

FREIGHT ANALYSIS FRAMEWORK VERSION 5

Getting Started Guide for the Data Tabulation Tool (DTT)

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1 Introduction to Data Tabulation Tool (DTT)

The Data Tabulation Tool (DTT) is a web-based interface that allows FAF users to create customized subsets of FAF5 data through easy-to-use pull-down menus. Users can choose one of the three types of FAF5 data: Total Flows, Domestic Flows, and Foreign Trade Flows (Flows of Imports and Exports). See Appendix A for further definitions of these flows. In addition to data extraction via DTT, an enhancement was made to the FAF5 webtool that allows users to visualize their extracted data.

2 Data Tabulation

2.1 Tabulation of Total Flows

By default, the DTT provides a selection for Total Flows. The following additional data selection categories are available in the DTT. A short description of a menu is displayed when users hover mouse pointer over it. To make multiple selections from a menu, hold the control key while making a selection (by clicking on the menu item).

- **Year:** The FAF5 synchronized historical base years (1997-2012) are available only when users select the data at state level. As future FAF5 products (annual and forecast) are developed and become available, selection of other years will be activated, and results will be provided for each year selected.
- **Measure:** The options are “tons”, “value”, “tmiles”, and “current_value.” The “tmiles” represents ton-miles and “current_value” represents value in current US dollar. Note that the estimate for “tmiles” is not yet available; thus, this option is inactive at the current time.
- **Origin-Destination Geography:**
 - **Domestic Origin:** Hover your mouse pointer over “Domestic Origin” button and select from options “All Domestic Origins Combined” or “Select All/Specific Domestic Origins” to obtain data on associated shipments at the desired domestic-origin geography.
 - *All Domestic Origins Combined* is not origin specific; it provides the total of freight movements originated within the United States, including both domestic shipments and domestic legs of foreign trade shipments.
 - *Select All/Specific Domestic Origins* allows selection from options “FAF zone (sort by state)”, “FAF zone (alphabetical order)”, or “State.” FAF zone selections provide a pull-down menu for the 132 FAF regions. By default, all regions are selected; you can select one or multiple regions if needed. For ease of use, two options are provided for the listing of FAF regions (one by state name and another by alphabetical order of the FAF zone name). State selection provides a pull-down menu for the 50 States and Washington, D.C. By default, all states are selected; you can select one or multiple states if needed. Both FAF regions and states can also be selected from a map. To do this, first you need to click on the US map icon and then click on the desired zone or state. Figure 1 shows cases

where (a) FAF zones “061 – Los Angeles CA” and “062 – Sacramento CA” are selected as Domestic Origin from the pull-down menu, (b) these two FAF regions are selected using the map; (c) Arkansas and Connecticut are selected as Domestic Origin from the pull-down menu, (d) these two states are selected using the map.



Fig. 1. Selection of Domestic Origin

- **Domestic Destination:** Hover your mouse pointer over “Domestic Destination” button and select from options “All Domestic Destinations Combined” or “Select All/Specific Domestic Destinations” to obtain data on associated shipments at the desired domestic-destination geography.
 - *All Domestic Destinations Combined* is not destination specific; it provides the total freight movements terminated within the United States, including domestic shipments and domestic legs of foreign trade shipments.
 - *Select All/Specific Domestic Destinations* allows selection from options “FAF zone (sort by state)”, “FAF zone (alphabetical order)”, or “State.” FAF zone selections provide a pull-down menu for the 132 FAF regions. By default, all regions are selected; you can select one or multiple regions if needed. As with the domestic origin selection, two options are provided for the listing of FAF regions (one by state name and another by alphabetical order of the FAF zone name). State selection provides a pull-down menu for the 50 States and Washington, D.C. By default, all states are selected; you can select one or multiple states if needed. Both FAF regions and states can also be selected from a map. To do this, first you need to click on the US map icon and then click on the desired zone or State.

- **Commodity:** Hover your mouse pointer over “Commodity” button and select from options “All Commodities Combined” or “Select All/Specific Commodities.”
 - *All Commodities Combined* is not commodity specific and provides total freight moved of all commodities as a whole.
 - *Select All/Specific Commodities* provides a pull-down menu for commodity types. By default, all commodities are selected; you can select one or multiple commodities if needed. Figure 2 shows a case where “05 – Meat/seafood” and “08 – Alcoholic beverages” are selected as the commodity.



Fig. 2. Selection of Commodity

- **Mode & Distance:**
 - **Domestic Mode:** Hover your mouse pointer over “Domestic Mode” button and select from options “All Domestic Modes Combined” or “Select All/Specific Domestic Modes.”
 - *All Domestic Modes Combined* is not mode specific and provides total freight moved by all modes as a whole.
 - *Select All/Specific Domestic Modes* provides a menu for domestic modes. By default, all modes are selected; you can select one or multiple modes if needed. Figure 3 shows a case where “1 – Truck” and “3 – Water” are selected as the domestic mode.



Fig. 3. Selection of Domestic Mode

- **Distance Band:** Hover your mouse pointer over “Distance Band” button and click to activate the option to select the range of estimated routed distance for the domestic portion of shipment. The estimates for distance ranges are not yet available; thus, these options are inactive at the current time.
- **Display Output Labels as Descriptive:** This button provides the option to select how the output labels will be displayed. The options for labels are either descriptive (e.g., “truck” for mode) or numeric (e.g., “1” for mode). By default, descriptive labels are selected. You can slide the button to the left should you need the output labels as numeric.

Once all desired selections are made, click the **Run** button and the results will be shown on the screen under “Extracted Data” tab with an option to download a CSV file. Note that, you can click on a column heading of the resulting table shown on the screen to reorder the displayed

values by that selected variable (column). A second click on the same variable heading will reverse the ranking order.

2.2 Tabulation of Domestic Flows

To obtain Domestic Flows, select “Domestic Flows” from the “Flow Type” pull-down menu. The procedure for tabulation is similar to that of Total Flows. Please refer to Section 2.1 for details.

2.3 Tabulation of Foreign Trade Flows

The DTT can also be used to obtain specific flows of foreign trade (Imports and Exports). To activate the options for Import Flows in the DTT, users need to select “Import Flows” from “Flow Type” pull-down menu. The following additional data selection categories are available for Import Flows.

