

# BI Concepts, Tools and Applications

## Exercise # 4: Advanced Enterprise Data Discovery

### Introduction

Mobile device ownership has reached critical mass around the world. Today, these devices serve as the primary communications and media vehicles for many, and play an increasingly important role in the daily lives of consumers in both developed and high-growth economies.

Your first assignment is to create a presentation-ready dashboard to better understand today's mobile world. To achieve this, you have been given access to a comprehensive dataset on the following countries – Australia, Brazil, China, India, Italy, South Korea, Russia, Turkey, the United Kingdom, and the United States – in addition to other relevant information to analyze Global Smartphone users in depth.

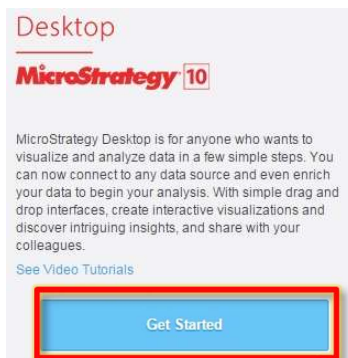
### Importing and Preparing Data


Your first goal is to bring in the data you were given and convert it into a compelling analysis. To start the visual data discovery process, create a new dashboard in MicroStrategy Desktop.

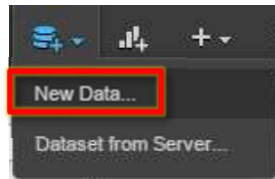
1. Launch **MicroStrategy Desktop** from your Desktop



2. Click the **Get Started** button. The Visual Insight Interface comes up

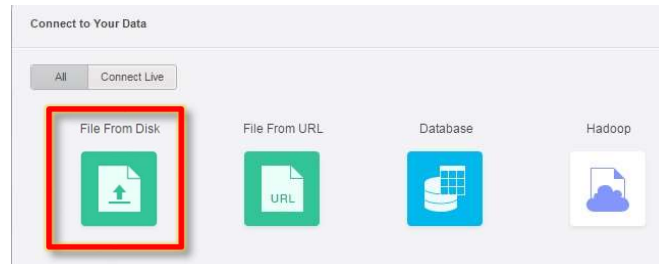


3. From the toolbar, click the arrow next to the **Add Data** button 
4. From the types of available data sources, select **New Data** to bring up the data import wizard



From this screen, you can browse existing data sources or import new ones for your analysis. The data you will be analyzing is available as an Excel spreadsheet.

5. In the Connect to Your Data interface select File From Disk



6. On the next screen, click **Choose files** to find and import the spreadsheet from the local machine. You can find the file in the assignment details section and save it your local machine.
7. Browse for **Mobile Usage Analysis.xlsx** file and select it. At the bottom of the page, click **Prepare Data**



If the Excel file has several sheets, the next screen allows you to select your desired data sheet. You also have the ability to drag the file from its folder location and drop it in the Upload your files area.

In this exercise you are going to import several sheets from the same file at once.

8. Uncheck **App Usage by Age Group**
9. Check **Device Usage over time, Top Mobile Markets, Mobile Usage by Age Group**. Click **Select**




The datasets contains data for an in-depth look at mobile consumers and how they use their devices in their daily lives in both developed and high-growth economies.



MicroStrategy automatically maps the columns as attributes (your business dimensions) and metrics (your performance indicators or KPIs) that will be available for analysis. This mapping is based on the data types available, and names are determined by the column headers specified in the data source file. If any adjustments are needed, they can be performed here.

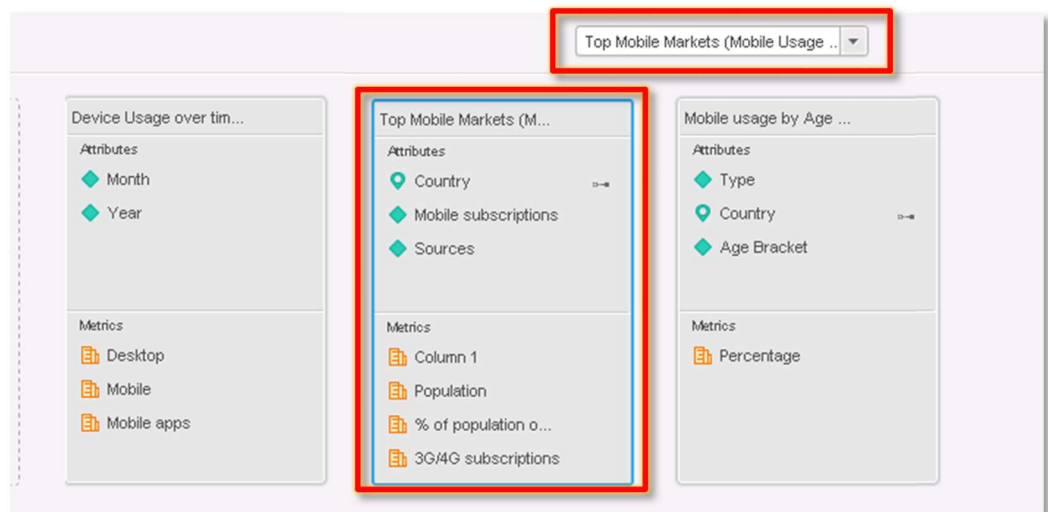


MicroStrategy's data enrichment feature gives users the chance to automatically enrich the uploaded data. As part of the data import process, MicroStrategy can add hierarchical levels to time and geographic columns and assign geo attributes proper geographic levels for a tighter integration with MicroStrategy's mapping offering.

