VISUALIZE GEOSPATIAL DATA WITH MAPS

MicroStrategy Academic Program
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INTRODUCTION

MicroStrategy’s suite of capabilities includes powerful data discovery tools that let you explore data, answer pressing business questions, and easily share those insights. MicroStrategy helps Intelligent Enterprises inject business intelligence in their users’ daily workflows and harness the power of that data.

This hands-on workshop is an introduction to MicroStrategy’s map visualization capabilities, with a focus on analyzing data through map layers and customizations. In this workshop, you will:

• Learn how to use out-of-the-box Geospatial mapping capabilities from Mapbox
• Identify trends, growth drivers, and outliers by leveraging Geospatial analytics on a sample data set
• Create maps that present multiple layers of information on a single visualization
• Use markers and thresholds to increase map interactivity
• Compare a Geospatial Service map with a similar ESRI map
• Create an ESRI map using a live API feed

MicroStrategy Desktop supports out-of-the-box Geospatial and ESRI maps.
Geospatial Service Maps

Display a high-performance vector map using a Geospatial Service map, powered by Mapbox, which allows you to:

- Show geographic areas down to the detail of the postal code for most countries.
- Zoom through map layers from the entire world to the street level.
• Tilt the map for a 3D view.
• Color areas using an attribute’s elements.
• Display labels in the local language.
• Use markers and thresholds to increase map interactivity.

ESRI Maps

ESRI map visualizations display your data as markers on an interactive map. For example, you can create a visualization that displays how customer households are clustered in different parts of the country using a density map or display retail locations as a series of map markers that users can click to view additional information about stores in their area. You can also add a custom shape to add personalized boundaries to the map. Note that custom shape files can only be added to MicroStrategy Web, not Desktop.

To display map markers in the ESRI Map visualization, you must provide a geo attribute that contains longitude and latitude. MicroStrategy Desktop automatically assigns that attribute a latitude and longitude.
Data Exploration: MicroStrategy Desktop

MicroStrategy Desktop is a powerful data discovery tool that will be used throughout the workshop to help you explore your data and answer key business questions. With a simple drag and drop interface, you can build compelling dossiers (interactive and intuitive business intelligence dashboards) quickly and easily.

Requirements

For this workshop, you need to have MicroStrategy Desktop downloaded to your computer.

- If you already have the necessary software for this course, skip to the Getting started section. If you have not downloaded the necessary software, follow the steps below.
- If you did not bring a laptop with you, if your laptop permissions prohibit you from downloading software, or you are otherwise unable to complete the necessary software installations, find a neighbor and form teams for the remainder of the workshop.

Workshop software setup

Follow the steps below to download MicroStrategy Desktop on your Mac or PC.

2. Populate the fields and click Download Now.
3. Choose the appropriate link based on your computer for either Windows or Mac.
For Windows

1. Extract the $\texttt{MicroStrategyDesktop\_11.1\_Windows.zip}$ file found in $\texttt{C:}\texttt{\Users\<yourusername>\Downloads}$.
2. Open the folder $\texttt{MicroStrategy Desktop 11.1}$.
3. Double-click $\texttt{DesktopSetup.exe}$. Follow the steps to complete the installation.

For Mac

1. Double-click $\texttt{MicroStrategyDesktop\_11.1\_Mac.zip}$ found in $\texttt{MacintoshHD:\Users\<yourusername>\Downloads}$.
2. Double-click $\texttt{MicroStrategy\_11.1\_Mac.dmg}$. Click to agree with the license.
3. Drag the $\texttt{MicroStrategyDesktop.app}$ into the $\texttt{Applications}$ folder and follow the steps to complete the installation.

MicroStrategy Desktop is now ready to go. Leave Desktop open as we will use it throughout the remainder of this workshop.

Getting Started

In the following exercises, you are a pirate tracker for Francis Drake, a British privateer. After defeating the Spanish Armada, Sir Drake has his sights set on capturing pirates in the Americas. As the lead pirate tracker, you want to create a dossier that your company can use to target ships that contain the most profitable product types (categories). To visualize this, you want to map the ports and their states, which will allow the crew to see their location and their total trade values.

