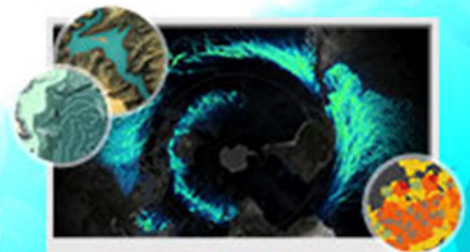


# Exercise

## Vector Tiles

### Section 3 Exercise 3

January 20, 2021



## Vector Tiles

### Instructions

Use this guide and ArcGIS Pro to reproduce the results of the exercise on your own.

*Note: The version of ArcGIS Pro that you are using for this course may produce slightly different results from the screen shots that you see in the course materials.*

### Time to complete

Approximately 20-30 minutes

### Software requirements

ArcGIS Pro 2.7

ArcGIS Pro Standard license (or higher)

*Note: The MOOC provides a separate ArcGIS account (user name and password) that you will need to use to license ArcGIS Pro and access other software applications used throughout the MOOC exercises. This account (user name ending with \_cart) provides the appropriate ArcGIS Online role, ArcGIS Pro license, ArcGIS Pro extensions, and credits. We strongly recommend that you use the provided course ArcGIS account to ensure that you have the appropriate licensing to complete the exercises. Exercises may require credits. Using the provided course ArcGIS account ensures that you do not consume your organization's credits. Esri is not responsible for any credits consumed if you use a different account. Moreover, Esri will not provide technical support to students who use a different account.*

## Introduction

A multiscale map like the one that you are making is often used as a basemap (<https://bit.ly/3cyFYX3>). It becomes a backdrop for other content and needs to be functional across scale ranges.

Traditionally, basemaps are made as a series of image tiles for each scale. This works well but has some limitations:

- Image tiles are large. They take a long time to create and use up a lot of storage space. This means that they are cumbersome to update.
- Labels and symbols are embedded into the tiles as pixels (<https://bit.ly/2vC3tyC>). So, rotating the map means that there will be labels that are difficult to read. Changes to labels or symbols mean recreating the tiles.
- Image tiles have an inherent resolution (<https://bit.ly/2xQY2MY>), so they may not render crisply on high-resolution displays.

For this exercise, you will make vector tiles instead. The resulting tiles can also be used in a web map or a web app, but you will bring them back into ArcGIS Pro as a single vector tile basemap layer for use with other operational data.



For students using their existing ArcGIS Online organizational account, your ArcGIS Online credentials need to include the Publish Hosted Tile Layer privilege to complete this step. If you are unsure what privileges you have, please refer to this Common Question (<https://bit.ly/2UAo4xK>).

### Step 1: Create vector tiles

First, you will publish a web layer of vector tiles of your map.

- a If necessary, start ArcGIS Pro and open the ScaleAndGeneralization\_<your first and last name>.aprx project that you saved in the previous exercise.
- b In the Contents pane, click Street Map to select the whole map.
- c On the Share tab, in the Share As group, click the Web Layer down arrow and choose Publish Web Layer.
- d In the Share As Web Layer pane, on the General tab, in the Name field, type **\_<your first and last name>** at the end of the layer name.

*Note: The layer name needs to be unique because all students are saving their map as a web layer to the same ArcGIS Online organization.*

- e In the Summary field, type a summary for your street map, such as **Street map of New Zealand**.
- f In the Tags field, add any tags that you would like, such as **New Zealand, basemap, and streets**.

*Note: Tags may already include New Zealand, basemap, and streets, but you can choose to add more.*

- g In the Layer Type section, select the Vector Tile option.
- h In the Location section, under Folder, click the down arrow and select the value that matches your ArcGIS user name.

This is where your web layer will be stored.

- i In the Share With section, check the box for your organization.

*Note: If you are signed in with the provided course ArcGIS credentials (user name ending with \_cart), select the Cartography. organization. If you are signed in with your existing ArcGIS organizational credentials, select the name of your organization.*

The web layer will be shared to and therefore available within ArcGIS Online to everyone within the organization that you selected but only to those within the organization.

When you are finished, the General tab should look similar to the following graphic.

Share As Web Layer ? ▾ ⌵ ×

Sharing Map As A Web Layer

**General** Configuration Content

**Item Details**

Name  
Street map\_your first and last name

Summary  
Street map of New Zealand.

Tags  
New Zealand × basemap × streets ×  
Add Tag(s)

**Layer Type** ⓘ

Feature  
 Tile  
 Vector Tile

**Location**

Folder  
user name\_cart

**Share with**

Everyone  
 Cartography.  
Groups ▾

- j** At the top of the Share As Web Layer pane, click the Configuration tab.
- k** Click the Tiling Scheme drop-down list and choose ArcGIS Online / Bing Maps / Google Maps.