For this example, notice the  icon displayed for the Country column. This indicates that the attributes have already been identified as a Geographic type and will be automatically enriched with geo-coding data such as longitude and latitude.

Before you start analyzing, you have the option to clean and manipulate the data within the product using the new data wrangling feature.

10. Select the **Top Mobile Markets** by clicking on it or selecting it from the drop down box on top

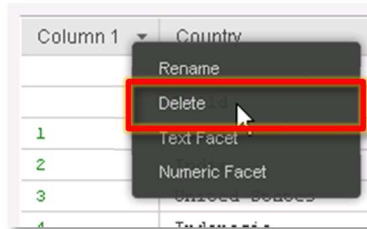


11. On the right-hand side of the data preview interface, click **Wrangle** (If the data preview interface is not visible click on the arrow on the bottom left to display the interface)



There are 3 main parts in the Data Wrangling interface. On the top left there is a dynamic list of suggested functions that updates every time you click on a column or value. In the top right corner, you have the history script, which is a collection of steps taken during the Data Wrangling process. Lastly, the data preview section in the center of the interface helps identify cleansing opportunities.

- a) Select the arrow next to **column 1** and then choose **Delete column**



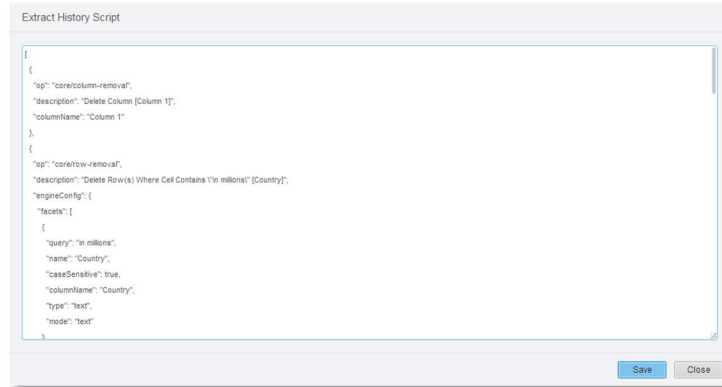
- b) Select the **Mobile Subscriptions** Column and then highlight the “m” which represents “in millions” next to the values. The goal here is to remove the “m” part from all the cells within that column in one action. Once the **m** is highlighted a dynamic list of functions will be populated. Scroll down to find the function **Remove Characters After “.any number”** and Apply



- c) Select the **% population of 3G/4G users** column and scroll down to the **N/A** value. Hover over the N/A and double click, delete the N/A and then select **Apply to all** (double tick) that appears.
- d) From the **History Script** section choose to save your script on the local machine for later use. Name it **Top Mobile Markets Wrangling**
- e) Click the **down arrow** button

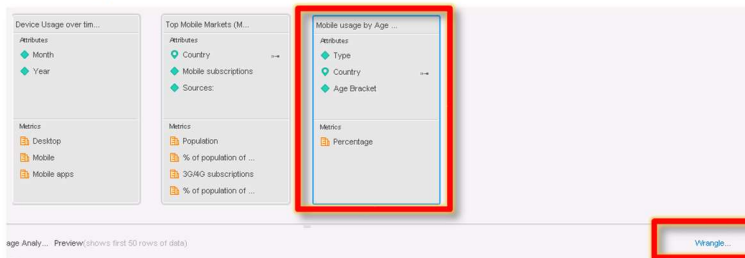


- f) Select **Save**
- g) **Save** the wrangling script as **Top Mobile Markets Wrangling** and select **Close**

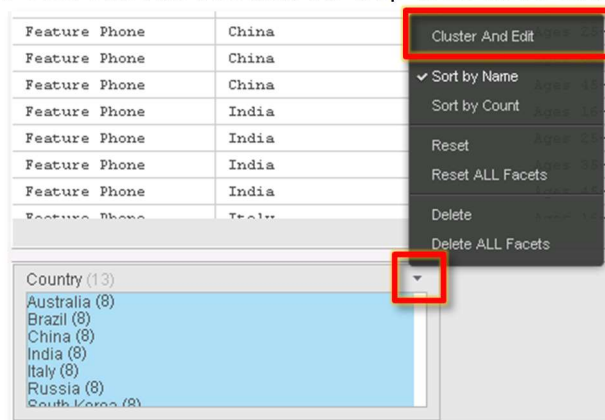


- h) Click **OK** to exit the Data Wrangling section

12. Once you return to the Data Preview area select the **Mobile Usage by Age** table and select **Wrangle**



- a) Select the **Country** column, click on the drop down arrow next to country and select **Text Selector**
- b) From the **Text Selector** box click the drop down arrow and select **Cluster and Edit**



Clusters are used to identify similar content that may need to be synchronized in the data to avoid inconsistencies in the analysis; for example, multiple instances of a country name all spelled differently.