- **Year:** The FAF5 synchronized historical base years (1997-2012) are available only when users select the data at state level. As future FAF5 products (annual and forecast) are developed and become available, selection of other years will be activated, and results will be provided for each year selected.
- **Measure:** The options are “tons”, “value”, “tmiles”, and “current_value.” Note that the estimate for “tmiles” is not yet available; thus, this option is inactive at the current time.
- **Origin-Destination Geography:**
 - **Foreign Origin:** Hover your mouse pointer over “Foreign Origin” button and select from options “All Foreign Origins Combined” or “Select All/Specific Foreign Origins.”
 - *All Foreign Origins Combined* is not origin specific; the option presents the total volume of freight entering the United States from all foreign countries as a whole.
 - *Select All/Specific Foreign Origins* provides a menu for foreign origins. By default, all foreign origins are selected; you can select one or multiple foreign origins if needed.
 - **US Entry Region:** Hover your mouse pointer over “US Entry Region (Domestic Origin)” button and select from options “All US Entry Regions Combined” or “Select All/Specific US Entry Regions.” Please refer to Section 2.1 for more details related to these options.
 - **Domestic Destination:** Hover your mouse pointer over “Domestic Destination” button and select from options “All Domestic Destinations Combined” or “Select All/Specific Domestic Destinations.” Please refer to Section 2.1 for more details related to these options.
- **Commodity:** Hover your mouse pointer over “Commodity” button and select from options “All Commodities Combined” or “Select All/Specific Commodities.” Please refer to Section 2.1 for more details related to these options.
- **Mode & Distance:**

- **Foreign In-Mode:** Hover your mouse pointer over “Foreign In-Mode” button and select from options “All Foreign In-Modes Combined” or “Select All/Specific Foreign In-Modes.”
 - *All Foreign In-Modes Combined* is not mode specific; it provides data for total freight volume moved from the selected Foreign Origin to the selected zone of entry (i.e., US Entry Region).
 - *Select All/Specific Foreign In-Modes* provides a menu for foreign in-modes. By default, all modes are selected; you can select one or multiple modes if needed.
- **Domestic Mode:** Hover your mouse pointer over “Domestic Mode” button and select from options “All Domestic Modes Combined” or “Select All/Specific Domestic Modes.” Please refer to Section 2.1 for more details related to these options.
- **Distance Band:** Please refer to Section 2.1 for details related to this option.
- **Display Output Labels as Descriptive:** Please refer to Section 2.1 for details related to this option.

Once all desired selections are completed, click the **Run** button and the results will be shown on the screen under “Extracted Data” tab with an option to download a CSV file.

To activate the options for Export Flows in the DTT, users need to select “Export Flows” from “Flow Type” pull-down menu. The following additional data selection categories are available for Export Flows.

- **Year:** The FAF5 synchronized historical base years (1997-2012) are available only when users select the data at state level. As future FAF5 products (annual and forecast) are developed and become available, selection of other years will be activated, and results will be provided for each year selected.
- **Measure:** The options are “tons”, “value”, “tmiles”, or “current_value.” Note that the estimate for “tmiles” is not yet available; thus, this option is inactive at the current time.
- **Origin-Destination Geography:**
 - **Domestic Origin:** Hover your mouse pointer over “Domestic Origin” button and select from options “All Domestic Origins Combined” or “Select All/Specific Domestic Origins.” Please refer to Section 2.1 for more details related to these options.
 - **US Exit Region:** Hover your mouse pointer over “US Exit Region (Domestic Destination)” button and select from options “All US Exit Regions Combined” or “Select All/Specific US Exit Regions.” Please refer to Section 2.1 for more details related to these options.
 - **Foreign Destination:** Hover your mouse pointer over “Foreign Destination” button and select from options “All Foreign Destinations Combined” or “Select All/Specific Foreign Destinations.”
 - *All Foreign Destinations Combined* is not destination specific; the option presents the total volume of freight leaving the United States as a whole.
 - *Select All/Specific Foreign Destinations* provides a menu for foreign destinations. By default, all foreign destinations are selected; you can select one or multiple foreign destinations if needed.

- **Commodity:** Hover your mouse pointer over “Commodity” button and select from options “All Commodities Combined” or “Select All/Specific Commodities.” Please refer to Section 2.1 for more details related to these options.
- **Mode & Distance:**
 - **Domestic Mode:** Hover your mouse pointer over “Domestic Mode” button and select from options “All Domestic Modes Combined” or “Select All/Specific Domestic Modes.” Please refer to Section 2.1 for more details related to these options.
 - **Foreign Out-Mode:** Hover your mouse pointer over “Foreign Out-Mode” button and select from options “All Foreign Out-Modes Combined” or “Select All/Specific Foreign Out-Modes.”
 - *All Foreign Out-Modes Combined* is not mode specific; it provides data for total freight volume moved from the selected zone of exit (i.e., US Exit Region) to the selected Foreign Destination.
 - *Select All/Specific Foreign Out-Modes* provides a menu for foreign out-modes. By default, all modes are selected; you can select one or multiple modes if needed.
 - **Distance Band:** Please refer to Section 2.1 for details related to this option.
- **Display Output Labels as Descriptive:** Please refer to Section 2.1 for details related to this option.

Once all desired selections are completed, click the **Run** button and the results will be shown on the screen under “Extracted Data” tab with an option to download a CSV file.

A NOTE OF CAUTION about determining value and tons for an individual region or state

The DTT was designed to aid users in selecting customized subsets of the FAF5 database (which includes over 1.6 million records) for further analysis or usage in other applications. That is, instead of downloading the rather large database, users can select specific records of interests, or obtain data at higher aggregated levels as needed.

Caution should be exercised when using this online tool to generate summary “tabulations,” however. As an example, when using the DTT to generate a combined total flow for domestic shipments originated from Kansas (i.e., Kansas to all states), the results produced from DTT include (1) freight that is moving within the region (e.g., Kansas to Kansas), and (2) all freight leaving the region (e.g., Kansas to all other states). Therefore, if you want to identify only the freight that is moving out of a specific region, you will need to perform two separate processes. First, identify the totals for shipments moving from the desired origin (or to a destination). Second, obtain the within-region total by selecting the region or state of interest as both the origin and destination, and then subtract those results from the total results obtained in the first step.

3 Data Visualization

The visualization feature requires extracted data from DTT as input. To activate the visualization feature, click on “Interactive Tabulation and Chart” button located below the extracted data table. There are different types of tabulations and charts that can be generated in

the visualization feature. These include two-way pivot table, table barchart, horizontal and vertical barcharts, area chart, pie chart, Sankey diagram (a flow diagram in which the width of arrows is proportional to the flow quantity), and O-D flow map. The DTT webpage also provides pre-generated quick charts to demonstrate how the visualization feature can be used effectively. These quick charts vary based on the selection of flow types and can be found on the corresponding DTT webpage under “Quick Chart Generation” tab.

3.1 Visualization of Total Flows

An example is provided below to demonstrate how to use the visualization feature and generate various charts and tables for Total Flows. We use the following inputs in DTT and show visualization based on the extracted data.

Flow Type	Measure	Domestic Origin	Domestic Destination	Commodity	Domestic Mode
Total Flows	Tons	New York NY-NJ-CT-PA (NY Part)	Nashville TN	All Combined	Truck
		Atlanta GA	Knoxville TN		Rail
		Chicago IL-IN-WI (IL Part)			Multiple modes & mail
		Phoenix AZ			
		Charlotte NC-SC (NC Part)			
		North Dakota			

Once data is extracted from DTT (see Section 2.1), click on “Interactive Tabulation and Chart” button. Now you can see a flow map (Figure 4) where origin and destination FAF zone center points are connected through lines. The thickness of lines varies based on the volume of flows (tonnage) going from origin to destination. Also, the size for origin and destination center points vary based on the volume of flows corresponding to each respective zone. Origin zone center points are displayed in red and destination zone center points are displayed in blue. Click on “Show Legend” button located at the top-right corner to see the legends. To hide the legend, click on “Hide Legend” button.

