

Using Community Data Program data in Tableau

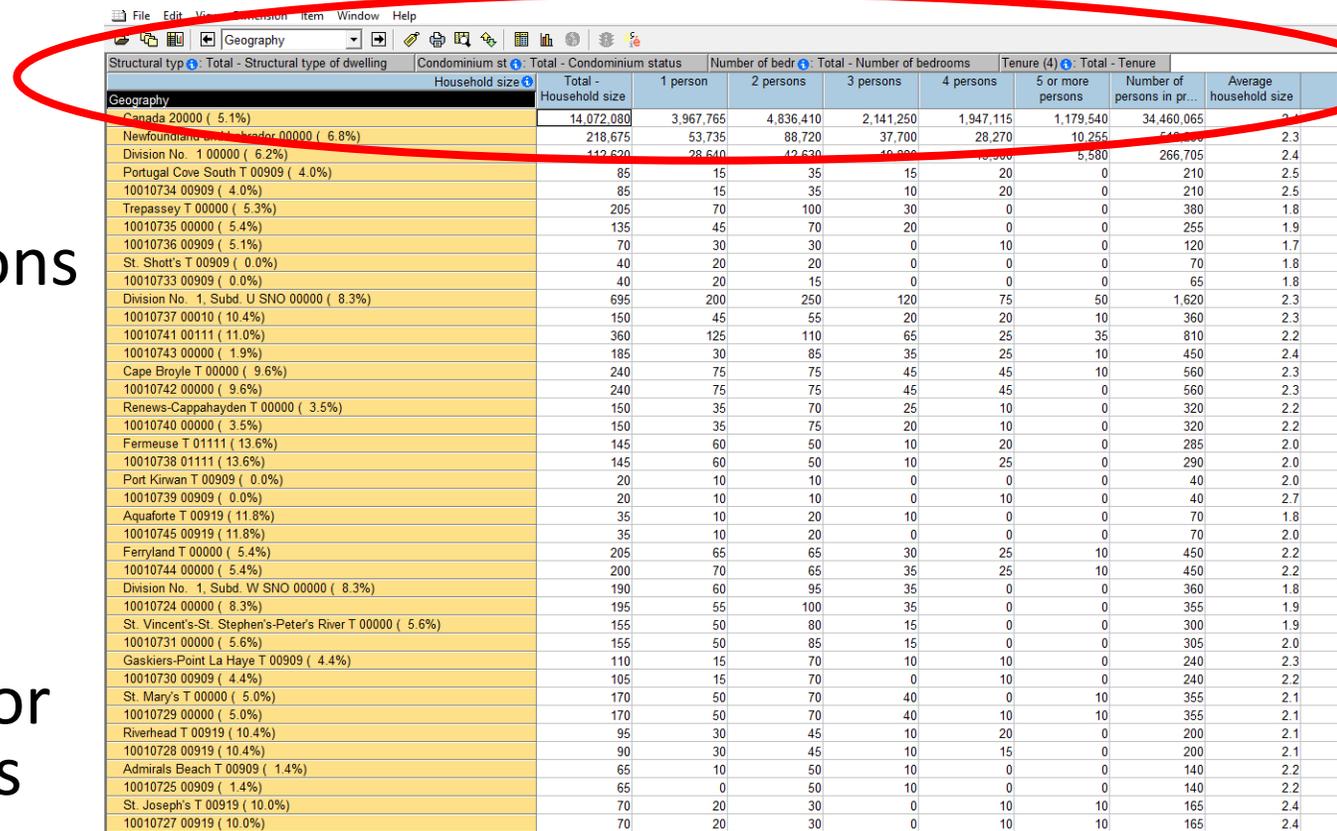
By Jamie Carrick

From Beyond 2020 to Tableau

- Most CDP data is in IVT format, openable only in Beyond 2020
- Tableau cannot read IVT tables – extraction is required
- Beyond 2020 can export to CSV, a Tableau friendly format
- The exact process will depend on the data and the needs of the project

Challenge: Preserving the multidimensionality of IVT tables

- IVT tables often contain >2 dimensions
- Limiting extracts to 2 dimensions is an option
 - 1 geography dimension and 1 variable dimension
 - Or 2 variable dimensions for a single geography
- It is possible to capture many or all combinations of dimensions in a single export



The screenshot shows a software interface with a menu bar (File, Edit, View, Dimension, Item, Window, Help) and a toolbar. Below the toolbar is a table with the following columns: Structural type (Total - Structural type of dwelling), Condominium status (Total - Condominium status), Number of bedrooms (Total - Number of bedrooms), and Tenure (Total - Tenure). The table contains data for various geographical areas, including Canada 20000, Newfoundland and Labrador 00000, and numerous divisions and tracts. The table is highlighted with a red circle.

