Exercise 1: Creating a mosaic dataset

In this exercise, you will be creating a mosaic dataset containing GeoTIFF raster dataset files using the geoprocessing framework in ArcMap.

This exercise does not rely on any previous exercises.

Before you begin, it is assumed that you have installed the tutorial at D:\your_folder\Data. If not, make the appropriate path changes throughout this tutorial so it works properly for you.

Complexity:
Beginner

Data Requirement:
ArcGIS Tutorial Data Setup

Data Path:
C:\arcgis\ArcTutor\Raster\Data

Goal:
Create a basic mosaic dataset.

Start ArcMap

Steps:

1. Start ArcMap by clicking **Start** > **All Programs** > **ArcGIS** > **ArcMap 10.**
2. Click **Cancel** on the ***ArcMap - Getting Started*** window.
   This window may not open if you've previously opted not to show it.

Note: You will be setting the default map document's geodatabase later in this exercise.

Create a file geodatabase

If you have already created ImageGDB in another exercise, you can skip this section of steps.

Steps:

1. Click the Catalog window button on the Standard toolbar.
   This opens the ***Catalog*** window.
2. In the **Location** text box, type `D:\your_folder` and press ENTER. This location is added to the Catalog tree under the Folders Connection heading.
   If your tutorial data was installed in a different location, alter the path according to your installation location.
3. Right-click the Raster folder and click **New** > **Folder**.
4. Name the folder `Exercises`.
5. Right-click the Exercises folder and click **New** > **File Geodatabase**.
6. Rename the new file geodatabase `ImageGDB`.

Set the default geodatabase

Each map document has a default geodatabase, which is the home location for the spatial content of your map. This location is used for adding datasets and saving resulting datasets created by various editing and geoprocessing operations.

Learn about the default geodatabase

Steps:

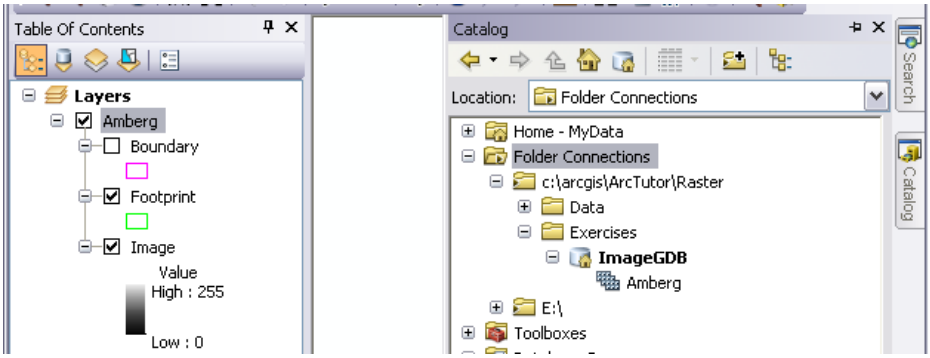
1. Right-click the ImageGDB geodatabase in the ***Catalog*** window and click **Make Default Geodatabase**.

Create a new mosaic dataset

Steps:

1. Right-click ImageGDB in the ***Catalog*** window, point to **New**, then click **Mosaic Dataset**.
   This opens the ***Create Mosaic Dataset*** tool dialog box.
2. Type `Amberg` in the **Mosaic Dataset Name** text box.
3. Click the **Coordinate System** browse button .
4. Click **Select**.
5. Double-click the Projected Coordinate Systems folder, double-click the National Grids folder, double-click the Germany folder, choose Germany Zone 4.prj, then click **Add**.
6. Click **OK** to close the ***Spatial Reference Properties*** dialog box.
7. Click **OK** on the ***Create Mosaic Dataset*** tool dialog box.
   The reporter window opens.
8. Once the process is complete, click **Close**.
   The Amberg mosaic dataset is created in the geodatabase and added to the ArcMap table of contents. This is an empty mosaic dataset. You will be adding raster datasets to it in the next steps.

When the mosaic dataset is added to the table of contents, it is added as a mosaic layer, which is essentially a special group layer. The top level has the name of the mosaic dataset--Amberg. There are also empty Boundary, Footprint, and Image layers.



Add rasters to the mosaic dataset

Steps:

1. Right-click the Amberg mosaic dataset in the ***Catalog*** window and click **Add Rasters**.
   This opens the Add Rasters To Mosaic Dataset tool.
2. In the **Raster Type** list, choose **Raster Dataset**.
3. Click the drop-down arrow and click **Workspace**.