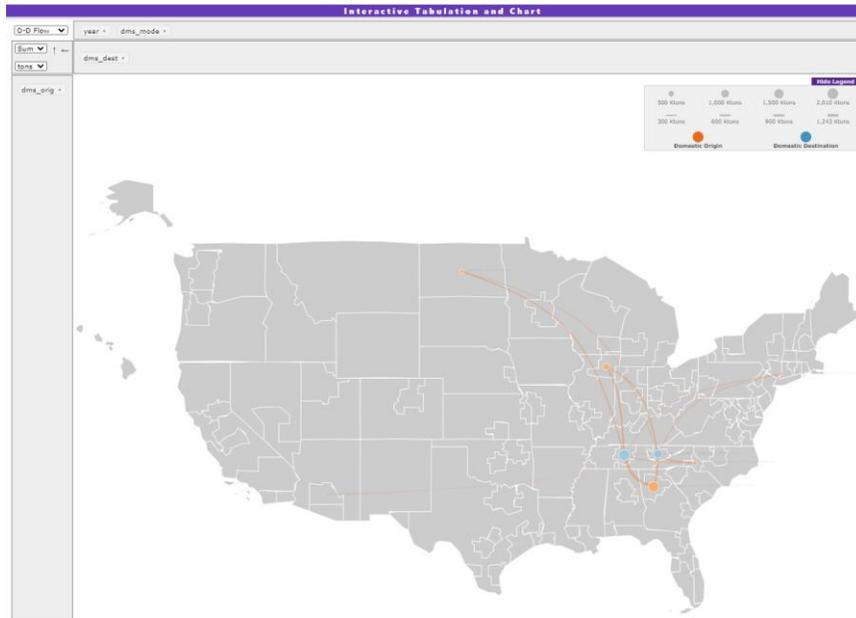


Fig. 4. O-D Flow Map

You can filter your selection further using a pull-down menu next to variable name. For example, Figure 5(a) shows a selection of “Knoxville TN” as the destination zone and Figure 5(b) shows a selection of Rail and Truck as the domestic modes. Once you are done with your desired selection, click on “Apply” button. The flow map will be updated.

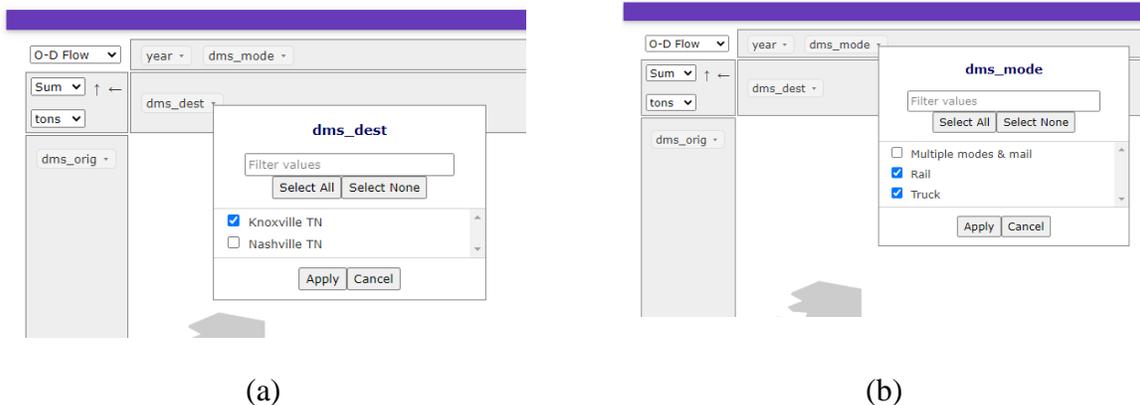


Fig. 5. Selection of Domestic Destination and Domestic Mode

If you click on any zone that is in your selection of origin and destination zones, the flow map will be updated to show only flows coming to or going out of that zone. In particular, if the zone is in the destination zone list, the flow map will show all flows coming to it; and if the zone is in the origin zone list, the flow map will show all flows going out of it. Figure 6 shows the updated map when you click on “Knoxville TN” zone. Note that this zone is a destination zone in our example.

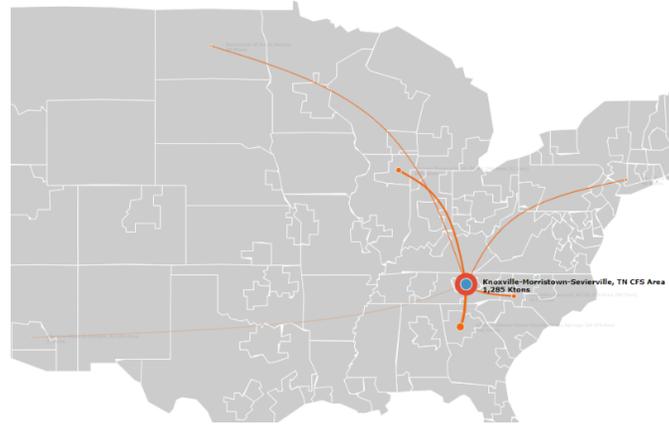


Fig. 6. O-D Flow Map for Knoxville TN FAF Zone

Using the pull-down menu at the top left corner, you can generate other tables and charts. Select “Table” from the menu and you can see a two-way pivot table (Figure 7(a)). By default, cell value is selected as sum of all records. You can change it to show value in percentages. Three types of percentage values can be obtained—percent of total, percent of rows and percent of columns. Figure 7(b) shows the value when “percent of total” is selected. The data can be downloaded as CSV for further processing as well.

Interactive Tabulation and Chart

Table | year | dms_mode

Sum | dms_dest

tons

dms_orig

dms_orig	dms_dest	Nashville TN	Knoxville TN	Totals
Atlanta GA		1,243.0	644.8	1,887.8
Chicago IL-IN-WI (IL Part)		395.4	305.9	701.3
Charlotte NC-SC (NC Part)		107.4	217.2	324.6
North Dakota		204.1	47.9	252.0
New York NY-NJ-CT-PA (NY Part)		55.3	68.1	123.4
Phoenix AZ		4.3	1.3	5.6
Totals		2,009.6	1,285.3	3,294.8

[>>Download CSV](#)

(a)

Interactive Tabulation and Chart

Table | year | dms_mode

% of | dms_dest

tons

dms_orig

dms_orig	dms_dest	Nashville TN	Knoxville TN	Totals
Atlanta GA		37.7%	19.6%	57.3%
Chicago IL-IN-WI (IL Part)		12.0%	9.3%	21.3%
Charlotte NC-SC (NC Part)		3.3%	6.6%	9.9%
North Dakota		6.2%	1.5%	7.6%
New York NY-NJ-CT-PA (NY Part)		1.7%	2.1%	3.7%
Phoenix AZ		0.1%	0.0%	0.2%
Totals		61.0%	39.0%	100.0%

[>>Download CSV](#)

(b)

Fig. 7. Two-way Table for Domestic Origin and Destination

It is possible to include more than one variable in the tabulation. You need to drag your desired variable and place it in the list of row or column variables. Figure 8 shows the updated table when “dms_mode” variable is considered as a column variable in addition to “dms_dest” variable.