Structural type (Total - Structural type of dwelling)	Condominium status (Total - Condominium status)	Number of bedrooms (Total - Number of bedrooms)				Tenure (Total - Tenure)		Average household size
Household size	Household size	1 person	2 persons	3 persons	4 persons	5 or more persons	Number of persons in pr...	
Geography								
Canada 20000 (5.1%)	14,072,000	3,967,765	4,836,410	2,141,250	1,947,115	1,179,540	34,460,065	2.4
Newfoundland and Labrador 00000 (6.8%)	218,675	53,735	88,720	37,700	28,270	10,255	540,395	2.3
Division No. 1 00000 (6.2%)	112,620	28,640	42,630	19,990	16,590	5,580	266,705	2.4
Portugal Cove South T 00909 (4.0%)	85	15	35	15	20	0	210	2.5
10010734 00909 (4.0%)	85	15	35	10	20	0	210	2.5
Trepassey T 00000 (5.3%)	205	70	100	30	0	0	380	1.8
10010735 00000 (5.4%)	135	45	70	20	0	0	255	1.9
10010736 00909 (5.1%)	70	30	30	0	10	0	120	1.7
St. Shott's T 00909 (0.0%)	40	20	20	0	0	0	70	1.8
10010733 00909 (0.0%)	40	20	15	0	0	0	65	1.8
Division No. 1, Subd. U SNO 00000 (8.3%)	695	200	250	120	75	50	1,620	2.3
10010737 00010 (10.4%)	150	45	55	20	20	10	360	2.3
10010741 00111 (11.0%)	360	125	110	65	25	35	810	2.2
10010743 00000 (1.9%)	185	30	85	35	25	10	450	2.4
Cape Broyle T 00000 (9.6%)	240	75	75	45	45	10	560	2.3
10010742 00000 (9.6%)	240	75	75	45	45	0	560	2.3
Renews-Cappahayden T 00000 (3.5%)	150	35	70	25	10	0	320	2.2
10010740 00000 (3.5%)	150	35	75	20	10	0	320	2.2
Fermeuse T 01111 (13.6%)	145	60	50	10	20	0	285	2.0
10010738 01111 (13.6%)	145	60	50	10	25	0	290	2.0
Port Kinwan T 00909 (0.0%)	20	10	10	0	0	0	40	2.0
10010739 00909 (0.0%)	20	10	10	0	10	0	40	2.7
Aquaforte T 00919 (11.8%)	35	10	20	10	0	0	70	1.8
10010745 00919 (11.8%)	35	10	20	0	0	0	70	2.0
Ferryland T 00000 (5.4%)	205	65	65	30	25	10	450	2.2
10010744 00000 (5.4%)	200	70	65	35	25	10	450	2.2
Division No. 1, Subd. W SNO 00000 (8.3%)	190	60	95	35	0	0	360	1.8
10010724 00000 (8.3%)	195	55	100	35	0	0	355	1.9
St. Vincent's-St. Stephen's-Peter's River T 00000 (5.6%)	155	50	80	15	0	0	300	1.9
10010731 00000 (5.6%)	155	50	85	15	0	0	305	2.0
Gaskiers-Point La Haye T 00909 (4.4%)	110	15	70	10	10	0	240	2.3
10010730 00909 (4.4%)	105	15	70	0	10	0	240	2.2
St. Mary's T 00000 (5.0%)	170	50	70	40	0	10	355	2.1
10010729 00000 (5.0%)	170	50	70	40	10	10	355	2.1
Riverhead T 00919 (10.4%)	95	30	45	10	20	0	200	2.1
10010728 00919 (10.4%)	90	30	45	10	15	0	200	2.1
Admirals Beach T 00909 (1.4%)	65	10	50	10	0	0	140	2.2
10010725 00909 (1.4%)	65	0	50	10	0	0	140	2.2
St. Joseph's T 00919 (10.0%)	70	20	30	0	10	10	165	2.4
10010727 00919 (10.0%)	70	20	30	0	10	10	165	2.4

Horizontal vs vertical table structures

Horizontal

- Numerical data stored in multiple columns
- Each column is a variable

Geography	Variable 1	Variable 2	Variable 3
Geo 1	x	x	x
Geo 2	x	x	x
Geo 3	x	x	x
Geo 4	x	x	x
Geo 5	x	x	x
...			

Vertical

- Data values are stored in a single column
- Each row is a single variable or combination of variables/geographies
 - Non-numerical columns are dimensions
 - There is a row for each combination of variables in those dimensions
- Preferable in Tableau (in most cases)

Geography	Variable	Value
Geo 1	Variable 1	x
Geo 1	Variable 2	x
Geo 1	Variable 3	x
Geo 2	Variable 1	x
Geo 2	Variable 2	x
Geo 2	Variable 3	x
Geo 3	Variable 1	x
Geo 3	Variable 2	x
Geo 3	Variable 3	x
Geo 4	Variable 1	x
...		

Including more dimensions

Geography	Dimension 1	Dimension 2	Value
Geo 1	Variable 1	Variable A	x
Geo 1	Variable 1	Variable B	x
Geo 1	Variable 1	Variable C	x
Geo 1	Variable 2	Variable A	x
Geo 1	Variable 2	Variable B	x
Geo 1	Variable 2	Variable C	x
...			

Geography	Dimension 1	Dimension 2	Dimension 3	Value
Geo 1	Variable 1	Variable A	Variable i	x
Geo 1	Variable 1	Variable A	Variable ii	x
Geo 1	Variable 1	Variable A	Variable iii	x
Geo 1	Variable 1	Variable B	Variable i	x
Geo 1	Variable 1	Variable B	Variable ii	x
Geo 1	Variable 1	Variable B	Variable iii	x
Geo 1	Variable 1	Variable C	Variable i	x
...				