There are two types of clusters in data wrangling, phonetic clusters and fingerprint clusters. Phonetic clusters are based on what the text sounds like. Fingerprint clusters are based on how the text is spelled.

- c) From the **Algorithm** drop down box select **Phonetic**
  - The first **cluster** contains two spellings for **United States**. In this case the cluster already selected the proper spelling for you
  - The second **cluster** contains two different spellings for **UK**. Replace them with **United Kingdom** in the New Cell Value Column
  - **Check** the 2 **checkboxes** under the Merge? column once you are done and then select **Merge and Close**

Merge?	Cluster Size	Row Count	Values in Cluster	New Cell Value
<input checked="" type="checkbox"/>	2	8	<ul style="list-style-type: none"> <li>United States (7 rows)</li> <li>United States of America (1 row)</li> </ul>	United States
<input checked="" type="checkbox"/>	2	2	<ul style="list-style-type: none"> <li>U.K. (1 row)</li> <li>UK (1 row)</li> </ul>	United Kingdom

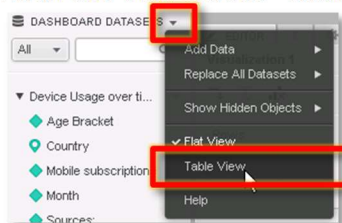
Buttons: Merge and Recluster, Merge and Close (highlighted), Cancel

- d) Click **Ok** to leave the Data Wrangling area. Click **Finish** from the **data preview** menu to go to the dashboard area.

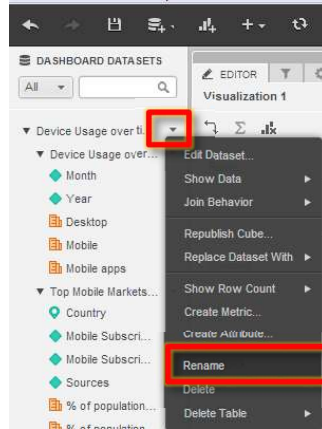


Data wrangling also provides Numeric Facets for numeric columns and the ability to preview the outcome of a function before applying it. Users also have the ability to undo or redo functions in any order without losing their changes.

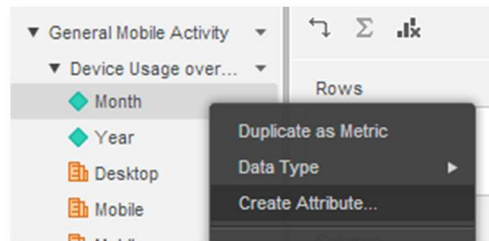
13. Once you are in the dashboard area, find the drop down arrow next to the **Dashboard Datasets** Icon and then choose **Table view**



14. Next right-click on the newly created dataset and rename it **General Mobile Activity**



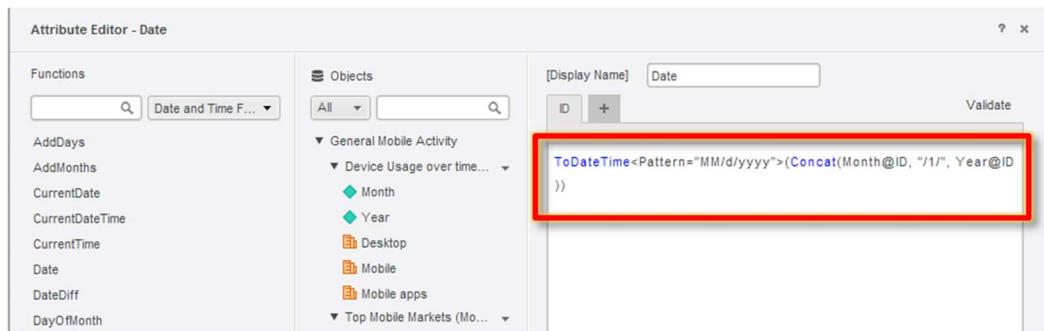
15. In the Dashboard Datasets panel, right-click on **Month** attribute and select **Create Attribute**.



