MIS771 Descriptive Analytics and Visualisation	DEAKIN UNIVERSITY
Topic 10 Tutorial - A Working with GeoTagged and Time-Series Data	

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Introduction

This week's tutorial provides an introduction to the basics of Map-based and Time-based visualisations. Using the Tableau Data Visualisation tool the tutorial will explain, how to use Latitude and Longitude dimensions in order to project data on to a map, how to work with a basic Time dimension, and how to zoom and/or expand various views. You will also practice building a simple Tree/Area chart.

Specifically, the aims of this tutorial are to:

- understand the basics of map-based data visuals
- understand the basis of time-based data visuals
- and explore the basic principles of zoom and/or expand

Scenario

This week we will explore a sample Store Sales data set, which has been augmented with some Latitude and Longitude data.

The Store Sales data set provides details on more than 5,000 individual sales transactions, which span 2012 and 2013. Each record in the data set relates to a specific Sales transaction and consists of some 11 attributes ranging from, a unique Order Identifier, the Date of the Sale, the Product purchased, the Quantity of Product Sold, the Product Price, the Total Value of the specific Sales Transaction, the Location of the Store, and the Sales Region (as defined by the company). The data set has been put together specifically for this Tutorial, using Random numbers.

The main aim of today's tutorial is to see how adding geographical data to your analysis can provide additional insight using maps as a visual aid, and how time attributes in your data can be used to identify trends.

1. Open the data file in Excel

First we need to download our sample data set for this Tutorial and open the data in Excel.

a) Download the file Sales_Actuals_Tut03.xls from the Unit Resources on Cloud Deakin. Save it to your hard drive (or your working disk if working on one of the Deakin lab computers).

b) Open the Sales_Actuals_Tut03.xls file in Excel.

Figure 1: The Sales_Actuals_Tut03.xls file, opened in Excel

2. What structure can you see in that data?

As we did in our previous tutorial, before we can begin any type of analysis on the Sales data we first need to understand the basic structure of the data and understand how the data is organised.

In previous tutorials you have been shown the difference between Categorical and Continuous data. In this step we will first identify the different types of Categorical and Continuous data available in the tutorial data set.

a) What different groups of data are there in the Data Set, and what are the labels/names for each of the Categorical data?

b) What are the labels/names for the Continuous data?

c) How many records are there in the Data Set?

d) Can you seen any of Suburb in the Store Location column?

e) Can you see a Date attribute (as discussed a Date is both Ordinal and an Interval)?

f) What attributes appear to be Location type data?

> ⚠️ Categorical Data usually can take on one of a limited, and usually fixed, number of possible values, and is typically used to describe or group related data. Continuous data is usually Numeric and many take on any value with a range.

3. Launch Tableau and connect to our data.

As we have done before, we will begin by starting Tableau and connecting to the Sales data set using the Tableau Software. These are the same basic steps you took at the beginning of the last Tutorial, only this time we will connect to the Sales_Actuals_Tut03.xls file and attached to the 'Sales' excel worksheet.