Interactive Tabulation and Chart

Table: year -

Sum: ↑ ↓

tons: ↓

dms_dest: dms_mode:

dms_orig	dms_dest	Nashville TN		Knoxville TN		Nashville TN		Knoxville TN		Totals
		Truck	Truck	Multiple modes & mail	Multiple modes & mail	Rail	Rail			
Atlanta GA		1,186.1	598.3	57.0	46.5	0.0				1,887.8
Chicago IL-IN-WI (IL Part)		343.3	278.8	52.1	27.0	0.0	0.0			701.3
Charlotte NC-SC (NC Part)		104.4	192.7	3.0	18.1	0.0	6.4			324.6
North Dakota		97.0	19.1	68.0	19.3	39.1	9.6			252.0
New York NY-NJ-CT-PA (NY Part)		50.1	66.9	5.3	1.2	0.0	0.0			123.4
Phoenix AZ		3.3	0.7	1.0	0.6	0.0				5.6
Totals		1,784.0	1,156.5	186.4	112.6	39.2	16.1			3,294.8

[>>Download CSV](#)

Fig. 8. Two-way Table for Domestic Origin, Destination and Mode

Another table option available in the visualization feature is a table with barchart. To generate this table, select “Table Barchart” from the pull-down menu. Figure 9 shows the output for this selection.

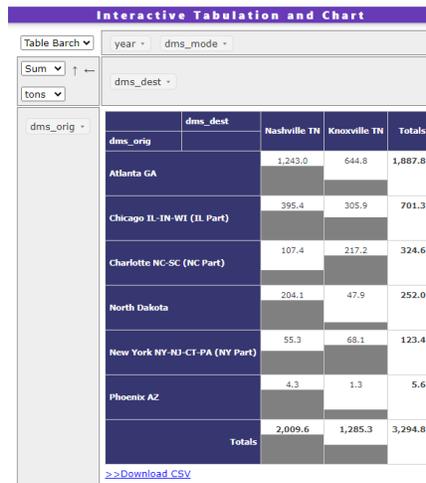


Fig. 9. Table Barchart for Domestic Origin and Destination

The visualization feature provides the capability to generate both vertical and horizontal barcharts. For the horizontal barchart, select “Bar Chart (Horizontal)” from the pull-down menu. This will generate a barchart where origin FAF zones are shown on the Y-axis (Figure 10). The stacked bars for each origin FAF zone show flows associated with destination FAF zones. You can add/edit title and axis labels by double-clicking on the associated texts. There are additional options available (at the top right corner) when you hover your mouse pointer on the plot area. These include zoom, pan, saving plot as png, etc.

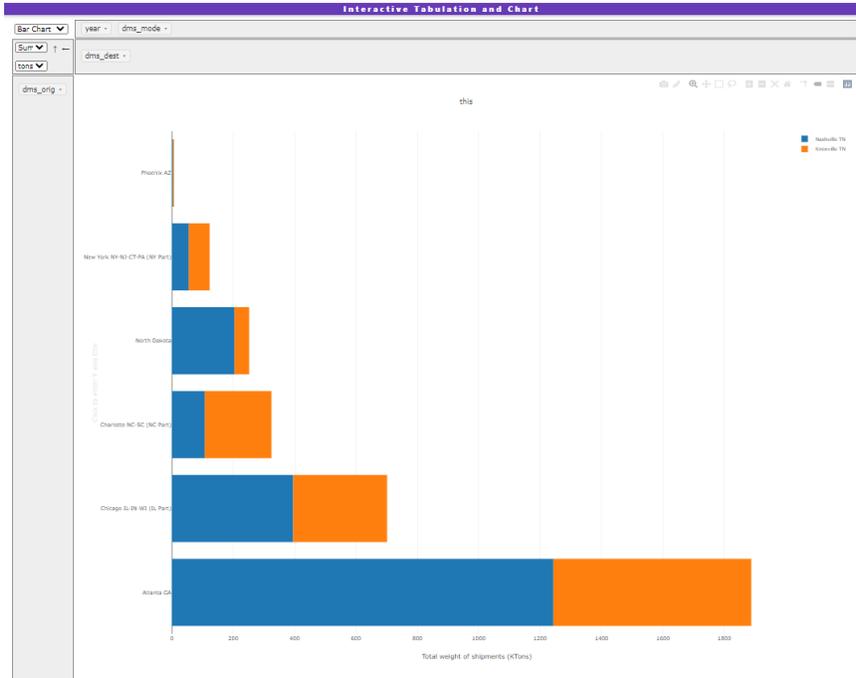


Fig. 10. Horizontal Barchart

For the vertical barchart, select “Bar Chart (Vertical)” from the pull-down menu. This will generate a barchart where destination FAF zones are shown on X-axis (Figure 11). The stacked bars for each destination FAF zone show flows associated with origin FAF zones.

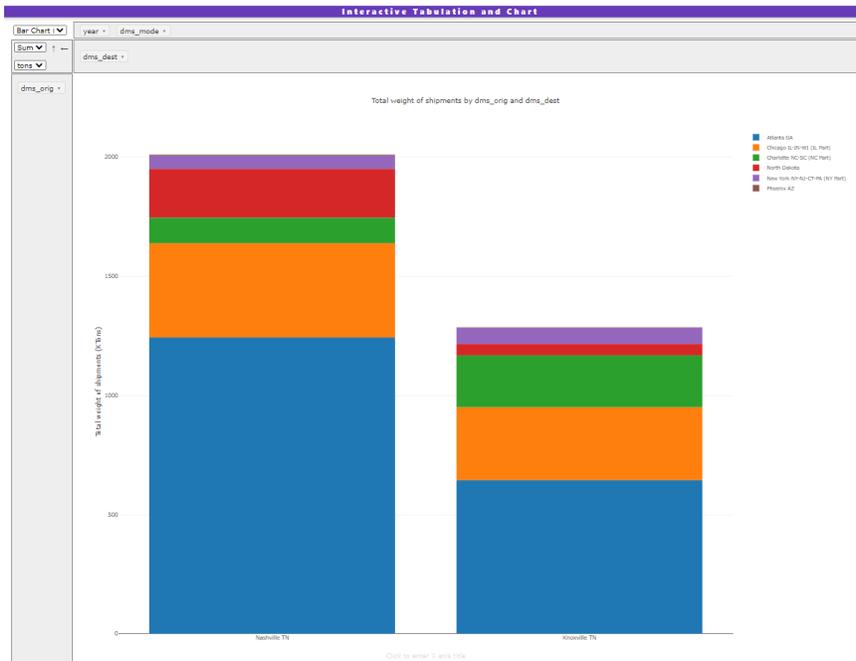


Fig. 11. Vertical Barchart

Area chart is a line chart that displays quantitative data using colored areas between the axis and lines. To generate this chart, select “Area Chart” from the pull-down menu. Figure 12 shows the generated plot. The destination FAF zones are shown on X-axis. This chart shares the same display options as barcharts.