16. Once in the Attribute Editor window, change the Attribute Name to: **Date**

17. In the function editor enter the following:

**ToDateTime<Pattern="MM/d/yyyy">(Concat(Month@ID, "/1/", Year@ID))**

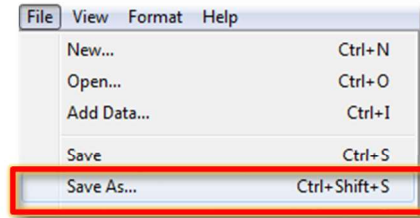


(Copy and Paste form this document)


18. Click the **validate** button and **Save**

At this point, it is a good idea to **save** the work you have so far.

19. Using the MicroStrategy Desktop toolbar, click on **File** and then on **Save As** to save your progress:

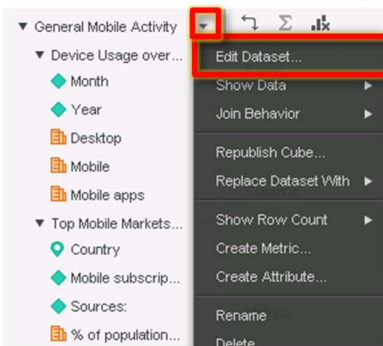


20. On the Save dialog, navigate to the folder where you want to save your file.
21. Once in your new folder, enter **Mobile Usage Analysis** as the name for your MicroStrategy file
22. Click **Save** to complete the request.

When you save your dashboard as a MicroStrategy (.MSTR) file, the entire dashboard, including visualizations, filters and data cubes, is exported. You can share this file with other MicroStrategy Desktop users, who can import it into their own MicroStrategy Desktop environments to review, modify, or create new visualizations based on the data you share with them. Feel free to save your dashboard at any point using the Save  button.

In the next steps we will be exploring Multisource Data Import capabilities which allow users to connect to data from multiple sources within a single dataset.

23. Right-click on the dataset **General Mobile Activity** and click **edit dataset**

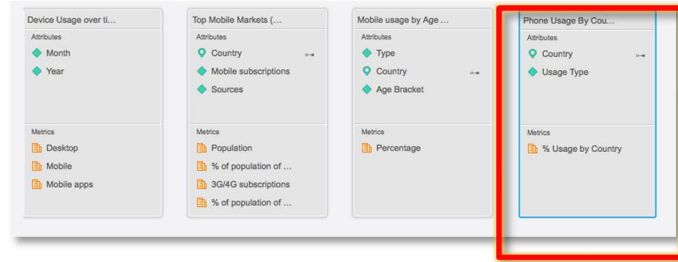


- a. From the Data Preview Page click on “**Add a new table**” from the left hand side.



- b. Select Files From Disk; select Choose Files
- c. In your working folder find the file “**Phone Usage by Country**”
- d. Click **Add**
- e. You will notice the new table is now available in the dataset. Click **Update Dataset** to confirm.



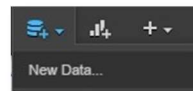


#### 24. Save your Dashboard



This feature also allows automatic joining of related objects and the ability for users to apply manual joins as well. Notice how Country is automatically linked between all the tables. Users can also add multiple tables from different sources directly from the Preview section without the need to go back and forth from the dashboard.

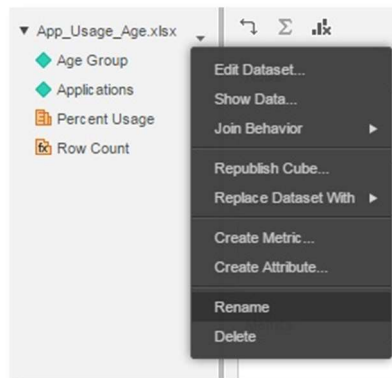
#### 25. From the Dashboard page click on the **Add Data** icon and select **New Data**



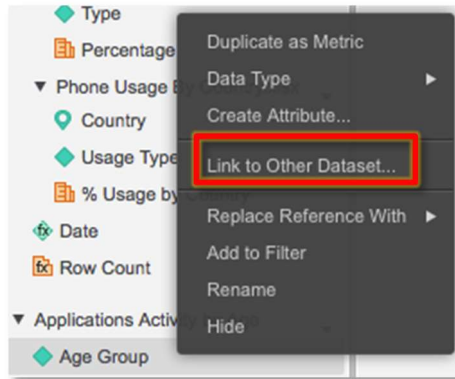
#### 26. Select the **File From Disk** option

- Find in your working folder the file “**App\_Usage\_Age**”.xlsx
- Click **Finish**

#### 27. Rename the new dataset to **Applications Activity by Age**.



#### 28. Right-click on **Age group** in your new dataset and select **Link to Other Dataset**



29. Choose the **Age bracket** attribute from the **General Mobile Activity** dataset and then click **OK**



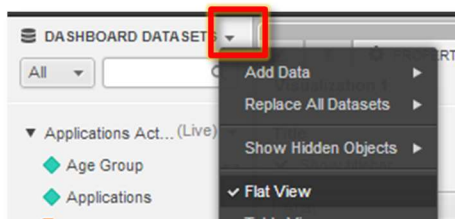
30. **Save** your dashboard

Now that your data has been imported, you can start creating visualizations to easily explore and analyze the information contained in this data.