As Sir Drake directs an intelligent and tight ship, you must use the following design standards:

- Use the privateer colors of silver and blue.
- Use the Basic map style.
- The map must include labels in the local language to help international crew members interpret the visualization.
- To keep dossier pages from being cluttered, each page should only contain one visualization and tooltips should be disabled when data points are clustered.
EXERCISE 1: EXPLORE AND COMPLETE THE GEOSPATIAL SERVICE DOSSIER

Your fellow crew member started a dossier using Excel and Wikipedia data sources, but unfortunately, he had to walk the plank, so you need to complete the dossier.

1. On the Desktop main window, click File, then click Open Local Dossier.
2. Search for and select the GeospatialSymposium.mstr file, then click Open.

If needed, select the Map page from the contents panel. This map plots ports colored by total revenue; the darker the marker, the higher the revenue.

Create a state mapping layer

You want to analyze total trade by state. To do this, you will add a state layer to the map.

1. In the Editor panel, in the Layers drop zone, click Add.
2. Right-click the new layer and select Rename. Type State.

3. Drag State from the Port Export Info Data dataset to the Geo Attribute drop zone.
4. Drag **Total trade** from the **Port Export Info** Data dataset to **Color By** dropzone.

States are two-dimensional areas, so you want to change the map to an Area Map. This will help you to quickly visualize which state has a higher profit.

5. Click the **Format** icon to open the Format panel.

6. From the first dropdown list, select **Formatting on layer**.

7. From the second dropdown list, select **State**.

8. From the **Type** dropdown list, select **Area**.

9. Since the Ports layer uses the blue color range, you want the ports to be easily visible on the map. Change the States threshold color range to gray to comply with your ship’s design standards, and to see the port markers easier. Click the **Color Fill Thresholds** editor under **Shape Formatting**.
10. From the **Color** dropdown list, select **Gray** and click **OK**.

![Color dropdown list](image)

11. Select the **Show Legend** check box to view the color range parameters for the State layer.

![Legend](image)

12. Geospatial Service maps provide several map styles. Sir Drake likes the oceans to be colored blue, so he asks that all maps use the Basic style. On the map toolbar (displayed on the map), click the **Map Styles** icon and select **Basic**.

![Map styles](image)
Set the language to local

With Geospatial Services, you can display country names in the local language, regardless of the language on your machine or browser. Per the privateer guidelines, maps should be shown in the local language.

1. In the **Format** panel, select **Map Options** from the first dropdown menu.

![Map Options Panel](image1)

2. From the Language dropdown menu, select **Local**.

![Map Labels Panel](image2)

You can also select **your machine language + Local** to view map labels in both languages.
EXERCISE 2: RESOLVE A LOCATION CONFLICT ON THE MAP

1. Switch back to the Editor panel.

Now that the layer is an area map, the State attribute in the Geo Attribute drop zone has an alert indicating there is a conflict with commonplace names that exist in multiple countries or states. With Geospatial Service visualizations, you can resolve duplicate geo names by adding another geo attribute to better define results.

2. Hover your cursor over the indicator to display more information, along with a suggestion to resolve it.

3. Drag the State (Country) attribute to the Geo Attribute drop zone, below State. The indicator is now gone.
EXERCISE 3: DEFINE HOW LAYER ARE DISPLAYED BASED ON ZOOM LEVEL

Defining how the layers are displayed based on the zoom level controls whether certain map layers are displayed or hidden at different magnifications (zoom levels).

Defining this allows you to control how an end user moves between global information (summary or holistic) down to city (detail or granular). This helps your colleagues interpret the map without being overwhelmed with information.

1. Return to the **Format** panel.
2. From the first dropdown list, select **Map Options**.
3. From the **Zoom Behavior** dropdown list, select **Static**. When a user zooms in or out on the map, it will retain that zoom level when a change is made, or the user reopens the dossier.
4. Select the **Zoom through layers** check box.