a) First start the Tableau software, just like any other software (access from the Windows Start menu)… Note: If you haven't already you can download a trail version of Tableau from http://www.tableau.com/ and use the Product Activation Key provided on Cloud Deakin.
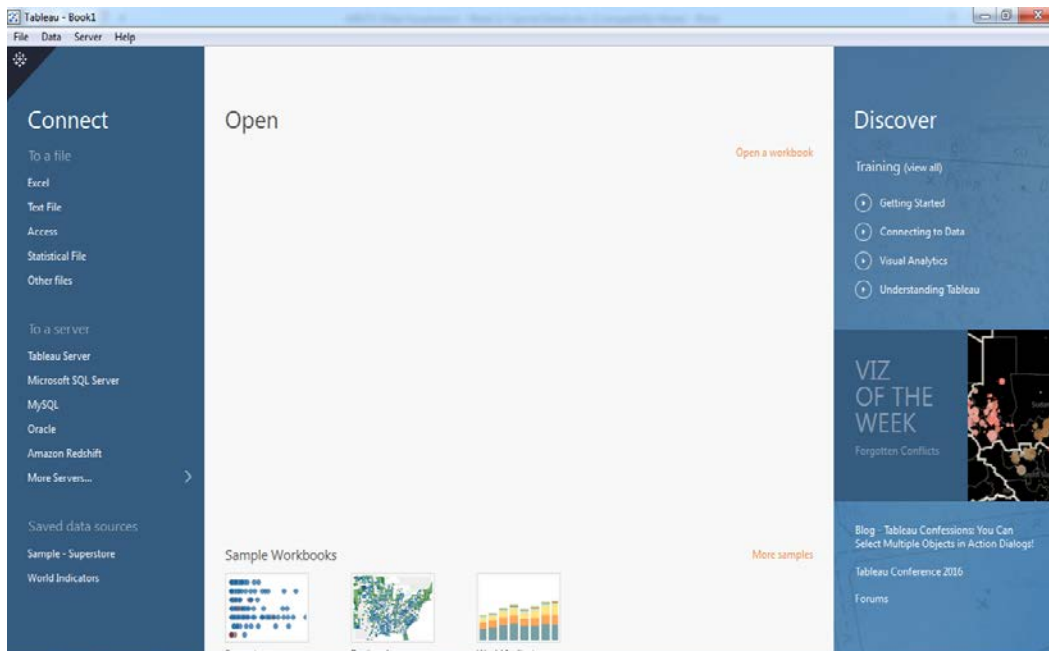

Figure 2: The Tableau software opening screen

If you are using the Deakin Lab computers the Tableau software will already be installed. If you are working through the tutorial on your personal computer you will need to first install the Tableau using the instructions and software key provided in the MIS771 discussion forum.

b) Next use the 'Connect' feature to open the Sales_Actuals_Tut03.xls in Tableau.
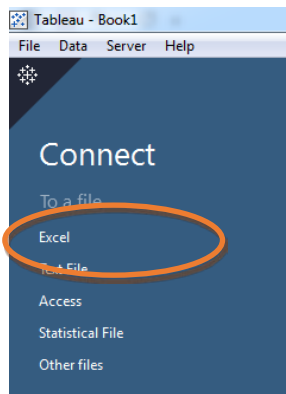
Step 1. 'Select Excel'	Step 2. Locate and Select 'Sales_Actuals_Tut03.xls' and click 'Open'
Figure 3: Tableau Connect to Data	*Figure 4: Select the Sales Actuals Tutorial file*
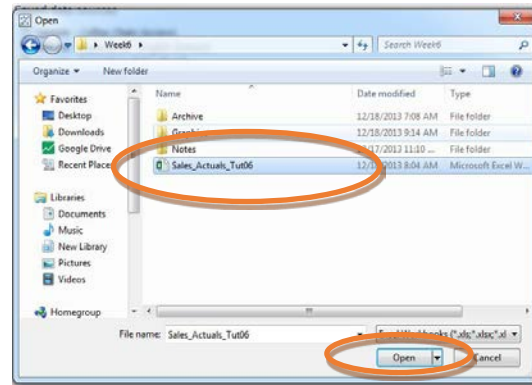
Step 3. 'Connect live'. Ensure the 'Live' Connection option is selected, and drag the 'Sales' worksheet in to the Preview (so that the data is shown), then click the 'Sheet 1' tab at the bottom of the screen.
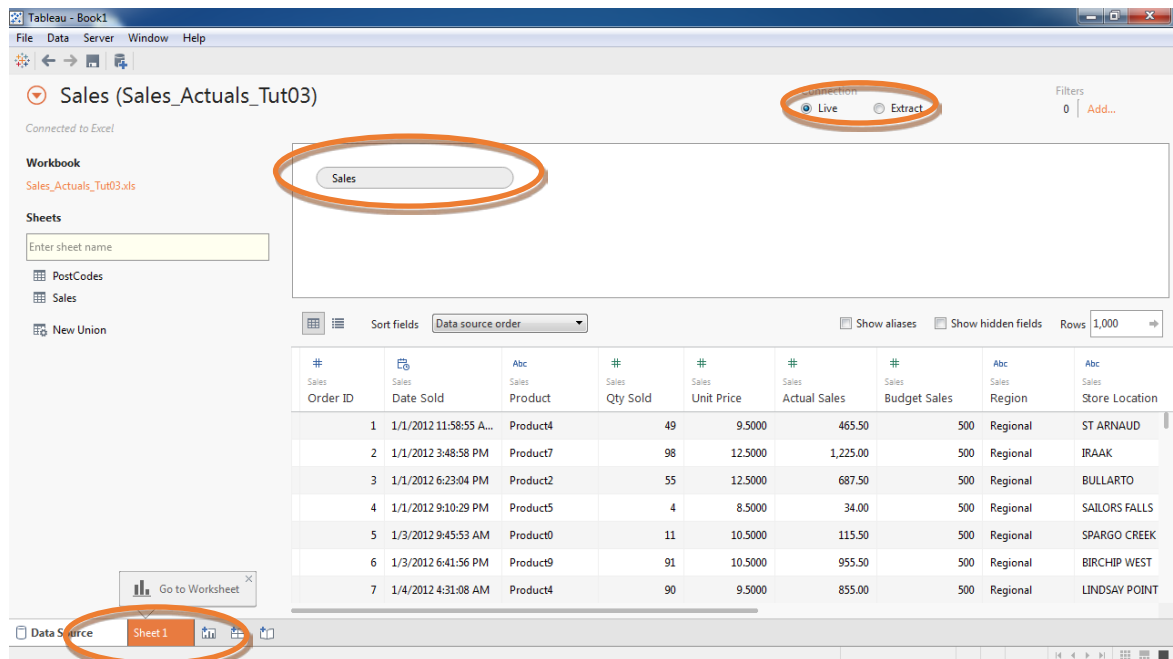
Figure 5: Tableau Connect live to the Excel file