Vertical Tables in Beyond 2020

- Drag dimensions you wish to include next to geography
- One dimension will need to be on the x-axis
 - Can be a dimension you don't need (just highlight the total and export only that)
 - Otherwise can be pivoted later or left as columns
- Save as a CSV
 - Export can take a while (but it will work)

The screenshot shows the Beyond 2020 software interface. The main window displays a vertical table with the following dimensions: Geography, Number of bedrooms, Household size, and Tenure (4). The table is filtered for PR10 and CD1001. The columns are: Geography, Number of bedrooms, Household size, Tenure (4), Total - Condominium, Condominium, and Not condominium.

Geography	Number of bedrooms	Household size	Tenure (4)	Total - Condominium	Condominium	Not condominium
PR10	4 or more bedrooms	4 persons	Band housing	15	0	15
			Total - Tenure	7,220	55	7,165
			Owner	6,205	35	6,170
		5 or more persons	Renter	930	20	910
			Band housing	85	0	80
			Total - Tenure	165,330	925	164,405
		Number of persons in private households	Owner	149,335	660	148,675
			Renter	15,265	260	15,005
			Band housing	725	0	725
		Average household size	Total - Tenure	3.0	3.1	3.0
			Owner	2.9	3.1	2.9
			Renter	3.3	3.5	3.3
CD1001	Total - Number of bedrooms	Total - Household size	Band housing	5.8	0.0	5.8
			Total - Tenure	112,620	3,395	109,225
			Owner	83,445	2,175	81,270
			Renter	29,175	1,210	27,960
		1 person	Band housing	0	0	0
			Total - Tenure	28,640	1,735	26,905
			Owner	16,400	1,150	15,250
			Renter	12,235	585	11,650
		2 persons	Band housing	0	0	0
			Total - Tenure	42,630	1,255	41,375
			Owner	33,235	800	32,440
			Renter	9,395	450	8,935
		3 persons	Band housing	0	0	0
			Total - Tenure	19,880	210	19,660
			Owner	15,640	120	15,520
			Renter	4,235	90	4,145
		4 persons	Band housing	0	0	0
			Total - Tenure	15,900	135	15,765
Owner	13,710		80	13,625		
Renter	2,195		50	2,140		
5 or more persons	Band housing	0	0	0		
	Total - Tenure	5,580	55	5,515		
	Owner	4,455	25	4,430		
	Renter	1,120	30	1,090		
		Band housing	0	0	0	
		Total - Tenure	266,705	5,740	260,965	

Vertical Tables in Beyond 2020

- Dimensions not included can be used as filters
- Variables that are not needed can be hidden to exclude from export
 - Reduces size of export

Number of persons in private households	Renter	15,265
	Band housing	725
	Total - Tenure	3.0
Average household size	Owner	2.9
	Renter	3.3
Total - Household size	Band housing	5.8
	Owner	112,620
	Renter	83,445
1 person	Owner	29,175
	Renter	0
	Band housing	28,640
Band housing	Owner	16,400
	Renter	12,235
	Band housing	0

The screenshot shows the Beyond 2020 software interface. The menu bar includes File, Edit, View, Dimension, Item, Window, and Help. The toolbar contains various icons, with the left and right arrow icons circled in red. The main window displays a vertical table with the following structure:

Structural typ: Single-detached house			Condominium st	Total - Condomin
Geography	Number of bedr	Household size	Tenure (4)	
PR10	4 or more bedrooms	4 persons	Renter	
			Band housing	
		5 or more persons	Total - Tenure	
			Owner	
		Number of persons in private households	Renter	
			Band housing	
	Total - Tenure		14	
	Owner		13	
	Average household size	Renter		
		Band housing		
		Total - Tenure		
		Owner		
Total - Household size	Renter			
	Band housing			
	Total - Tenure	7		
	Owner	6		

A context menu is open over the 'Average household size' row, with the 'Hide' option selected. The menu options are: Show, Hide, Dimension Summary, Chart, Copy, Paste, and Print...

Tableau Prep Builder

- Can be used to prep tables for Tableau (when necessary)
- Allows data processing on tables too large for Excel

Tableau Prep Builder - Flow1*

File Edit Flow Server Help

Connections

example table.csv
Text file

Search

Tables

- example table

example table → Clean 1

Clean 1 7 Fields 952K Rows

Filter Values... Create Calculated Field...