4. Click the **Input** browse button.
5. Navigate to D:\your_folder\Data\Amberg_tif and click **Add**.
6. Check **Update Overviews**.
7. Click **OK** to run the tool.
8. Once the process is complete, click **Close**.
   The raster datasets are added to the mosaic dataset. The footprints are created for each raster dataset, and the boundary is generated for the entire mosaic dataset. The overviews are then generated for the entire mosaic dataset.
9. You may need to click the **Full Extent** button to view the mosaic dataset.

Modify the default properties

There are properties that can be set on the mosaic dataset. These properties affect how the mosaicked image will be presented to the user (or client) and how they might interact with it. They can also impact the performance of the server or image service if the mosaic dataset is served.

In these next steps, you will change the compression method for the mosaic dataset and set the allowable mosaic methods. The compression method can affect the transmission speed. It is recommended that you set a compression method to transmit the mosaicked image more quickly than without compression. If you serve the mosaic dataset as an image service, clients can modify this setting to decompress the mosaicked image if they prefer. The mosaic method defines the order in which the rasters are mosaicked together to create the image. You can choose one or more allowable mosaic methods and which one will be the default. The user is able to choose from the methods you select.

Steps:

1. Right-click the Amberg mosaic dataset in the ***Catalog*** window and click **Properties**.
   This opens the Mosaic Dataset Properties dialog box.
2. Click the **Defaults** tab.
3. Click the **Allowed Compression Methods** ellipsis button .
4. Click the **Default Method** arrow and click **JPEG**.
5. Click **OK**.
6. Click the **Allowed Mosaic Methods** ellipsis button .
7. Uncheck **Closest To Viewpoint** and **Seamline**.
   You are turning off Closest To Viewpoint because this mosaic dataset will not be used in that way. You are turning off Seamline because you are not creating any, so this method cannot be applied.
8. Click **OK**.
9. Click **OK** to close the ***Mosaic Dataset Properties*** dialog box.

Adding metadata

Steps:

1. Right-click the Amberg mosaic dataset and click **Item Description**.
2. Click the **Edit** button at the top of the window.
3. In the **Summary** text box, type `Imagery in Amberg, Germany`.
4. In the **Description** text box, type `A mosaic dataset containing several orthophoto TIFF images of Amberg, Germany`.
5. Click the **Save** button at the top of the window.
6. Close the ***Item Description - Amberg*** window.
   You have completed creating the mosaic dataset and defining metadata.

Explore the mosaic dataset as a user

Steps:

1. Use the tools on the ***Tools*** toolbar to pan and zoom around the mosaicked image.
2. Right-click the **Image** layer in the table of contents and click **Properties**.
   The ***Layer Properties*** dialog box for the mosaicked image is opened. This is similar to the dialog box for any other raster layer.
3. Click the **Status** tab.
   Here you can explore the properties of the mosaicked image, such as the number of rows and columns and the transmitted size.
4. Note the value for **Transmitted Size**.
5. Click the **Display** tab.
   You can modify the compression method from JPEG, which you set earlier, to something else or change the quality value.
6. Click the **Transmission Compression** arrow and click **None**.
7. Click **Apply**.
8. Click the **Status** tab.
   The transmitted size has increased, which means a larger mosaicked image is being displayed.
9. Click the **Mosaic** tab.
10. Click the **Mosaic Method** arrow and click **North-West**.
11. Click **OK** to close the ***Layer Properties*** dialog box.
12. Pan and zoom around your image. Notice that the images are ordering themselves differently due to the changed mosaic method.
13. Close ArcMap.

The mosaic dataset has been created and is ready to publish as an image service using ArcGIS Server. You can also use the mosaic dataset as a layer within ArcMap or ArcGlobe.

Exercise 2: Creating **multiple mosaic datasets** from a single mosaic dataset

Complexity:
Beginner

Data Requirement:
ArcGIS Tutorial Data Setup

Data Path:
C:\arcgis\ArcTutor\Raster\Data

Goal:
Understand how to create a master mosaic dataset that can be used as the source from which to create multiple products.

In this exercise, you will be creating a mosaic dataset containing a single DEM. This mosaic dataset will be the source for two additional mosaic datasets that will be created to produce both a hillshade and a shaded relief product. This tutorial walks you through the steps using only one DEM file; however, you would typically create a mosaic dataset containing many DEMs and potentially DEMs with various spatial resolutions.