c) Can you identify the labels for the Categorical data and the Continuous data?

Figure 8: Tableau Work Sheet

⚠️ Tableau calls Categorical data 'Dimensions', and calls Continuous data 'Measures'. Also if you saved the Sales_Actuals_Tut03.xls with your additional Data Analysis there migh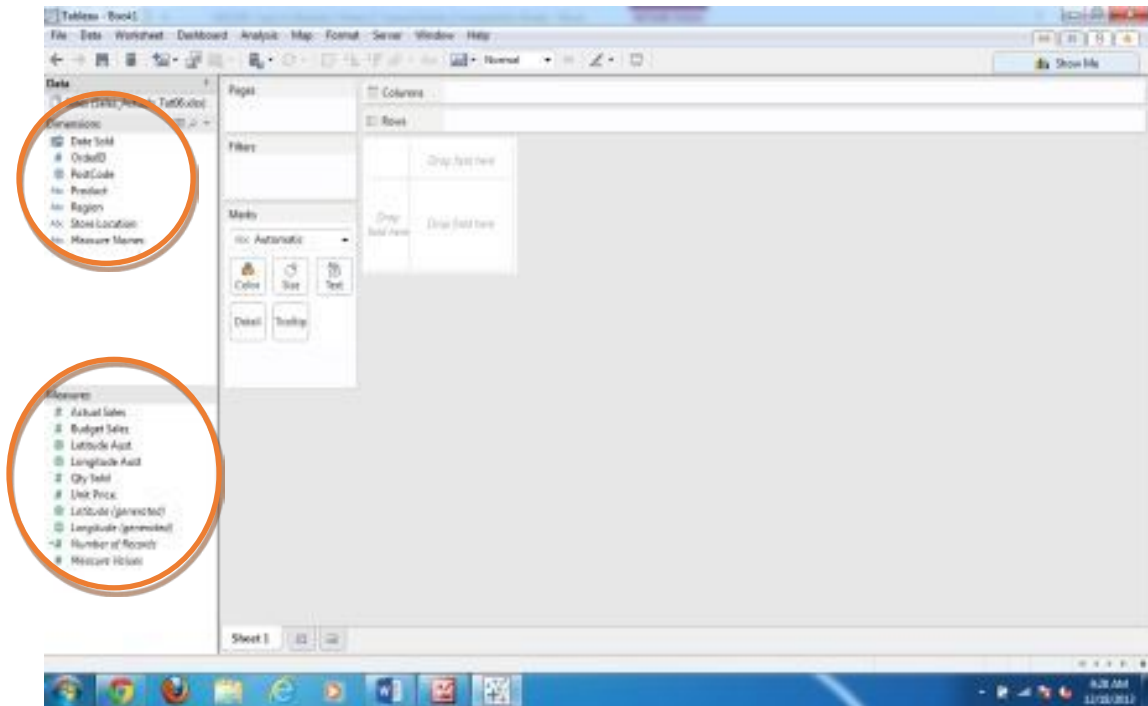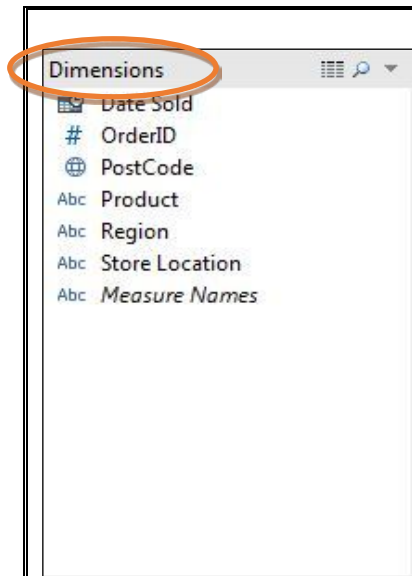t be some additional unnecessary Dimensions (these can be hidden in Tableau, using the 'Hide' option on each unwanted Dimension).