Changes (0)

Geography	Number of bedr	Household size	Tenure (4)	Total - Condominium status	Condominium	Not condominium
CD1001	1 bedroom	1 person	Band housing	0	0	0
CD1002	2 bedrooms	2 persons	Owner	0	0	0
CD1003	3 bedrooms	3 persons	Renter	0	0	0
CD1004	4 or more bedrooms	4 persons	Total - Tenure	0	0	0
CD1005	No bedrooms	5 or more persons	Average household size	0	0	0
CD1006	Total - Number of bedrooms	Number of persons in privat...	Total - Household size	0	0	0
CD1007						
CD1008						
CD1009						
CD1010						
CD1011						

Geography	Number of bedr	Household size	Tenure (4)	Total - Condominium status	Condominium	Not condominium
DA10010174	1 bedroom	Total - Household size	Total - Tenure	20	0	20
DA10010174	1 bedroom	Total - Household size	Owner	0	0	0
DA10010174	1 bedroom	Total - Household size	Renter	20	0	20
DA10010174	1 bedroom	Total - Household size	Band housing	0	0	0
DA10010174	1 bedroom	1 person	Total - Tenure	0	0	0
DA10010174	1 bedroom	1 person	Owner	0	0	0
DA10010174	1 bedroom	1 person	Renter	10	0	10

Tableau Prep

- Pivot columns into rows
- Pivot rows into columns
- Perform calculations on columns
 - i.e. calculate inverses or percentages
- Join tables
 - i.e. joining geographic information
- Union tables
 - i.e. combine tables with same fields covering different regions or themes
- Export as Tableau Data Extract (.hyper)
 - Preferable format for working in Tableau
- Many of these functions are available in Tableau Desktop, but Prep directly edits the table

Pivot1 Names	Pivot1 Values	Geography	Number of bedr	Household size
Condominium	0	DA10010174	1 bedroom	Total - Household

Geography	Number of bedr	Household size	Tenure (4)	Condominium status	Households
DA10010174	1 bedroom	Total - Household size	Total - Tenure	Condominium	0
DA10010174	1 bedroom	Total - Household size	Owner	Condominium	0

Tableau Desktop

- Columns with variable names will be recognized as dimensions in Tableau
- Filter dimensions to choose a variable to display
 - When selecting variables, all dimensions should be filtered
 - Variable values are the measure fields
- Drag dimensions to rows/columns to create charts

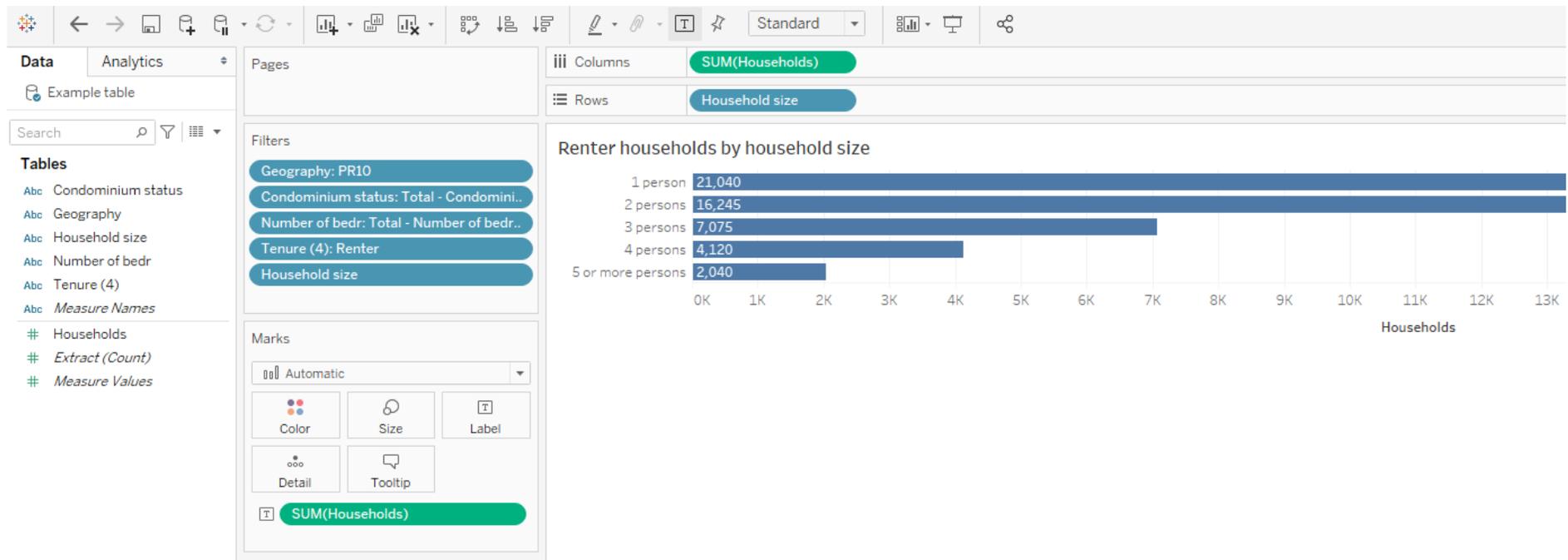


Tableau Desktop

- Dimensions can be used to provide filter options for users
 - Note: avoid selecting “(All)” when dimension contains a total