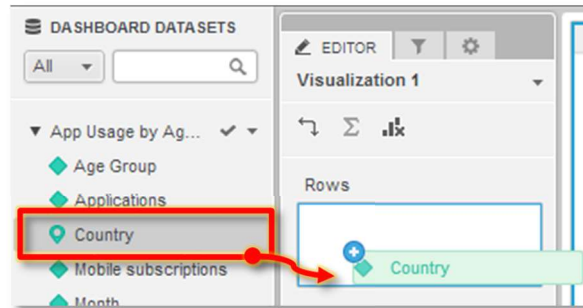
## Exploring the Data

Before starting remember to save your changes. To get started with your analysis, you will first study the penetration of the mobile devices around different countries.


31. From the Dashboard Datasets modify your view back to **Flat view** by clicking on **the drop down arrow** next **Dashboard Datasets**



32. From the Dashboard Datasets panel, click and drag **Country** to the **Rows** drop zone on the Editor panel, to add it to the visualization. By default, a grid is created

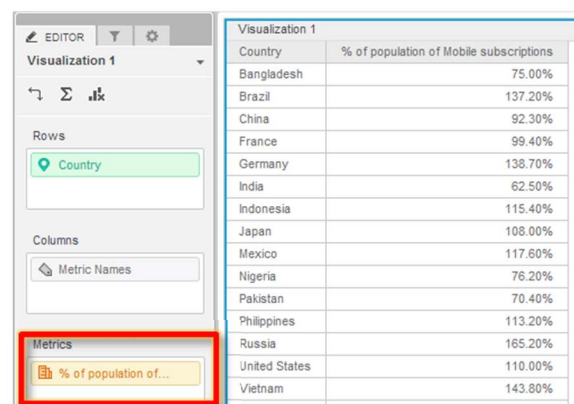


**TIP**

When dragging the element to the grid area, notice the  icon next to the cursor. This helps you identify valid drop zones for adding and replacing objects.

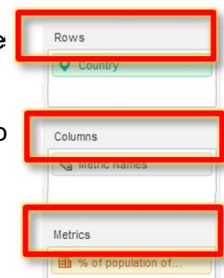
Data objects can also be added to the visualization by double clicking on the object name, dragging the object directly into visualization, or by clicking on the drop zone's Add button to bulk add and remove objects.

33. In a similar fashion, add **% of Population of Mobile Subscriptions** to the **Metrics** drop zone



**TIP**

The Editor panel shows you the objects being used in your visualization. The titles of each section of this panel may vary depending on the type of visualization you are modifying. For example, the pane sections will read “Rows”, “Columns” and “Metrics” when modifying a Grid visualization; or “Geo Attribute”, “Color By” and “Tooltips” when modifying an ESRI Map visualization.



It is easy to change the type of visualizations within a dashboard. Sometimes one type of visualization can represent data more effectively than another. You will now change the existing grid into an ESRI Map.

34. From the **Visualization Gallery** at the right of your screen click on the **ESRI Map icon**.

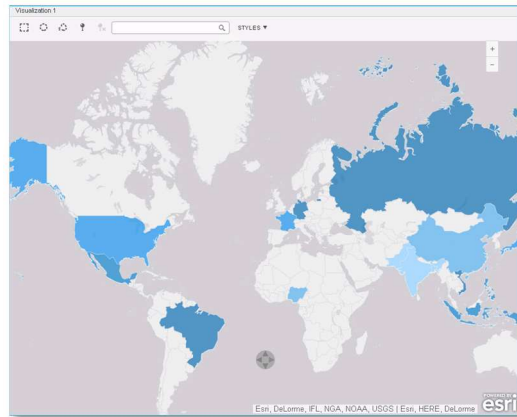


**TIP**

If the Visualization Gallery is not displayed, click View in the toolbar, then select Visualization Gallery.

For maps to work you need to be connected to the internet

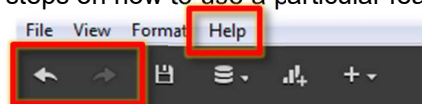
Notice that when you **hover** over the different countries and **click**, a tool tip containing all the metrics data for that country appears. Take a few moments to explore and analyze the information presented on this graph.



You have now created your first visualization as a map analyzing the Top Mobile Markets. With just a few clicks you have identified Russia as the highest Market and India as the lowest.

**TIP**

At any time, you can use the Undo and Redo buttons to revert your dashboard to any previous state. You also have available the Help button to search for detailed documentation and steps on how to use a particular feature.



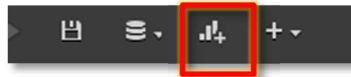
Dashboards can also be exported as PDF or Image. Feel free to explore these options on your own.

Next, you will start exploring additional features available to you through MicroStrategy Desktop.

Now that Mobile Penetration is easier to analyze, what new insights can you draw? Russia had the largest market, however you don't know yet who your mobile consumers are in this market.