Dimensions	Measures
📅 Date Sold	# Actual Sales
# OrderID	# Budget Sales
🌐 PostCode	🌐 Latitude Aust
Abc Product	🌐 Longitude Aust
Abc Region	# Qty Sold
Abc Store Location	# Unit Price
Abc *Measure Names*	🌐 *Latitude (generated)*
	🌐 *Longitude (generated)*
	=# *Number of Records*
	# *Measure Values*

Figure 9: Dimensions/Categorical Data   *Figure 10: Measures/Continuous Data*
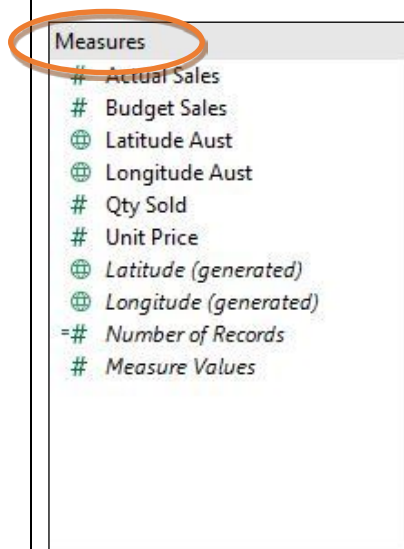
4. Configuring a set of Tableau Workspaces.

In this section we will configure 3 Tableau workspaces in preparation for placing them on to a Dashboard.
1. Location – A graphical representation of Store Location, and the relative Size of Sales by Store
2. Trend – A line chart showing the Trend in Sales over Time, by Sales Region
3. Product – A tree chart showing the relative Size of Total Sales by Produce