Because you are working with just New Zealand and not the whole world, you will reduce the scale range for which you will generate tiles.



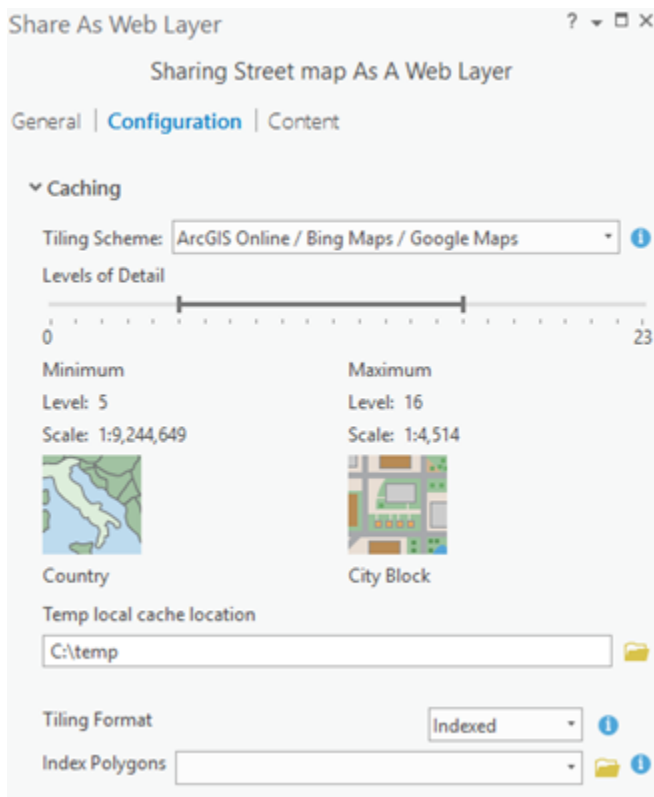
It is absolutely imperative that you **DO NOT** publish at too many scales or at very large scales. For every additional smaller scale, you would be requiring a doubling of the previous number of tiles made, which would generate millions of unnecessary cached tiles.

- l** On the Levels Of Detail slider, slide the first stop to the right to select a Minimum level of detail of Level 5 (1:9,244,649).
- m** Slide the other stop on the slider to the left to select a Maximum level of detail of Level 16 (1:4,514).

The Temp Local Cache Location will be filled in automatically.

- n** Set the Tiling Format to Indexed, if necessary.

The Configuration tab should look like the following graphic.



- o** Click Analyze.

Analyzing identifies any potential performance delays or errors. There should be no errors or warnings found.

- p** Click Publish to create the vector tile package and save the web layer.

*Note: Processing time may be lengthy. The bottom of the Share As Web Layer pane details the progress.*

When the process is complete, you will see a message that indicates that the web layer was successfully published.

- q** Save your project, if necessary.
- r** Close all the panes except the Contents and Catalog panes.

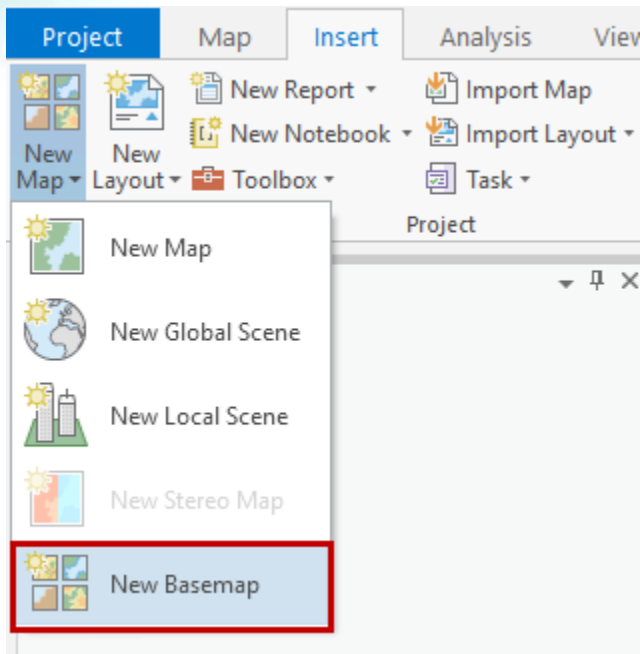
*Hint: If the Catalog pane is closed, on the ribbon, click the View tab, and then in the Windows group, click Catalog Pane.*

- s** At the top of the map view, on the Street Map tab, click the X to close the map but keep ArcGIS Pro open.