You can add as many visualizations as you need to build complete dashboards. To help answer the above question, create a new bar graph to show other metrics available from the dataset.

35. From the main toolbar, click the **Insert Visualization** button



36. From the Visualization Gallery select **Bar Chart**

37. Modify your visualization such that the following objects are in the specified zones:

- f. Vertical: Add **Country** and right-click to set as **Left Row**,  
Add **Age Bracket** and right-click to set as **Left Axis**
- g. Horizontal: Add **Type** and right-click to set to **Top Column**  
Add **Percentage** and right-click to set to **Bottom Axis**
- h. Color By: **Country**

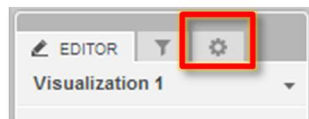
**TIP**

If you place more than one attribute on either the Vertical area or the Horizontal area, the attributes at the top of the area are used to split (or slice) your data into rows or columns of graphs. For example, in your graph, Country and Age Bracket are placed on the Vertical area. By default, Country is used to split the data into rows of graphs. A separate row is displayed for each element in the attribute, in this case, for each country. This is indicated by the Left Row icon (a grid icon) next to the Country name. Each country's row contains a bar graph for each age bracket in the country.



You can instead display one set of bar graphs, with a bar graph for each region and state combination. To do this, display Region on the left axis, along with State. Both attributes are displayed with the Left Axis icon.

38. At the top of the Editor Panel click on the **Properties Tab**



**TIP**

Each type of visualization provides distinct formatting options to enhance your ability to view and read the data. You can determine the shape used to display graph elements, whether to have MicroStrategy optimize space in the visualization by automatically

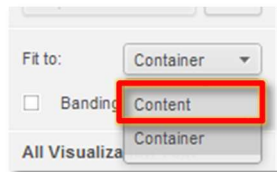
sizing graph elements, define the color of an attribute value in a Graph visualization, and so on.

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39. Under the Drop Down list select Data Exploration



40. From the Data Exploration available options, select Fit to: **Content**



41. Open the Drop Down list again, and select **Axis Lines and Labels** instead of **Data Exploration**.

42. On the Axis Labels section change the font to **6**

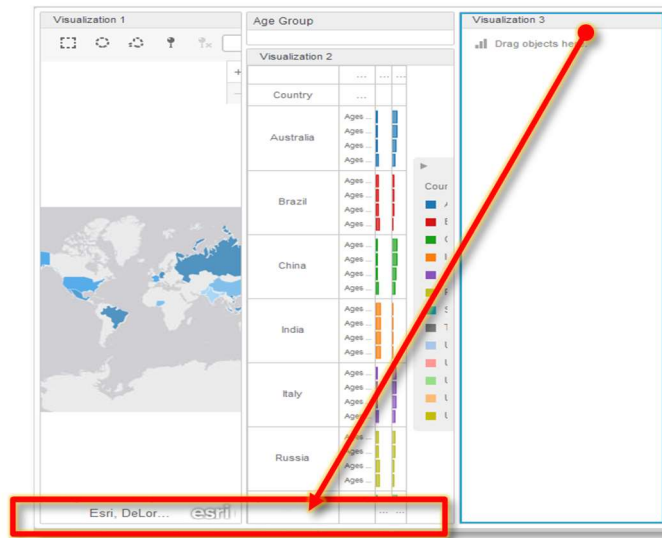


43. **Save** your Dashboard

What you can see from this graph is that younger users are more likely to own a smartphone and older users are more likely to own a feature phone, which makes sense since feature phones are more established in the marketplace. Though there are some exceptions – in Italy consumers have higher smartphone ownership among users ages 35-64, whereas in India feature phones have far more penetration than smartphones across all age segments – the broader trend suggests that smartphone adoption will likely continue to rise as younger consumer's age.

## Viewing Raw Data of a Visualization

44. Insert a **new visualization**
45. Reposition the Visualization 3 in this dashboard: Click and hold the **Visualization 3** title bar and drag it **under the Map and Bar Chart** visualization

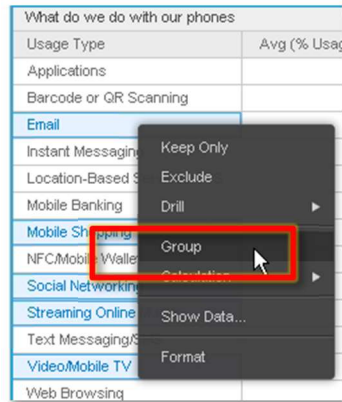


46. Modify the new Grid Visualization such that the final drop down zone shows the following:
  - i. Rows: **Usage Type**

Usage Type
Applications
Barcode or QR Scanning
Email
Instant Messaging
Location-Based Services/GPS
Mobile Banking
Mobile Shopping
NFC/Mobile Wallet
Social Networking
Streaming Online Music
Text Messaging/SMS
Video/Mobile TV
Web Browsing

To define a custom group, multi-select the elements while holding the **Ctrl** key (Command key for Macs).