a) Using the drop-and-drag techniques you learnt in the previous Tableau tutorial, configure the Location Workspace shown in Figure 11 (see Hints below). Note: Make sure you rename the workspace to 'Location'.
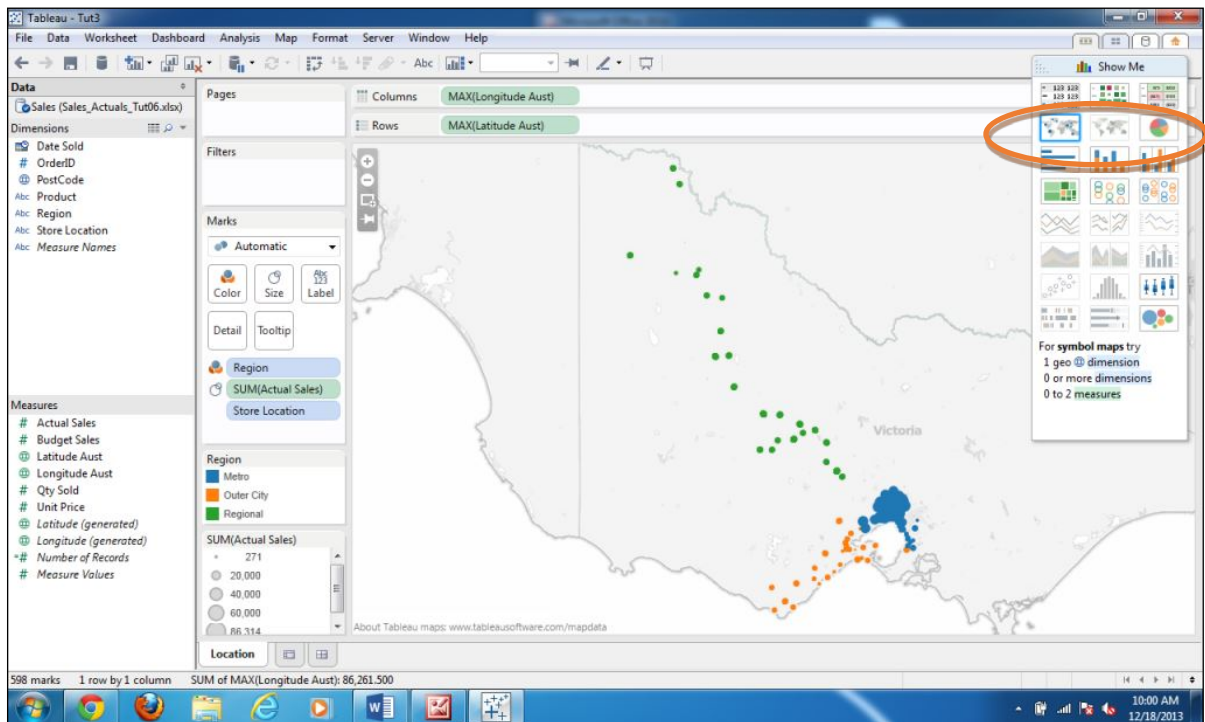
Figure 11: Drag-and-drop the 'Dimensions' and 'Measures' to the various Workspace Panels

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1. Dropping-and-dragging the 'Store Location' Dimension on top of the 'Detail' panel will make the chart show a data point/dot for every Store Location.
2. Dropping-and-dragging the 'Region' Dimension on top of the 'Color' panel will make the chart show Green, Orange, and Blue colors for each Region.
3. Dropping-and-dragging the 'Actual Sales' Measure on top of the 'Size' panel will make the Store Location dots change in Size to show relative Sales Volumes by Store.
4. To correct for some data quality errors, you can change the 'AVG' functions to 'MAX' functions for the Latitude and Longitude Measures on the Columns and Rows panels, by 'Right-clicking' on the Measure (once you have dragged it in to place) and selecting the 'Measure' menu item, then the 'Maximum' function.

*Question:* What does using the Map tell you about the apparent Store Location strategy for this example company?