### Step 2: Use vector tiles as a basemap in ArcGIS Pro

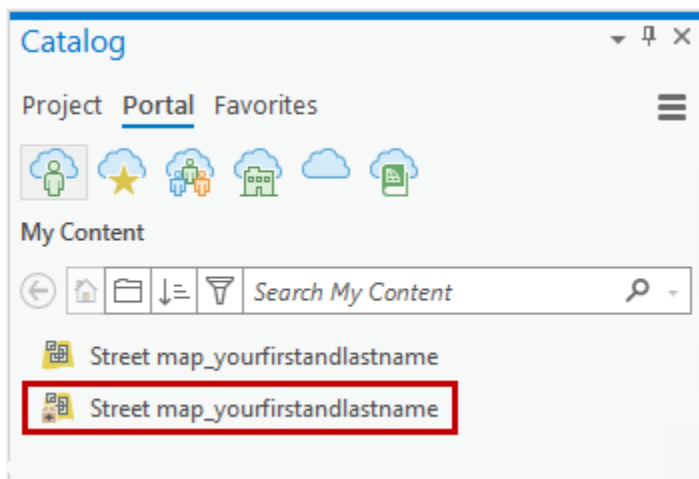
Now that the New Zealand map that you made exists as a vector tile package (.vtpk) on your portal, you can use it to make a new basemap in ArcGIS Pro.

- a** On the Insert tab, in the Project group, click the New Map down arrow and choose New Basemap.



- b** In the Catalog pane, click the Portal tab.
- c** Find the vector tile package that you generated in the previous step and drag it into the map.

*Note: You will see both a vector tile layer (<https://bit.ly/2hc6NWB>) and a vector tile package (<https://bit.ly/2HbYOHl>) with the same name. Point to each of the items to locate the vector tile package.*



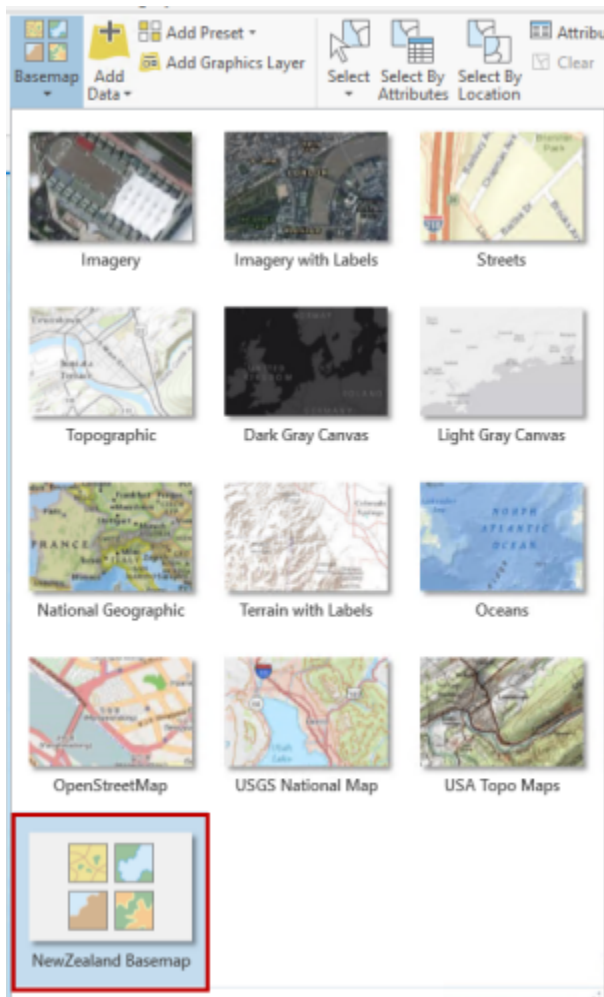


Because tiles were only generated for levels 5 - 16 to reduce processing time and data size, you need to be over New Zealand and zoomed in to at least Level 5 (1:9,244,649) to see anything.