The whisker line (shown below **World** in the example above) indicates the current zoom level of the map. The blue lines at the start and end of the Port and State bars indicate the level at which that map layer is displayed. Right now, both layers are displayed all the time, as shown below:
5. Drag the **start line** for **Port** to the **3.5** level, or as close as you can get it. The numbers are displayed when you hover your cursor over the bar.

![Zoom through layers]

6. Drag the **end line** for **State** to the **5.6** level, or as close as you can get it. The zoom layers should resemble the following:

![Zoom through layers]

**Define the zoom level for clustering**

1. On the Format panel, select **Formatting on layer** from the first dropdown list.
2. Select **Port** from the second dropdown list.
3. Select the **Enable Clustering** check box.
4. Drag the pointer to **5**, as shown below. The ports will be clustered until zoom level 5.

![Clustering]

The small triangle below the World to Street range shows the current zoom level of the map.
Disable tooltips

1. According to Sir Drake’s standards, maps should not include tooltips to avoid information overload on a dossier page. To disable the tooltips on the Port level, click **None** under Data Labels.

![Data Labels](image)

2. Click the **Save** icon in the toolbar.

EXERCISE 4: EXPLORE THE GEOSPATIAL SERVICE MAP

1. Click the **Presentation Mode** icon to view your dossier in full screen.

2. Since New York/New Jersey and Norfolk are the two most profitable ports (from a pirate’s point of view), we need select a safe home port between the two for the privateer crew. You think Baltimore could work as a home port. Search for **Baltimore** on the map. (The search box is displayed when you hover your cursor over the map.)

The map zooms in to display Baltimore. Notice that the State legend is not displayed, since the State layer is not displayed. We did not select to display the Port legend.
If you want to display the Port legend, click the **Show Legend** icon in the map toolbar. Close the Port legend by clicking the x in the upper right corner of the Port legend.

3. **Zoom out**, using the map toolbar, until both port and state are displayed, so that you can view alternative ports for your home port. Notice that the State legend is displayed now.

4. **Zoom out** one more time, using the map toolbar, to view more ports. The ports are now clustered according to the clustering zoom level that we set.

5. **Zoom out** again, using the map toolbar, until the ports are no longer displayed. This view allows you to compare the total trade for all the states.
6. Click the **Reset** icon on the map toolbar to return to the initial view of the map.

7. **Resize** the Desktop window. Because we selected static zoom behavior, the level of magnification does not change. If we had selected dynamic instead, the map would zoom to refit the contents.

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**EXERCISE 5: EXPLORE THE ESRI MAP**

Your team member who started the original dossier also created an ESRI map using the same dataset as your Geospatial Service map. In this exercise you will perform the same operations on the ESRI map as you did on the Geospatial Service map to see the differences between the two kinds of maps.

1. Search for **Baltimore** as a potential home port.

The map zooms in to display Baltimore. The State legend is displayed, unlike in the Geospatial Service map. In an ESRI map we cannot define how the map layers are displayed based on zoom level, so all layers are always displayed at all zoom levels. Likewise, legends are displayed at all zoom levels. Port is not selected to display the legend; otherwise that would also be displayed.
A Geospatial Service map allows you to display and hide legends for all map layers. You can expand and collapse displayed legends with both types of maps.

2. **Zoom out** using the map toolbar until you can see various states and the ports are clustered, and you can view alternative ports for your home port.

The clustering of the ports occurs automatically, when multiple ports are too close to easily distinguish their pointers. In a Geospatial Service map, you can set the zoom level that clustering occurs at.

3. **Zoom out** again using the map toolbar. All layers always being displayed in an ESRI map can be a positive feature—you don’t need to set the zoom levels for each layer. You can also easily compare the number of ports in each state using the ESRI map. (In the Geospatial Service map, the ports would no longer be displayed at this zoom level.)
EXERCISE 6: USE API DATA TO TRACK SCOOTERS IN REAL TIME

In this exercise, you play the role of a travel agent in Washington, D.C. Your clients enjoy taking the metro to different D.C. neighborhoods and then using an electric scooter to explore locally. By connecting to API data from an electric scooter company, you will build a dossier that tracks scooters and helps your clients navigate the city with ease.