b) Next, click on the 'Add New Workspace' icon at the bottom of the screen and add a new workspace. Then configure the new workspace as shown in Figure 12 (see Hints below). Note: Make sure you rename the workspace to 'Trend'.
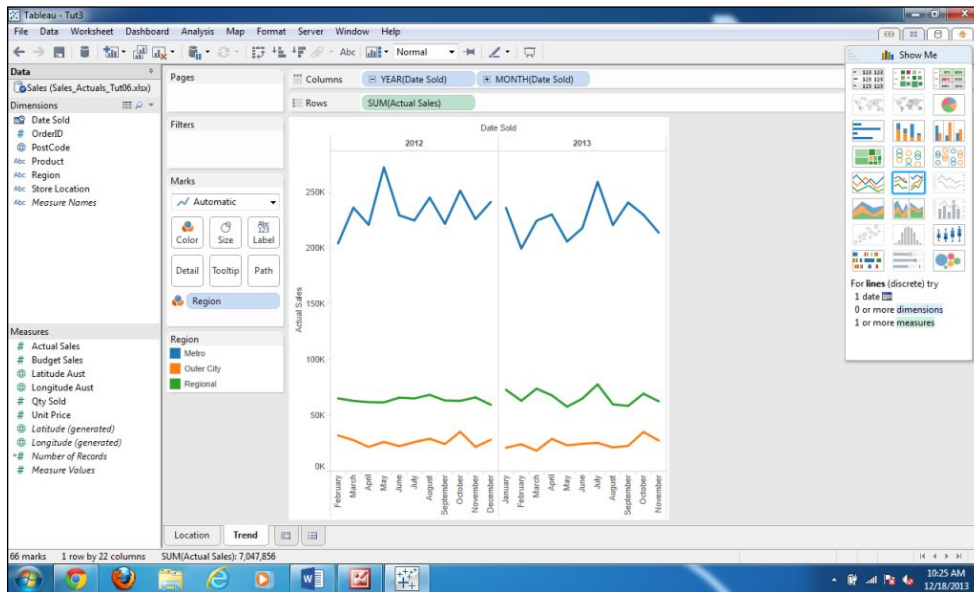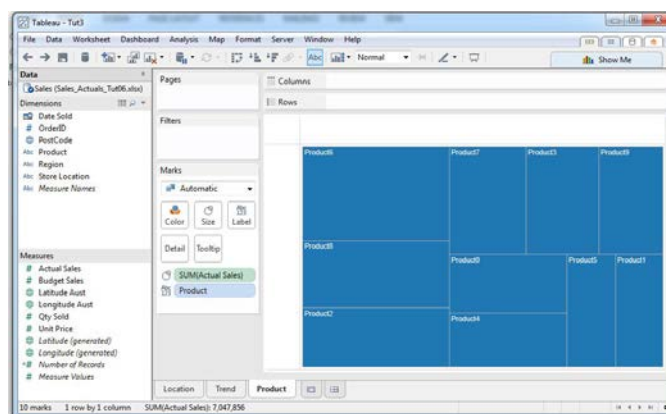

Figure 12: Drag-and-drop the 'Dimensions' and 'Measures' to the various Workspace Panels

You can expand the Date Dimension by clicking on the "+" symbol next to YEAR, and you can remove unwanted detail (eg. QUARTERS) by dragging off the panel or by using the 'Remove' option on the item menu
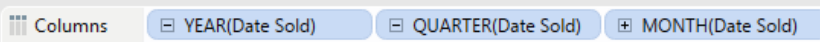
c) Finally, click on the 'Add New Workspace' icon one more time and add a new workspace. Then configure the new workspace as shown in Figure 13. Note: Make sure you rename the workspace to 'Product' (Hint: Product is a Label, and Actual Sales is the Size).
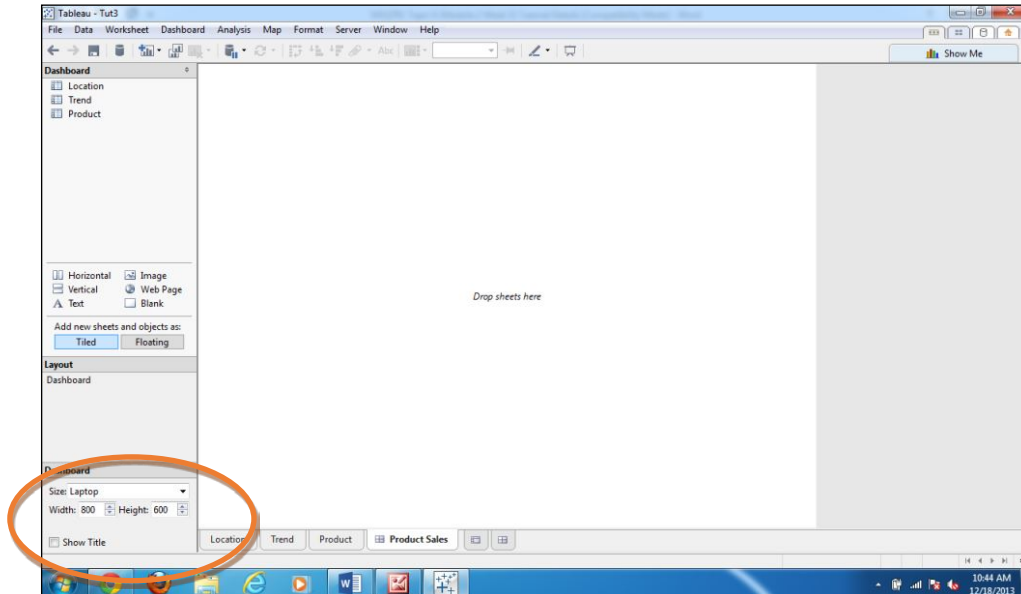