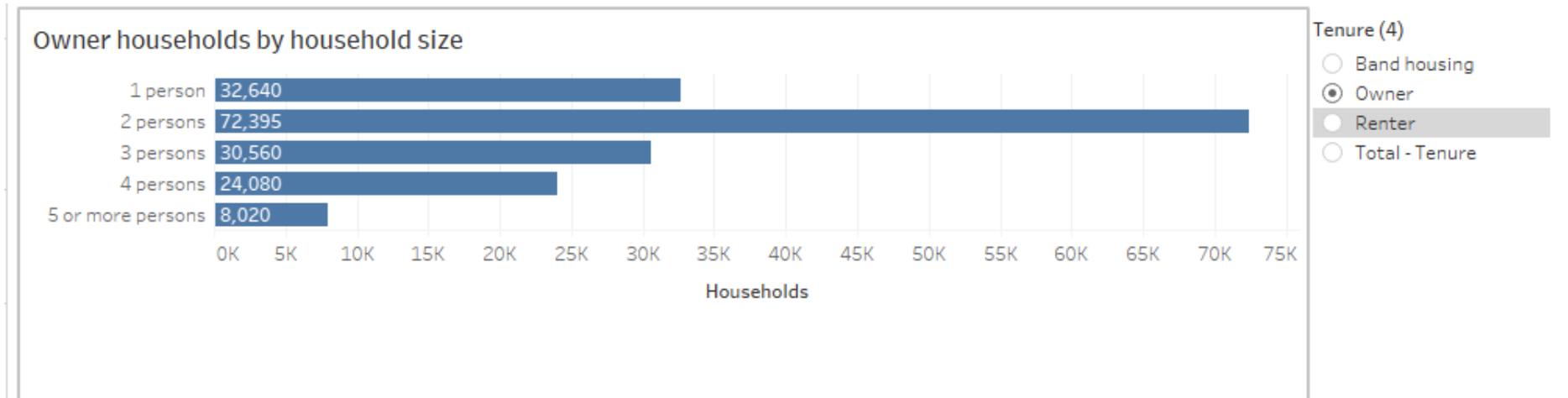


Tableau Desktop – mapping CDP data

- Census data can be mapped using shapefiles from Statistics Canada
- Connect data table to shapefile using relationships (instead of joins)

The screenshot displays the Tableau Desktop interface. On the left, the 'Connections' pane shows 'Example output 2' (Tableau Extract) and 'Icsd000b16a_e' (Spatial file). The 'Tables' pane shows 'Icsd000b16a_e' and 'New Union'. The main workspace shows an 'Extract+' (Multiple Connections) view with a relationship line connecting 'Extract' to 'Icsd000b16a_e'. Below this, a table view shows the following fields:

Abc Icsd000b16a_e	Abc Icsd000b16a_e	Abc Icsd000b16a_e	Abc Icsd000b16a_e
Csduid	Csduid	Csduid	Pruid

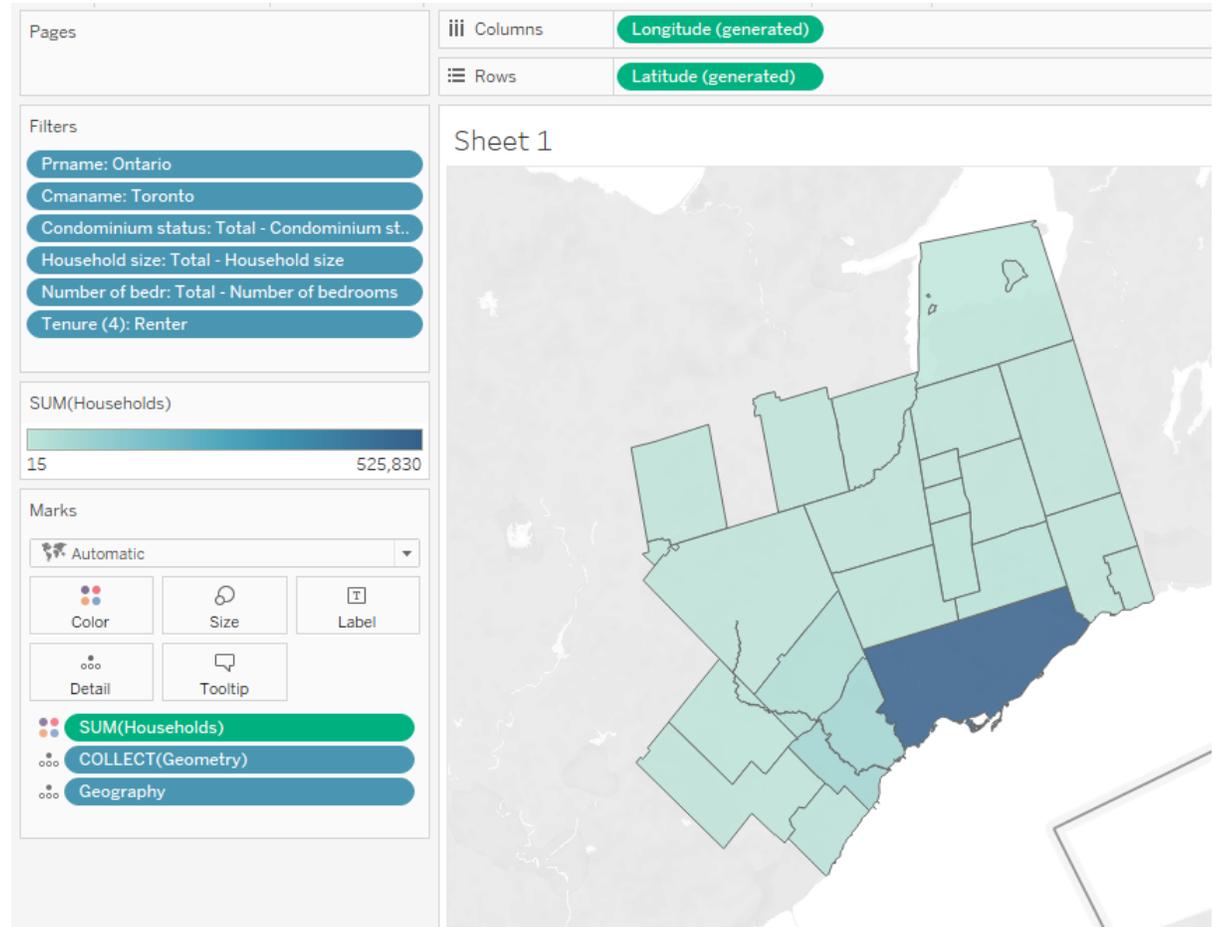
An 'Edit Relationship' dialog box is open, showing the relationship between 'Extract' and 'Icsd000b16a_e'. The relationship is defined as 'Abc Geography = Abc Csduid'. The dialog lists fields from both data sources:

Extract	Icsd000b16a_e
Abc Geography	Abc Csduid
Abc Condominium status	Abc Ccsname
Abc Household size	Abc Ccsuid
# Households	Abc Cdname
Abc Number of bedr	Abc Cdtype
Abc Tenure (4)	Abc Cduid
	Abc Cmaname

The dialog also includes search fields and 'Edit Relationship Calculation...' buttons for both sides, and a 'Close' button at the bottom right.

Tableau Desktop – mapping CDP data

- Use filters from shapefile to choose which geographies to show
- Use filters from data table to choose which variable to map
- Maps in dashboards can be used with filter actions to select a geography to filter for
 - Note: data can be aggregated across multiple geographies, but only when they are counts
 - See Community Recovery Dashboard for example



Answering your questions

Learning the basics

- Resources

- [Tableau Free Training Videos](#)

- Dozens of free training videos offered by Tableau
 - Helpful for getting started, learning the basics

- [The Tableau Community Forums](#)

- Ask questions and see answers to questions by other users

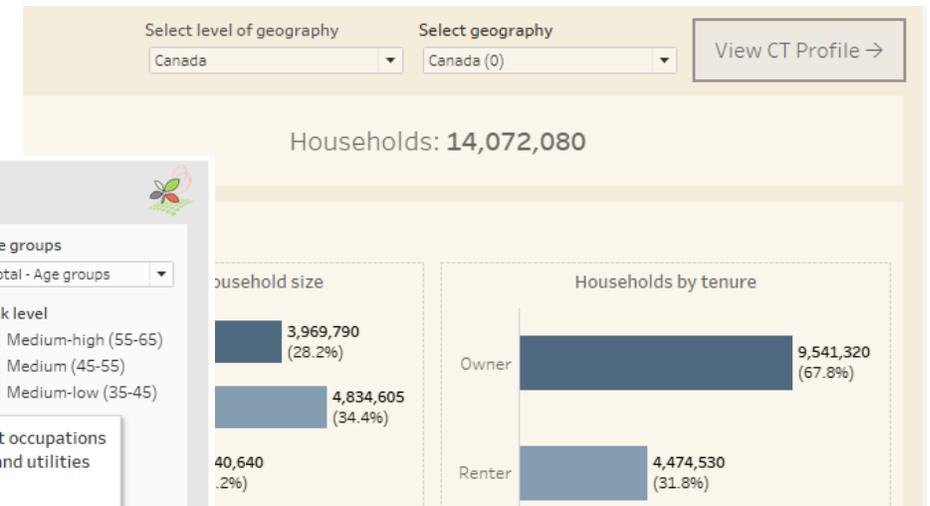
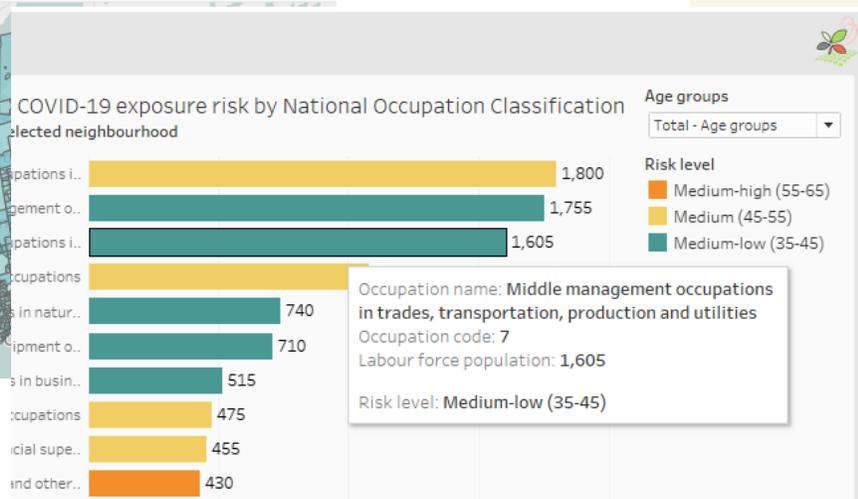
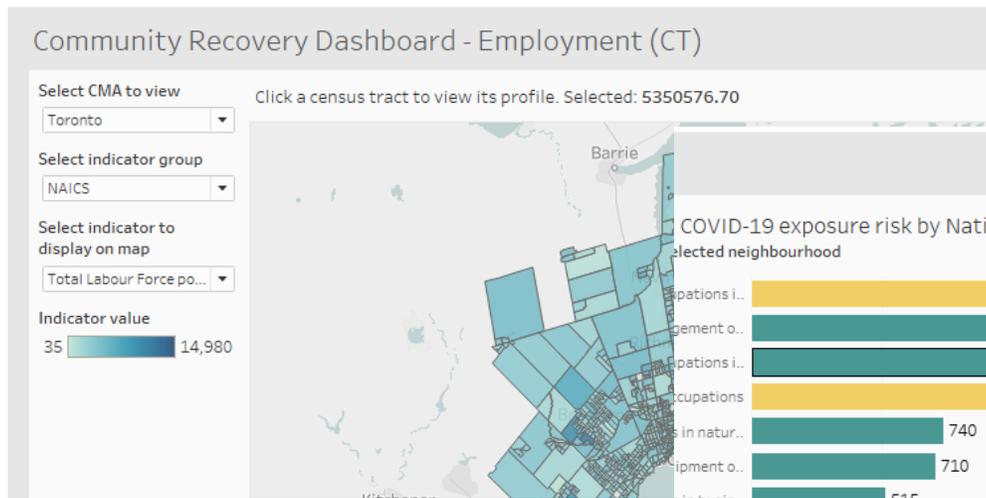
- [Tableau Public Viz of the Day](#)