This exercise will show you how to create a referenced mosaic dataset and edit its function chain.

This exercise does not rely on any previous exercises.

Before you begin, it is assumed that you have installed the tutorial at D:\your_folder\Data. If not, make the appropriate path changes throughout this tutorial so it works properly for you.

Start ArcMap

Steps:

1. Start ArcMap by clicking **Start** > **All Programs** > **ArcGIS** > **ArcMap 10.**
2. Click **Cancel** on the ***ArcMap - Getting Started*** window.
   This window may not open if you've previously opted not to show it.

Note: You will be setting the default map document's geodatabase later in this exercise.

Create a file geodatabase

If you have already created the ImageGDB in another exercise, you can skip this section of steps.

Steps:

1. Click the Catalog window button on the Standard toolbar.
   This opens the ***Catalog*** window.
2. In the **Location** text box, type `D:\your_folder` and press ENTER. This location is added to the Catalog tree under the Folders Connection heading.
   If your tutorial data was installed in a different location, alter the path according to your installation location.
3. Right-click the Raster folder and click **New** > **Folder**.
4. Name the folder `Exercises`.
5. Right-click the Exercises folder and click **New** > **File Geodatabase**.
6. Rename the new file geodatabase `ImageGDB`.

Set the default geodatabase

Each map document has a default geodatabase, which is the home location for the spatial content of your map. This location is used for adding datasets and saving resulting datasets created by various editing and geoprocessing operations.

Learn about the default geodatabase

Steps:

1. Right-click the ImageGDB geodatabase in the ***Catalog*** window and click **Make Default Geodatabase**.

Create a new mosaic dataset

You will be creating the main mosaic dataset, which the other mosaic datasets will reference.

Steps:

1. Right-click the ImageGDB in the ***Catalog*** window, point to **New**, then click **Mosaic Dataset**. This opens the ***Create Mosaic Dataset*** tool dialog box.
2. Type `DEM` in the **Mosaic Dataset Name** text box.
3. Click the **Coordinate System** browse button .
4. Click **Select**.
5. Double-click the Geographic Coordinate Systems folder, double-click the World folder, click WGS 1984.prj, then click **OK**.
6. Click **OK** to close the ***Spatial Reference Properties*** dialog box.
7. Click **OK** on the ***Create Mosaic Dataset*** tool window.
8. Once the process is complete, click **Close**.
   The DEM mosaic dataset is created in the geodatabase and added to the ArcMap table of contents. This is an empty mosaic dataset. You will be adding raster datasets to it in the next steps.

When the mosaic dataset is added to the table of contents, it is added as a mosaic layer, which is essentially a special group layer. The top level has the name of the mosaic DEM. There are also empty Boundary, Footprint, and Image layers.

Add rasters to the mosaic dataset

Steps:

1. Click the **Catalog** tab to expand the window.
2. Click the Default Geodatabase button .
3. Right-click the DEM mosaic dataset and click **Add Rasters**.
   This opens the Add Rasters To Mosaic Dataset tool dialog box.
4. From the **Raster Type** list, choose **Raster Dataset**.

5. Click the **Input** arrow and click **Workspace**.
6. Click the **Input** browse button , navigate to D:\your_folder\Data\DEM, then click **Add**.
7. Check **Update Overviews**.
8. Click **OK**.
9. When the process is complete, click **Close**.
   The raster datasets are added to the mosaic dataset. The footprints are created for each raster dataset, and the boundary is generated for the entire mosaic dataset. The overviews are then generated for the entire mosaic dataset.
10. Right-click the DEM in the table of contents and click **Zoom To Layer**.

Create a referenced mosaic dataset

Steps:

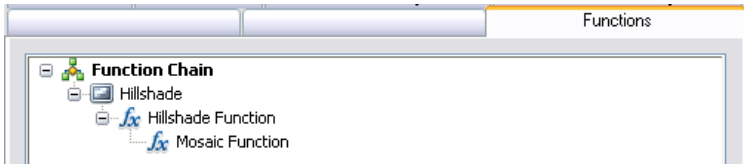
1. Click the Search window button .
2. Click **Tools** on the Search window.
3. Type `mosaic dataset` and press ENTER on the keyboard.
4. Click **Create Referenced Mosaic Dataset** from within the returned items. This opens the Create Referenced Mosaic Dataset geoprocessing tool.
5. Click the **Input Raster Catalog Or Mosaic Dataset** arrow and click **DEM**.
6. Change the path in the **Output Mosaic Dataset** box to `D:\your_folder\Exercises\ImageGDB.gdb\Hillshade`.
7. Click **OK**.
8. When the process is complete, click **Close**.