*Figure 13: Drag-and-drop the 'Dimensions' and 'Measures' to the various Workspace Panels*

5. Configuring a Tableau Dashboard.

a) Click on the 'Add New Dashboard' icon ![icon] at the bottom of the screen and add a new Dashboard. Note: Make sure you rename the workspace to 'Product Sales' and set the Dashboard Size to 'Laptop'.
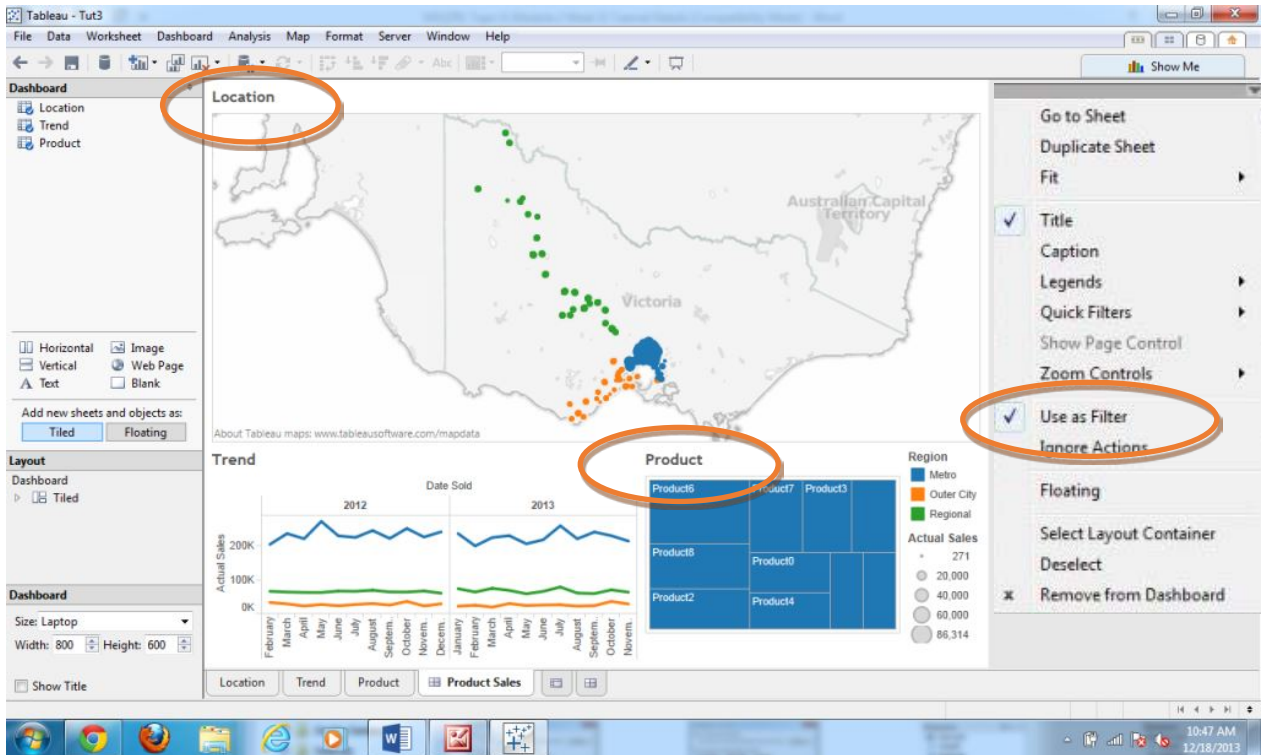