Connect to scooter data

1. In the Desktop Home window, select **New Dossier** to create a new dossier.
2. We will import scooter data first. In the dossier authoring window, click the **Add Data** icon and select **New Data**.
3. Choose **Data from URL**.
4. Enter the following URL:
https://s3.amazonaws.com/lyft-lastmile-production-iad/lbs/dca/free_bike_status.json

5. Click Prepare Data.

Create multiform attributes

When you import data, each column in a table is imported as a separate attribute. If your data contains different forms of the same attribute saved in separate columns, you can create a multiform attribute to combine the forms into a single attribute.

1. You want to create a multiform attribute for the scooters that includes the ID, latitude, and longitude. Convert the data bikes lat metric to an attribute by right-clicking it and choosing Convert to Attribute. Scooters are referred to as bikes in the dataset.
   2. Convert the data bikes lon metric to an attribute by right-clicking it and choosing Convert to Attribute.

3. For PC users, hold Ctrl, and select data bikes bike id, data bikes lat, and data bikes lon.
   For Mac users, hold Command, and select data bikes bike id, data bikes lat, and data bikes lon.

4. Right-click the selected data and click Create Multi-form Attribute.

5. Name the new attribute Scooters. From the Form Category dropdown, for data bikes lat, select Latitude. Repeat the same step with the appropriate selection for data bikes lon (Longitude), so your multiform attribute is set up as follows:
6. Click **Submit** to create the attribute.

7. In the Preview window, convert **last update** to a metric by right-clicking it and choosing **Convert to Metric**.

8. Click **Finish** to return to your dossier and add your data.

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### Add metro station data

1. Now we’re going to add metro station data. In theDatasets panel, click the **Add Data** icon 📁, and choose **New Data**.

2. Select **File from Disk** and open the **Metro Stations** file from the supporting files for this workshop.

3. Click **Prepare Data**.
4. Convert **Longitude** from a metric to an attribute.

5. Create the Station multiform attribute. PC users: hold **Ctrl** and click **Station**, **Latitude**, and **Longitude**. Mac users: hold **Command** and click **Station**, **Latitude**, and **Longitude**.

6. Right-click the selected attributes and select **Create Multi-form Attribute**.

7. Name the new attribute **Metro Stations**.

8. From the **Form Category** dropdown, for longitude, select **Longitude**. Repeat the same step with the appropriate selection for **Latitude** and select **ID** for Station so your multiform attribute is set up as follows:

![Create Multi-form Attribute](image)

9. Click **Submit** to create the attribute.

10. In the Data Preparation window, click **Finish**.

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**Add a Geospatial Service map visualization and create layers**

1. We want to see the location of the scooters and metro stations on a map. Change **Visualization 1** to a Geospatial Service visualization by selecting the **Geospatial Service map** icon from the Visualization Gallery.

2. Right-click the .json dataset in the Dataset panel and rename it **Scooters**.

3. In the Editor Panel in Layer 1, drag **Scooters** from the Scooters dataset into the Geo Attribute drop zone.

4. Rename Layer 1 to **Scooters** by right-clicking the layer and choosing **Rename**.
5. Let’s add another layer for the metro stations so we can see how close the scooters are to the stations. Click Add located under the Scooters layer.

6. Rename Layer 2 to Metro Stations.

7. Add the Metro Stations attribute from the Metro Stations dataset to the Geo Attribute drop zone in the Metro Stations layer.

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Format the Geospatial Service Map

Now you have data for scooters and metro stations on your map. However, we can’t tell which is which. Let’s do some formatting so we can differentiate scooters from metro stations.

1. In the Metro Stations layer, select the Format panel. Change the marker shape to Pins.

2. Under Shape Formatting, change the Fill color to Red.
Now you can clearly see all the D.C. metro stations and the position of the scooters. Keep in mind that this is a live feed, so the position of the scooters may differ in your dossier from the image above.