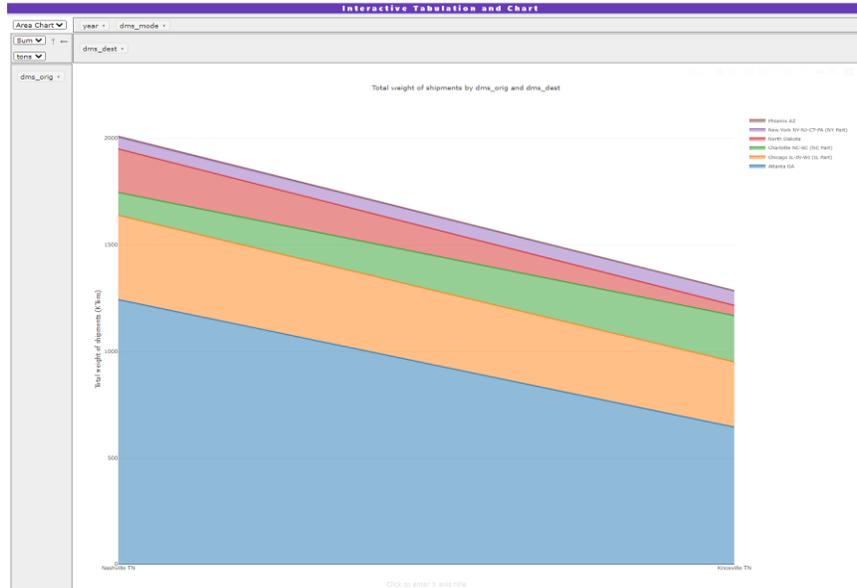


Fig. 12. Area Chart

To generate a pie chart, select “Pie Chart” from the pull-down menu. You can see two pie charts for two destination FAF zones (Figure 13). Sections in each pie represent origin FAF zone shares in terms of flow tonnage.

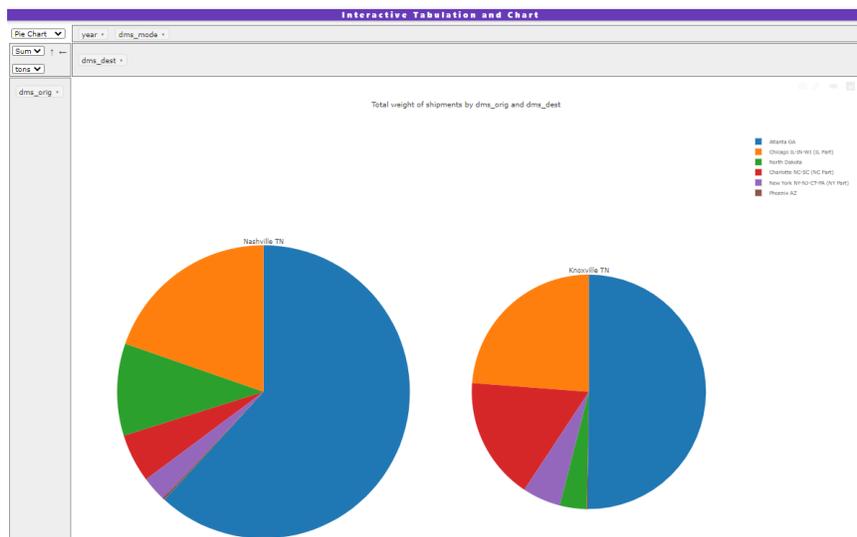


Fig. 13. Pie Chart

Lastly, to generate a Sankey diagram, select “Sankey” from the pull-down menu. You can see a flow diagram where the width of each flow from origin FAF zone to destination FAF zone is proportional to the tonnage (Figure 14).

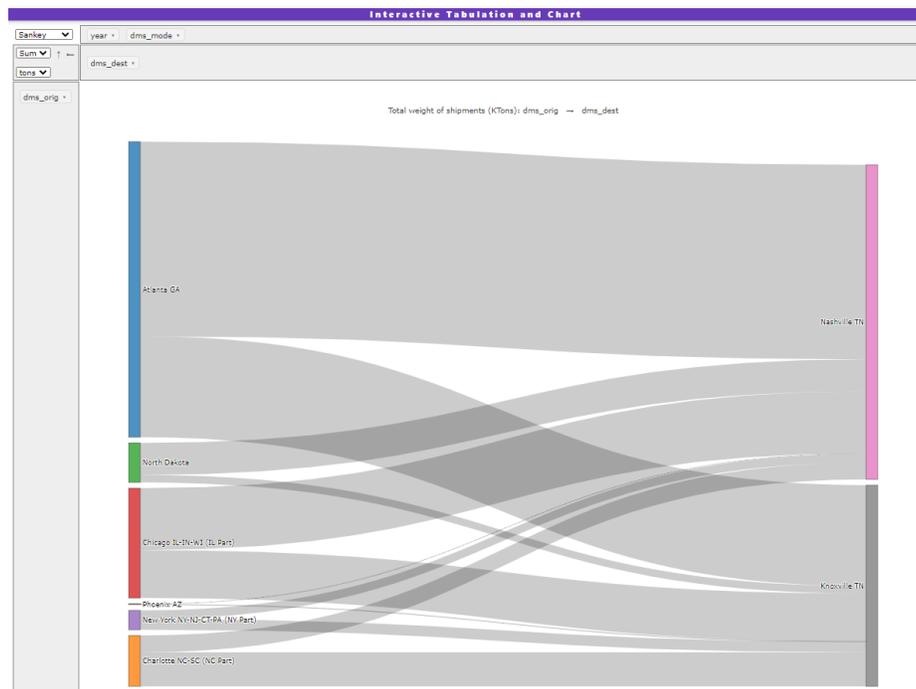


Fig. 14. Sankey Diagram

The DTT webpage provides six pre-generated charts; available under “Quick Chart Generation” tab. These charts were designed to be used as tutorials or guides on how you can use the visualization feature effectively. For “Total Flows”, the charts are

- Total tonnage by commodity and mode,
- Total tonnage by commodity,
- Mode share by commodity (tons),
- State level origin-destination flows (tons),
- Sankey diagram by mode and distance for two commodities (live animals/fish, meat/seafood),
- Pie chart by commodity and mode for shipments coming into D.C.

Hover your mouse pointer over your desired chart and click on it to generate the chart. In addition to the chart, its corresponding pre-extracted data will be displayed on the webpage. Figure 15 shows the chart (partially) when you click on “mode share by commodity (tons).”