Figure 14: Add a new Dashboard

b) Next, drop-and-drag the 'Location', 'Trend', and 'Product' worksheets on to the Dashboard workspace and resize them to show relative importance.
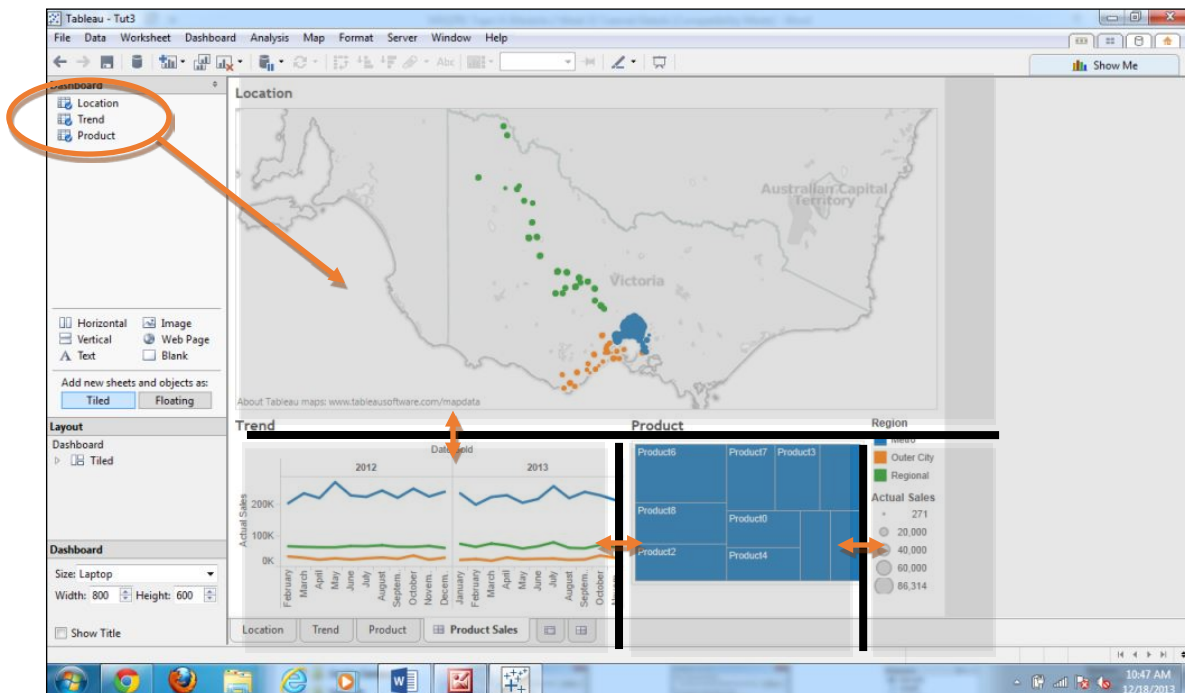
Figure 15: Place the Workspaces on the Dashboard, and resize the Windows

c) Next, we will select a 'Use as Filter' function on then for both the 'Location' and 'Product' workspaces (on the Dashboard).

Figure 16: Set the 'Use as Filter' feature on the Location and Product workspaces

6. Now you're ready to begin exploring the Dashboard

Try bringing the Dashboard up in full-screen mode:

Then try selecting a Product (right-clicking on a square in the Product tree chart), you can de-select by clicking on the same Product again. Or try selecting a Single Store or group of Stores (right-click and drag on the Map to select more than one Store).

Can you see any interesting Trends as you explore the Dashboard?

7. Adding a URL for drill-down

Finally, using the 'Worksheet -> Actions…' techniques you learnt in an earlier Tutorial try adding an 'Add Action -> URL' on the Location Visualisation so that it opens an Internet URL for a specific PostCode when a user of the Data Visualisation 'Selects' a specific location bubble.

> ⚠ You might want to first add the 'LocationLink' Dimension to the Details of the Location WorkSheet (that is, so that the URL will appear in the 'Hoverover' details for a Loaction, then in the URL area of the 'Add URL Action' dialog box you can insert <LocationLink>

References

1. Data Source: Sales_Actuals_Tut03 has been manually generated using pseudo random data.
2. Post Code GeoTag data: http://blog.datalicious.com/free-download-all-australian-postcodes-geocod/ (with some manipulation)
3. Tool: Tableau Version 8.1 http://www.tableausoftware.com/