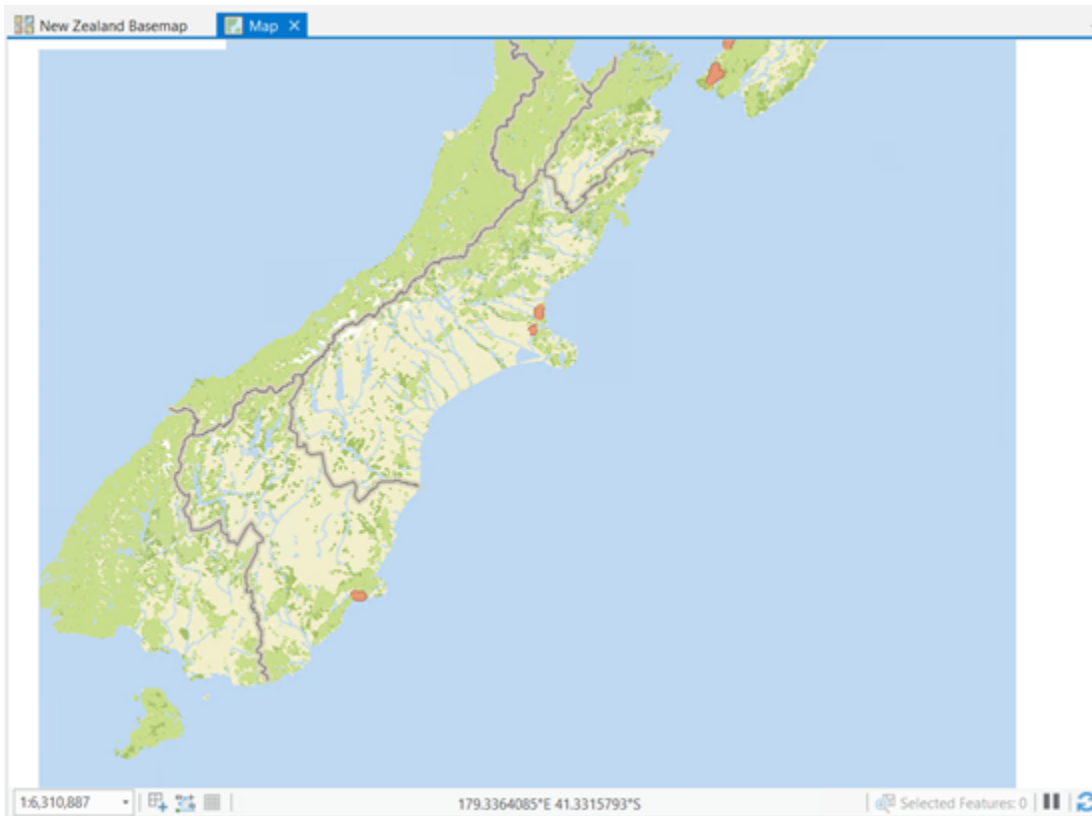
- d Zoom to the Wellington bookmark.
- e Zoom and pan the map as needed.
- f In the Contents pane, rename Basemap to **New Zealand Basemap**.

Now you can create a new map and use this as the basemap.

- g On the Insert tab, in the Project group, click the New Map down arrow and choose New Map.
- h On the Map tab, in the Layer group, click the Basemap down arrow.



- i Click New Zealand Basemap.
- j In the Contents pane, expand New Zealand Basemap, if necessary, right-click the layer that includes your name, and choose Zoom To Make Visible.
- k If necessary, zoom and pan the map.



The multiscale map that you made throughout the last three exercises is now ready to be used as a single background reference layer to any operational layers that you choose to add to it.

- l Save your project and exit ArcGIS Pro.

## Conclusion

In these exercises, you have learned how to manage and manipulate the display and appearance of symbolized features at different scales. You have been introduced to the basics of generalization geoprocessing, and you have learned how to create vector tiles from a multiscale map to use as a reference layer for other content.

### Stretch Goals

1. Apply what you have learned to further process other layers in the map.
  - Reference: [Author a multiscale map \(https://bit.ly/2qmrBZ7\)](https://bit.ly/2qmrBZ7)
2. Unpause the labels and apply what you have learned about scales and appropriate feature density to work with the labels on the map. (To simplify the exercise and keep redraws efficient, labeling was paused on this map. However, a detailed reference map of this nature requires labels.)
  - References: [Labeling basics \(https://bit.ly/2JzVLHv\)](https://bit.ly/2JzVLHv) and [Use label classes \(https://bit.ly/2v49KSx\)](https://bit.ly/2v49KSx)
3. Make a layout that shows the north island only but with an inset of Auckland and an overview map of all New Zealand, showing appropriate detail, content, and labels for each.
  - Reference: [Add and modify map frames \(https://bit.ly/2EASbt4\)](https://bit.ly/2EASbt4)

Use the Lesson Forum to post your questions and observations. Be sure to include **#stretch** hashtag in the posting title. Remember, stretch goals are community supported and a great opportunity to work together to learn together.

If you did some experimenting on your own beyond the steps of an exercise, we would love to hear about and see what you did! On the other hand, if you completed a map based on the exercise steps, that is awesome! But there is no need to share it in the Forum.