47. While holding the **CTRL (Command)** key select: **Email, Mobile Shopping, Social Networking, Streaming Online Music, Video/Mobile TV**
48. Right-click the selected elements and select **Group**.



49. The New Group dialog box opens. In the Name field, type the name of the group:  
**Direct Marketing**
50. Click **Save**. The group is created and displayed in the visualization, replacing the elements that you had selected.



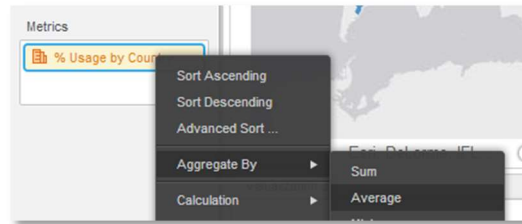
When you create a Group, you are combining multiple elements into a single one. In a grid, a group combines rows of data into one row; in a bar graph, a group combines multiple bar risers into one bar riser; in a Network visualization, a group combines multiple nodes into one node; and so on. The Group replaces the selected elements in the visualization's display.

51. Add the **'% Usage by Country'** metric in the **Metrics** drop down zone in editor panel. Adjust the width and height of the visualizations by using the handle that comes up when hovering over the visualization dividers

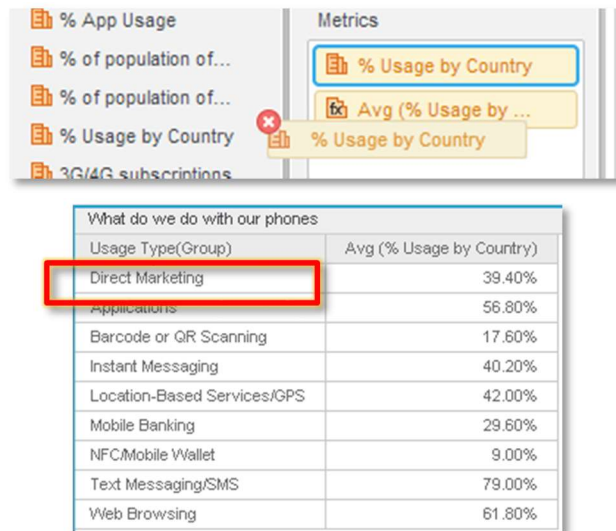


52. Rename your visualizations by double-clicking on the respective title bars  
Visualization 1(map): **Mobile Penetration**  
Visualization 2(Bar): **Phone Trends by Age Group**  
Visualization 3(Grid): **Phone Usage Type**
53. On Editor panel (for **Phone Usage Type**), right-click **% Usage by Country** metric and from the options available select **Aggregate by**
54. From the options select **Average**





55. A new metric, **Avg (% Usage by Country)** is created and is also available in the Dashboard Datasets panel
56. Remove **% Usage by Country** metric from the grid and final visualization will look like below



From this grid chart visualization you can see that across the board, top smartphone shopping activities include browsing products, price comparison and reading product reviews. Smartphone owners in the U.S. are the most likely to use their device for in-store price comparison, online coupons and purchasing products.

Now that you have identified what people normally do with their smartphones you can easily find direct marketing opportunities, picking a channel where you are confident the message will resonate with the audience.

## Adding a Custom Visualization

Users now have the ability to integrate custom visualizations into Web and Desktop dashboards. This is one of the advantages of moving to an HTML5 interface, as it allows third party integration with external libraries such as the popular D3 visualizations. These custom visualizations have the ability to work just like any other OOTB visualizations. For this exercise we will be using a previously packaged Bubble Graph.

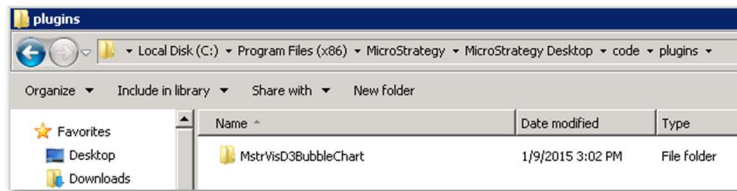
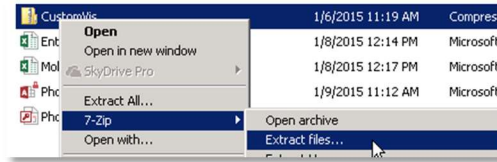
57. Save your work (File > Save) and then **close** the Desktop Application

### Windows users:

Browse to wherever you saved your **D3BubbleChart** file package (included in the Supporting Files for this workshop):

Unzip the folder and drop the content into this location:

**C:\Program Files\MicroStrategy\MicroStrategy Desktop\code\plugins**  
(you may need to create the plugins folder)



**For Mac users:**

Navigate to the **Applications** folder in the **Finder** window. Right click on the **MicroStrategy Desktop app icon**, and choose **Show Package Contents** from the available options. Navigate to the following location (**Contents\Resources\code\plugins**) and drop the **MstrVisD3BubbleChart** folder in the **Plugins** folder **NOTE:** you may need to manually create the plugins folder

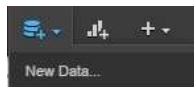
58. Start Desktop application and notice the additional visualization in the **visualization gallery** on the right hand side



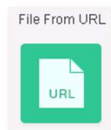
We will be creating a new dataset using the URL scraping option in the Data Import process. URL scraping allows you to import and analyze data from tables on webpages..

