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# On-Demand Training: Advanced Mapping Transcript

Welcome to Tableau's Advanced Mapping Video. We'll be using Tableau Desktop 8 to show some advanced mapping techniques. In this video, we'll discuss how to plot the direction and amount of trade between two given countries, how to track the energy and path of a storm through time, how to calculate the distance between given points on a map, how to use a parameter to select any given city and then calculate the distance between that city and other cities on that map, and how to filter using a radius.

We've already connected to our relevant data sources which are available to download in the companion workbook. Before we start recreating our first view, let's look at the underlying data to understand what fields are required to build it. We need a country field which lists every single country that we want to plot on the map. We also need a path ID field to separate each line to show a relationship between two countries. We also have a direction field which we won't use in the view but will allow us to know where to place the flow amount value. We only want to place the flow amount value on the destination country because that's where the trade ends. We also have that flow amount field which indicates the magnitude or amount of trade between those two countries.

So let's go ahead and create a new worksheet and recreate that view. The first step is to plot every single country. We can do that by double clicking on the country field. Once we've done that, we can change the mark type to be a line. Because we don't know the relationship between each of these countries, we have a single line drawn through all the points. We can place the path ID on the color shelf and that will separate each line to have a single line between two countries only. Next, we'll want to go ahead and place the flow amount on the size shelf. This will allow us to see the magnitude or amount of trade between those two countries ending at the destination country. We can increase the size of this if we want to. Let's go ahead and call this sheet example 1. There's a large amount of trade coming out of the country Saudi Arabia to many different countries. This leads me to guess that this model might be representing the flow of energy resources.

Let's move on to the next view. This chart tracks the path a storm takes through a given period of time as well as the energy that storm had along its path. Let's look at the underlying values for this specific data source. We identify each given storm by name and number and we also have a date and time for when that storm occurred along any given latitude and longitude coordinate. That way, we can track exactly where it was during that date/time period. The energy, speed, and pressure fields will actually allow us to measure attributes about that storm such as how powerful it was along a given point on the map. So let's create a new worksheet and recreate this view. We'll first want to plot every single point we have to create that map. We'll double click on the latitude coordinate field and the longitude coordinate field. We have single marks for every single point and we'll connect them by changing the mark type to be a line. Now this line does not distinguish between each storm, so we can place the storm name on the color shelf to break that line apart by storm.

Next, we can go ahead and place the date field on the path shelf to show where that storm was at any given time period in our data. I want to go ahead and change that date field to be an exact date, so I'll click on it then choose exact date. Now we want to plot the energy that the storm had along its path so we'll drag and drop the energy field onto the size shelf. To have a better view of the storm let's go ahead and just highlight a section of the map and keep only those values. Now we can actually see much more clearly the path of the storm and how much energy it had along that path. It looks like Katrina had a lot of energy along the southern coast of the United States near Florida. Another thing we can choose to do is illustrate the movement of the path by placing the date field on the pages shelf. We can change the date field by clicking on it, something like a day part, then, press play to illustrate that movement. We may

also want to show the history so we'll select show history then, using the options here on the show history button, select show history for all. Let's click play again and see what happens. We can increase the speed as well if we'd like to. Let's call this example 2.

Let's talk about calculating distance now. We can calculate the distance between any two given points on a map. For this example, we're using the great circle distance formula. It'll calculate the shortest distance between any two given points. Let's look at the underlying data to see which fields and what values are required to use this type of calculation. I'll right click on the distance data source and then select edit connection. We've already preformed a self-join, so I want to remove that so we can start from scratch. If I select single table, we can look at the underlying values for that sheet. This table contains three locations, each representing a city, and then the latitude and longitude coordinates for that city. We want to perform a self-join because we want to pair each city with the other two cities to calculate the distances based on their latitude and longitude coordinates. So what I'll do is select multiple tables, then add table. We want to keep the same sheet selected and then select the join tab. We'll use Location as the common field, because that's the field we want to join on. We want it to be unequal to each other because we don't want to calculate the distance from the same city to itself, just to the other cities. So we'll add this join clause and select OK. We'll do that one more time. Let's go ahead and create a brand new worksheet and create the view now.

If we look at the underlying data after the self-join, we'll see that each city is paired with the other cities but never to itself. And then we've brought in the latitude and longitude coordinates for the second city onto the same row as well. This way we can use that great distance formula and use those latitude and longitude coordinates to find the distance. We'll plot the location of each city by double clicking on the first latitude and longitude coordinates fields, and then to bring in each city onto the view we'll throw location onto the level of detail shelf. We can change this into a line chart if we like, then we'll go ahead and drag the distance formula into the color shelf. But let's go ahead and right click on it and edit it to see what the formula is. We have the latitude and longitude from the original table, then we have the latitude and longitude from the duplicate or the joined table. So the first set of latitude and longitude coordinates represents the city that we're measuring the distance from, and the second latitude and longitude coordinates represents the city that we're measuring the distance to. This 3959 constant number represents the Earth's radius. We have a copy of this formula online if you would like to actually have a closer look it, or you can pause the screen now and copy this formula. So I'll go ahead and cancel this and place that distance formula on the color shelf. I also want to go ahead and click on the distance formula field and change that to be a dimension. That way we get an individual color for each unique distance value because there's only 3 distance values that we have because there's only 3 cities. Now when we hover over each individual line we can see what the distance is based on that formula. So the shortest distance between Bend, Oregon and Seattle, Washington happens to be 251 miles. So let's call this sheet example 3.

Next we'll show you some other examples of the distance calculation applied in various contexts. This view shows the distance calculation in conjunction with a parameter. In this view, we can use a parameter to select any city and show the distance of surrounding cities by color. This next view allows us to filter out specific businesses from office locations if they fall outside a specific radius. You can download the companion workbook to examine how these calculations work.

So we've discussed several different mapping techniques and uses of the distance formula. Thank you so much for watching our Advanced Mapping Training Video. Please download the Companion Workbook so you can practice these techniques on your own.