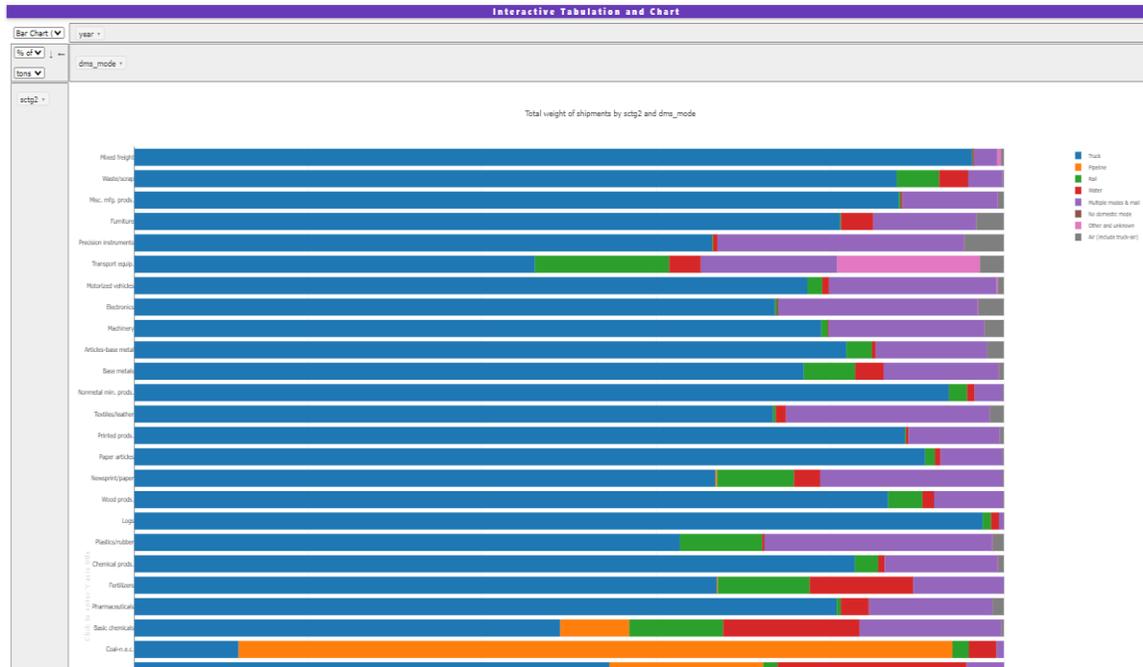


Fig. 15. Mode Share by Commodity

3.2 Visualization of Domestic Flows

A similar procedure used in the Total Flows can be applied to generate various charts and tables for the Domestic Flows. Please refer to Section 3.1 for details. Additionally, when you select “Domestic Flows” from the “Flow Type” pull-down menu, the DTT webpage provides six pre-generated charts. These are

- Total tonnage by domestic origin,
- FAF zone level origin-destination table within CA (tons),
- Total tonnage by commodity with mode share,
- Pie chart by commodity and mode for coal, gasoline, fuel oils, crude oil, etc. (tons),
- Sankey diagram by mode and distance for coal, gasoline, fuel oils, crude oil, etc. (tons),
- State level origin-destination flows for coal, gasoline, fuel oils, crude oil, etc. (tons).

Note that the above charts show flows associated with domestic freight. Figure 16 shows the chart for “FAF zone level origin-destination table within CA (tons).”

Interactive Tabulation and Chart

Table Barcl | year |

Sum | dms_dest |

tons |

dms_orig |

dms_orig	dms_dest	Los Angeles CA	San Francisco CA	Rest of CA	Sacramento CA	San Diego CA	Fresno CA	Totals
Los Angeles CA		354,283.6	19,043.8	15,065.8	4,626.2	16,634.6	2,336.6	411,990.6
San Francisco CA		16,001.3	153,701.9	16,717.0	8,250.4	396.1	3,369.3	198,436.0
Rest of CA		33,585.4	26,289.4	107,260.6	6,442.7	970.6	9,397.5	183,946.3
Sacramento CA		1,004.6	5,570.5	6,537.3	41,868.2	265.4	537.4	55,783.4
San Diego CA		8,699.7	285.4	1,180.3	48.4	35,300.7	143.9	45,658.4
Fresno CA		2,455.1	3,081.5	12,700.4	236.8	195.0	9,078.3	27,747.2
Totals		416,029.8	207,972.4	159,461.4	61,472.8	53,762.5	24,863.1	923,561.9

[Download CSV](#)

Fig. 16. FAF Zone Level Origin-Destination Table within CA

3.3 Visualization of Foreign Trade Flows

For imported shipments, we use the following inputs in DTT and show visualization based on the extracted data.

Flow Type	Measure	Foreign Origin	US Entry Region	Domestic Destination	Commodity	Foreign In-Mode	Domestic Mode
Import Flows	Tons	Canada	North Dakota	Rest of LA	All Combined	All Combined	All Combined
		SW & Central Asia	Corpus Christi TX	Chicago IL-IN-WI (IL Part)			
			Houston TX	Houston TX			
			Rest of WA	Rest of TX			
				Seattle WA			
				Rest of WA			

Once data is extracted from the DTT (see Section 2.3), click on “Interactive Tabulation and Chart” button. Now you can see a two-way pivot table where the row variable is fr_orig and the column variable is dms_orig. Edit the table to include fr_orig and dms_orig as the row variables, and dms_dest as the column variable. Figure 17 shows the updated table.

Interactive Tabulation and Chart									
Table		year							
Sum		dms_dest							
tons									
fr_orig									
dms_orig									
fr_orig	dms_orig	dms_dest	Chicago IL-IN-WI (IL Part)	Houston TX	Rest of LA	Rest of TX	Rest of WA	Seattle WA	Totals
Canada	Corpus Christi TX			57.3		27.3			84.6
	Houston TX		2.7	202.8	0.0	57.6	0.2	0.4	263.7
	North Dakota		32,652.1	8,310.2	144.5	819.4	31.2	154.9	42,112.4
	Rest of WA		98.7	102.0	1.4	48.2	5,225.1	13,449.7	18,924.9
SW & Central Asia	Corpus Christi TX			709.3		335.0			1,044.4
	Houston TX		17.2	16,260.7	11.6	515.7	0.1	0.8	16,806.2
	Rest of WA		0.0	0.0	0.0	0.0	551.9	430.2	982.1
Totals			32,770.7	25,642.3	157.6	1,803.2	5,808.5	14,036.0	80,218.2

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Fig. 17. Two-way Table for Foreign Origin, Domestic Origin and Domestic Destination

You can follow the procedures presented in Section 3.1 to generate other tables and charts (i.e., table barchart, horizontal and vertical barcharts, area chart, pie chart, Sankey, and O-D flow) using the extracted data. Figure 18 shows the O-D flow map.