59. **Reopen** your **Mobile Usage Analysis** dashboard from the file menu.

60. From the Dashboard area choose to add **New Data**



61. From the Import Menu choose **File from URL**:



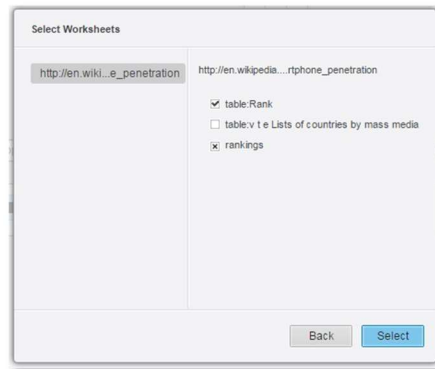
62. Enter the following **URL**

[http://en.wikipedia.org/wiki/List\\_of\\_countries\\_by\\_smartphone\\_penetration](http://en.wikipedia.org/wiki/List_of_countries_by_smartphone_penetration)



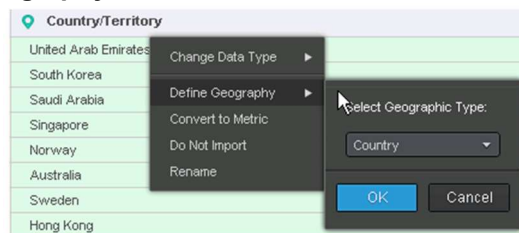
**NOTE:** Here we are importing the data from URL(Wikipedia). As Wikipedia keeps on updating the data, the visualization you get at the end related to this data might not be the same as in the solution provided.

63. Click **Add** and then **Prepare Data**
64. Only **select** the first worksheet: **table:rank**



**NOTE:** As Wikipedia keeps on updating its data, you might not see the same worksheets all the time. Make sure you select the '**table:rank**' worksheet. If there are two worksheets with the same name, verify after data is added, that it consists of columns '**Country/Territory**', '**Penetration**' and '**Rank**'.


65. Make sure the **Country/territory** column is set to **Geographic Type: Country** by clicking on the drop down arrow on the **Country/Territory** column and then clicking on **Define Geography**. Click **finish**



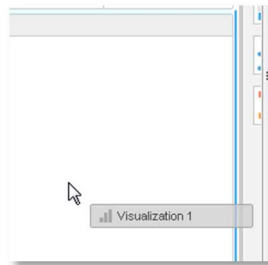
66. Rename the dataset to **Smartphone Penetration by Country**



67. Like you did in earlier steps, insert a **new visualization** and then choose the newly

added **D3 Bubble Chart** visualization icon  from the visualization gallery.

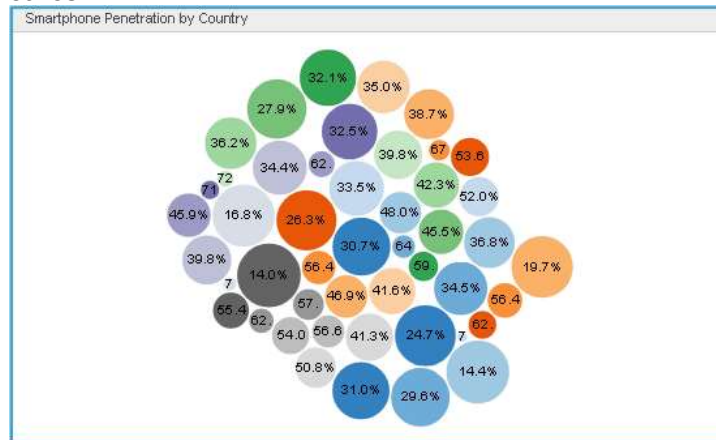
68. Drag the new visualization to be on the right side of the Grid visualization



69. Modify the new Bubble Visualization such that the final drop down zone shows the following:

**Attributes:** Country/Territory, and Penetration

**Metrics:** Rank



70. Rename your visualization to **Smartphone Penetration by Country**

71. **Save** your dashboard

## Conclusion

In less than an hour, you have created a dashboard and blended with external datasets in the form of a spreadsheet, database connectivity and cloud /web sources to enrich your decision making process. In addition, you explored various visualization capabilities, on-the-fly calculations and attributes creation to make your analysis easier and find insights faster