- See how others use Tableau
 - Download workbooks to see how they work

- Google!

Making an infographic interactive

- Add filter options to dashboard for selecting
 - Geography
 - Variables to display/chart
 - Filters to add to charts
- Interactive maps
 - Select which geographies to view and which data to view on map
- Tooltips can show additional information



Embedding Tableau Dashboards in webpages

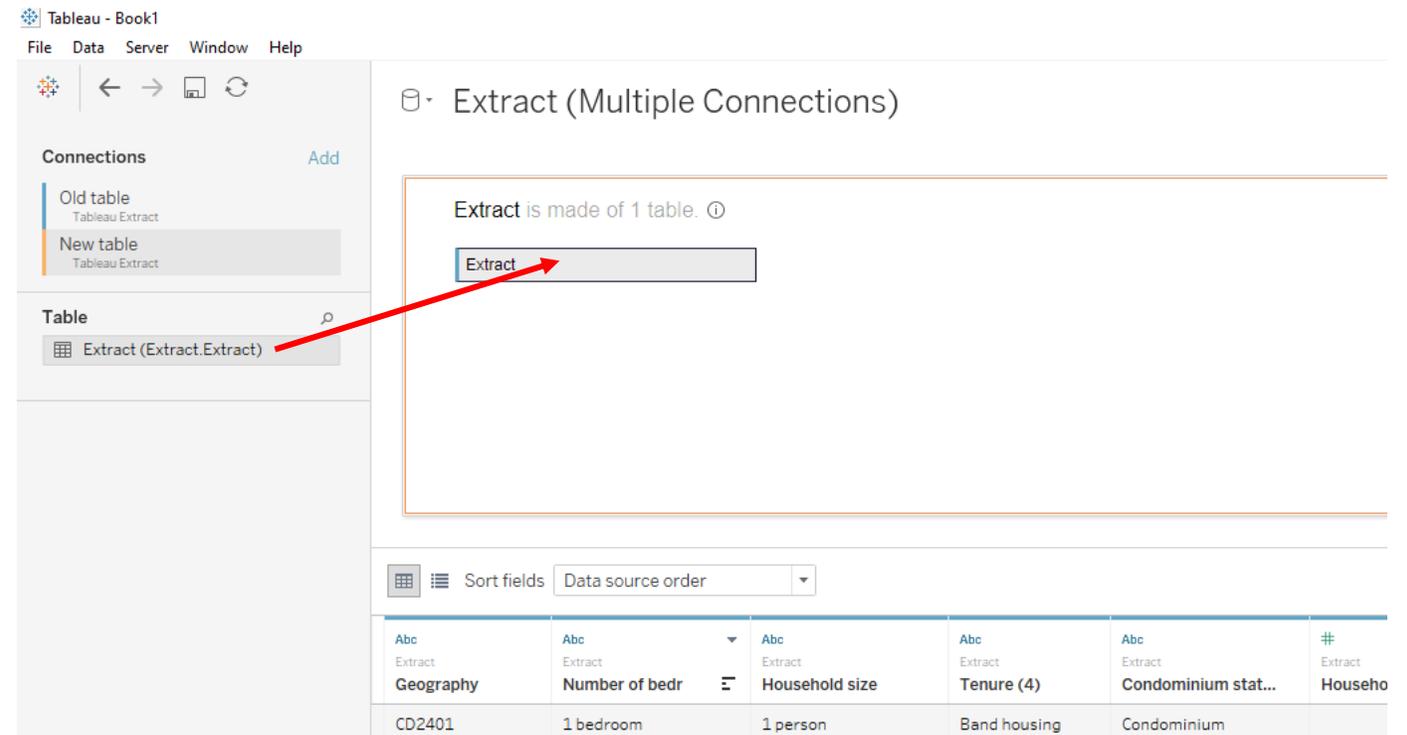
- Tableau Public
 - Free
 - Embedded dashboard becomes publicly available – anybody who sees it can download it, share it and access its data
- Tableau online or server
 - Monthly or annual fee
 - Only registered users under your organization can view
- Tableau Embedded Analytics
 - Significant cost, dependant on factors such as number of users
 - Secure, customizable embedding with support from Tableau