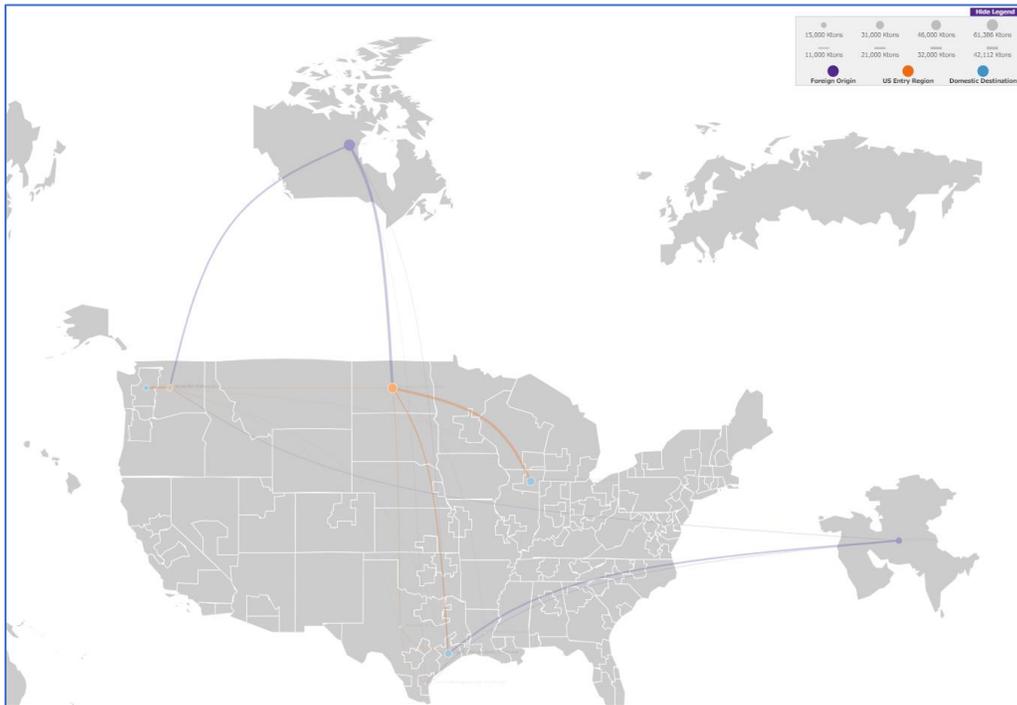


Fig. 18. O-D Flow Map

The DTT webpage provides six pre-generated charts for Import Flows. These are

- Pie chart by foreign origin and foreign mode (value),
- State level import flows (tons),

- Total tonnage of imports by US entry region,
- Value of imported shipments by commodity and foreign region,
- Sankey diagram by foreign region, foreign in-mode, and domestic mode for electronics (value),
- State level import flows for electronics (value).

Figure 19 shows the chart for “pie chart by foreign origin and foreign mode (value).”

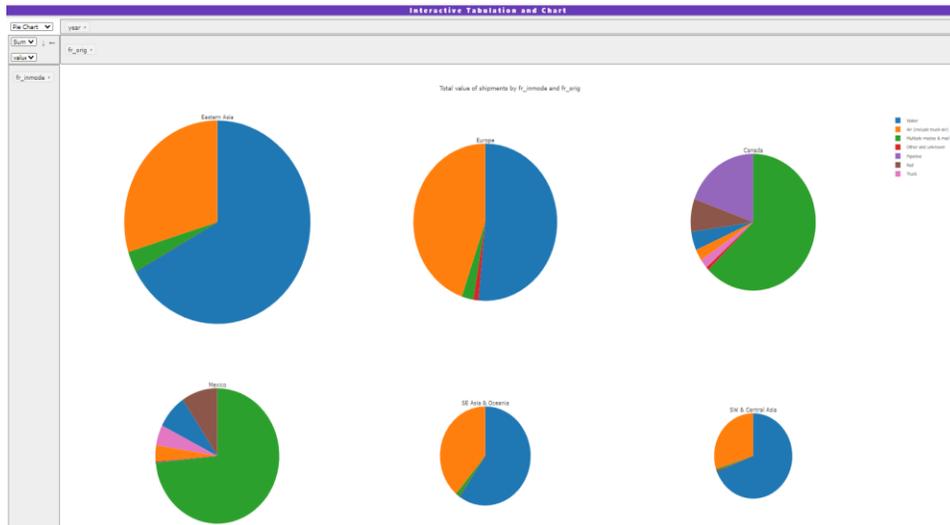


Fig. 19. Pie Chart by Foreign Origin and Foreign Mode

For exported shipments, we use the following inputs in DTT and show visualization based on the extracted data.

Flow Type	Measure	Domestic Origin	US Exit Region	Foreign Destination	Commodity	Domestic Mode	Foreign Out-Mode
Export Flows	Tons	Alaska	Alaska	Europe	All Combined	All Combined	All Combined
		Los Angeles CA	Los Angeles CA	Eastern Asia			
		Rest of TX	Corpus Christi TX				
			Houston TX				

Once data is extracted from the DTT (see Section 2.3), click on “Interactive Tabulation and Chart” button. Now you can see an O-D flow map where the row variable is dms_orig and the column variable is dms_dest. Edit the map to include dms_orig as the row variable, and dms_dest and fr_dest as the column variables. Figure 20 shows the updated O-D flow map.

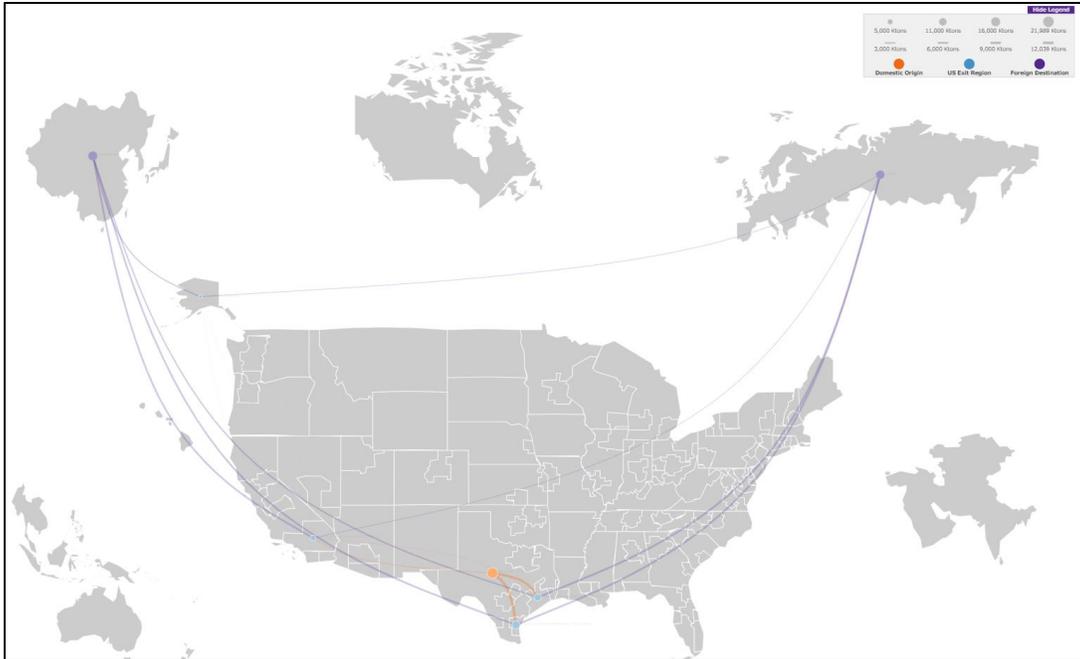


Fig. 20. O-D Flow Map

You can follow the procedures presented in Section 4.1 to generate other tables and charts (i.e., table, table barchart, horizontal and vertical barcharts, area chart, pie chart, and Sankey) using the extracted data. Figure 21 shows the table barchart.

