building data sets for relevant personnel to boost future sales

- A future goal could be to use Machine learning model (e.g., Random forest) or statistical models (e.g., ARIMA) to predict future prices and adjust retails prices in advance