3. Rename the visualization **Live Position of Scooters**.

4. Let’s give this dossier some context. Add a text box by clicking the Insert Text icon on the menu bar.

5. In the text box, type **Live Position of Scooters in Washington, D.C.**

6. In the Format panel, choose Center Alignment, and change the Fill Color to whatever you like—be sure to change the font color to something that is readable against your chosen fill color.

7. Add a simple grid to view the exact coordinates of the scooters. Click **Insert Visualization**. Drag and drop the visualization so that it sits below Live Position of the Scooters map.

8. From the Scooters dataset, drag and drop **Scooters** into the Rows drop zone and **last update** into the Metrics drop zone.

9. To make the attribute forms within an attribute visible, right-click the **Scooters** attribute in the Rows drop zone. Hover over Display Attribute Forms and choose On from the dropdown. Click OK.

10. Rename the grid to **List of Scooters**.

11. Click File and select **Dossier Properties**. Select Refresh, and type 60 seconds so that the dossier automatically refreshes the API data every minute. Click OK to save changes.

12. Change the style of the map to street view by clicking the Map Styles icon on the map visualization and selecting Street. The street view provides street names and will make it easier to guide your clients.
13. Save your dossier as **Map API**. You can click **Browse PC** in the Save As dialog box to select a desired folder on your PC.

14. For data to auto-refresh, the dossier needs to be in Presentation Mode. Click the **Presentation Mode** icon 📣. Your dossier should look like the image below:

![Image showing live position of scooters in Washington, DC.](image)

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**EXTRA CREDIT: EXTEND DATA DISCOVERY WITH HYPERINTELLIGENCE**

MicroStrategy helps Intelligent Enterprises inject business intelligence (BI) into the daily workflows of their users and employ the power of their own data. To help extend BI and increase data literacy, enterprises can use HyperIntelligence, a Chrome browser extension that uses MicroStrategy data to identify and highlight key information on a web page. When a user hovers over a highlighted item on a web page, a KPI card with key information is displayed, as shown in the Google search below:
For example, say a sales representative at a television production company needs to see key account information while typing notes during a meeting with her manager, and a supply chain manager needs to view a count of set props to manage inventory numbers. Instead of logging into multiple systems to get the data they need, the company can leverage HyperIntelligence to embed in-line analytics in their web-based applications such as Salesforce and Google Documents.

Additionally, HyperIntelligence can be used to augment dossier analysis. Users can hover over key words to view more information within a dossier without needing to navigate to another dossier page or log into another system. In this activity, you will install the Chrome plug-in and view HyperIntelligence in action, leveraging the data you used in this workshop to extend your analysis.

Add the HyperIntelligence plug-in to your Chrome browser

1. Navigate to https://chrome.google.com/webstore/category/extensions in Google Chrome.
2. Search for MicroStrategy in the search bar and press Enter.
3. Click Add to Chrome on the MicroStrategy HyperIntelligence extension. In the pop-up dialog box click Add extension.

You will be notified that HyperIntelligence has been added to your Chrome browser and the MicroStrategy logo will show up on your toolbar.
4. Connect your plug-in to the MicroStrategy Cloud environment. Click the MicroStrategy logo on the toolbar and type the following environment URL: https://demo.microstrategy.com/MicroStrategyLibrary/api

5. Click Continue.

6. In the list of Cards, enable Companies Card and Universities Card.

7. Once those cards are enabled, go to Google and search for a company or a university of your choice and hover your cursor over to see KPIs for the company or the university that you searched for.

CONGRATULATIONS

You have completed the Visualize Geospatial Data with Maps workshop! Over the course of this workshop you have:

- Explored the various ways that geographic information can be displayed on out-of-the-box maps with MicroStrategy.
- Built a dossier that contains multiple sheets of map analysis.
- Leveraged an API for live data updates.
- Changed settings to automatically update dossier data.

To learn more about other visualizations, MicroStrategy offers the 11.142 Dashboarding and Visualizations course.

For resources and certifications with MicroStrategy Education, visit: https://www.microstrategy.com/us/services/education