Interactive Tabulation and Chart

Table Barcl | year |

Sum | ↑ ↔ |

tons |

dms_dest | fr_dest |

dms_orig	dms_dest	Alaska		Corpus Christi TX		Houston TX		Los Angeles CA		Totals
		fr_dest	Eastern Asia	Europe	Eastern Asia	Europe	Eastern Asia	Europe	Eastern Asia	
Rest of TX		0.8	0.0	5,578.3	6,460.9	2,948.7	6,585.6	367.6	47.4	21,989.3
Los Angeles CA		4.4	0.0			1.4	70.5	5,120.1	428.0	5,624.4
Alaska		2,182.5	570.5				0.0	9.8	0.0	2,762.8
Totals		2,187.7	570.6	5,578.3	6,460.9	2,950.1	6,656.1	5,497.5	475.4	30,376.5

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Fig. 21. Table Barchart

The DTT webpage provides six pre-generated charts for Export Flows. These are

- Pie chart by foreign destination and foreign mode (value),
- State level export flows (tons),
- Total tonnage of exports by US exit region,

- Value of exported shipments by commodity and foreign region,
- Sankey diagram by domestic mode, foreign out-mode, and foreign region for electronics (value),
- State level export flows for electronics (value).

Figure 22 shows the chart (partially) for “total tonnage of exports by US exit region.”

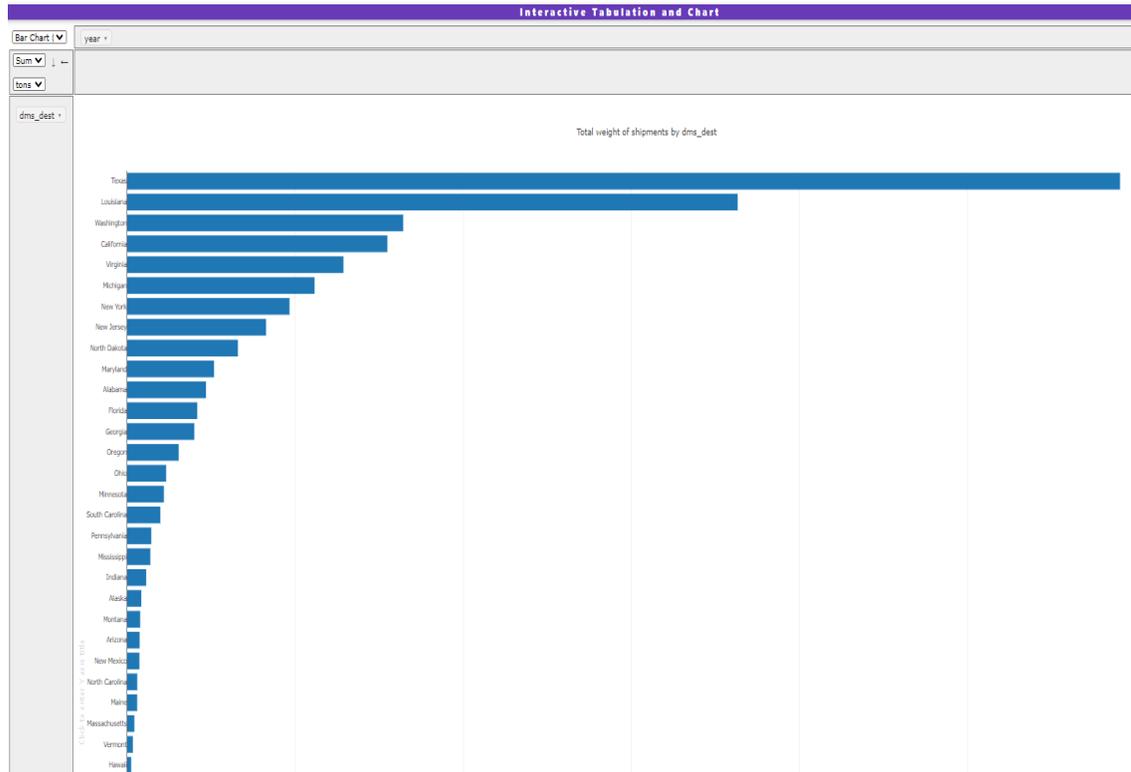


Fig. 22. Total Tonnage of Exports by US Exit Region

Appendix A: Glossary of Terms

Total Flows	Contains the data associated with freight moved between domestic origins and domestic destinations and includes both domestic and foreign shipments. For import shipments, the origin of the flow is zone of entry (the FAF region or state of entry), and for export shipments, the destination of the flow is zone of exit (the FAF region or state of exit). Mode of transportation for Total Flows is the mode used within domestic regions or states.
Domestic Flows	Contains only shipments associated with domestic freight moved between domestic origins and domestic destinations. No foreign trade flows are included, and the mode of transportation is the mode used within and between domestic regions or states.
Import Flows	Contains data associated with freight moved from foreign origins to domestic destinations. Geographies for this flow data include Foreign Origin, US Entry Region (Domestic Origin), and Domestic Destination. Mode of transportation consists of two parts: (1) foreign mode used between a foreign origin zone and a zone of entry in the United States and (2) domestic mode used between the zone of entry and its domestic destination.
Export Flows	Contains data associated with freight moved from domestic origins to foreign destinations. Geographies for this flow data include Domestic Origin, US Exit Region (Domestic Destination), and Foreign Destination. Mode of transportation consists of two parts: (1) domestic mode used between the domestic origin of the shipment and its zone of exit and (2) foreign mode used between the zone of exit and foreign destination.
US Entry Region	FAF region or state where an import enters the United States, i.e., domestic origin of the given shipment. This term refers to the entire region or state and does not limit the entry to any single location.
Foreign In-Mode	Mode used between a foreign origin region and the US entry region for the imported goods.
US Exit Region	FAF region or state where an export leaves the United States, i.e., domestic destination of the given shipment. This term refers to the entire region or state and does not limit the exit to any single location.
Foreign Out-Mode	Mode used between a foreign destination region and the US region of exit for the exported goods.