What can be done for free or for a reasonable cost?

- For free
 - Tableau Public
 - Offers most or all the functionality of Tableau desktop
 - Dashboards can't be saved locally, only to Tableau Public where anybody who sees it can download it, share it and access its data
 - Tableau Desktop 14-day free trial
- For reasonable cost
 - Techsoup offers discounted Tableau desktop licenses for non-profit organizations
 - 2-year license, includes Tableau prep builder

Changing the data source tables for a live dashboard without having it explode

- Add the new table as a new connection to the existing data source
- Double click the old table in the data source pane, then drag the new table onto the old one
- Make sure field formats are correct and everything updated correctly, then old table connection can be removed
- Keep a backup of your workbook in case anything goes wrong

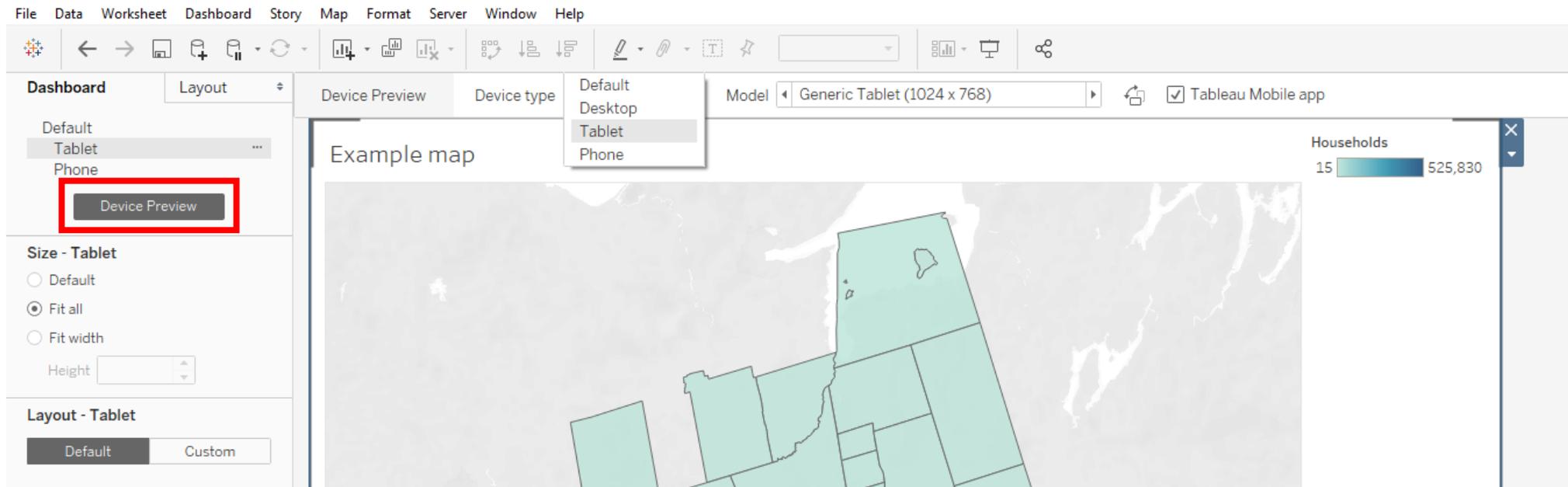


The screenshot shows the Tableau interface with a live extract connection. The 'Connections' pane on the left shows 'Old table' and 'New table' as Tableau Extracts. The 'Table' pane shows 'Extract (Extract.Extract)'. A red arrow points from the 'Extract (Extract.Extract)' table in the 'Table' pane to the 'Extract' button in the main view. The main view shows 'Extract (Multiple Connections)' with a message 'Extract is made of 1 table.' and a button labeled 'Extract'. Below this, there is a 'Sort fields' dropdown set to 'Data source order' and a data table.

Abc Extract Geography	Abc Extract Number of bedr	Abc Extract Household size	Abc Extract Tenure (4)	Abc Extract Condominium stat...	# Extract Househo
CD2401	1 bedroom	1 person	Band housing	Condominium	

Formatting dashboards for different screens and devices

- Use “Device preview” to preview your dashboard on different screens/devices and create separate layouts for those devices



Thank you!

Questions?