The Hillshade mosaic dataset is added to the table of contents.

Add the Hillshade function to the mosaic dataset

Steps:

1. Click the **Catalog** tab to expand the window.
2. Right-click the Hillshade mosaic dataset and click **Properties**.
3. Click the **Functions** tab.
4. Right-click **Mosaic Function**, point to **Insert**, then click **Hillshade Function**.
   You can alter the Azimuth, Altitude, and Z Factor values or leave the defaults.
5. Click **OK** to close the ***Raster Functions Properties*** dialog box.



6. Click **OK** to close the ***Mosaic Dataset Properties*** dialog box.

Calculate statistics

You may need to calculate statistics for your mosaic dataset so it will display better. Typically, you will be calculating statistics on a very large mosaic dataset. To reduce the time it takes to calculate the statistics, you can specify a large skip factor, such as 100. However, because this Hillshade mosaic dataset is so small, you will not need to specify a skip factor and can use the defaults.

Steps:

1. Click the **Catalog** tab to open the ***Catalog*** window.
2. Right-click the Hillshade mosaic dataset in the ***Catalog*** window and click **Calculate Statistics**.
3. Click **OK**.
4. Close the progress window when the process is complete.

Create another referenced mosaic dataset

Steps:

1. Click the Search window button .
2. Click **Create Referenced Mosaic Dataset** from within the returned items.
3. Click the **Input Raster Catalog Or Mosaic Dataset** arrow and click **DEM**.
4. Change the path in the **Output Mosaic Dataset** box to `D:\your_folder\Exercises\ImageGDB.gdb\ShadedRelief`.
5. Click **OK**.
6. When the process is complete, click **Close**.

The ShadedRelief mosaic dataset is added to the table of contents.

Add the Shaded Relief function to the mosaic dataset

Steps:

1. Click the **Catalog** tab to expand the window.
2. Right-click ShadedRelief mosaic dataset and click **Properties**.
3. Click the **Functions** tab.
4. Right-click **Mosaic Function**, point to **Insert**, then click **Shaded Relief Function**.
   You can alter the Color Ramp, Azimuth, Altitude, and Z Factor values or leave the defaults.
5. Click **OK** to close the ***Raster Functions Properties*** dialog box.

6. Click **OK** to close the ***Mosaic Dataset Properties*** dialog box.

Calculate statistics

You may need to calculate statistics for your mosaic dataset so it will display better.

Steps:

1. Click the **Catalog** tab to open the ***Catalog*** window.
2. Right-click the ShadedRelief mosaic dataset in the ***Catalog*** window and click **Calculate Statistics**.
3. Click **OK**.
4. Close the progress window when the process is complete.

You've now created three mosaic dataset and used one as the source for the other two. If you were to move or delete the original DEM mosaic dataset, the other two will be affected because they reference the source mosaic dataset; they do not reference the source raster.

Exercise 3: Creating and using a mosaic dataset with an **altering viewpoint**

To create a mosaic dataset that can take advantage of the Viewpoint mosaicking method, you need to have multiple raster datasets that overlap a particular area of interest, taken at multiple points of view. In this case, there are eight overlapping raster datasets in the area of interest.

This exercise does not rely on any previous exercises.

Complexity:
Beginner

Data Requirement:
ArcGIS Tutorial Data Setup

Data Path:
C:\arcgis\ArcTutor\Raster\Data

Goal:
To create a mosaic dataset containing overlapping images that can be used with the Viewpoint window.

Start ArcMap

Steps:

1. Start ArcMap by clicking **Start** > **All Programs** > **ArcGIS** > **ArcMap 10.**
2. Click **Cancel** on the ***ArcMap - Getting Started*** window.
   This window may not open if you've previously opted not to show it.

Note: You will be setting the default map document's geodatabase later in this exercise.

Create a file geodatabase

If you have already created the ImageGDB in another exercise, you can skip this section of steps.

Steps:

1. Click the Catalog window button on the Standard toolbar.
   This opens the ***Catalog*** window.
2. In the **Location** text box, type `D:\your_folder` and press ENTER. This location is added to the Catalog tree under the Folders Connection heading.
   If your tutorial data was installed in a different location, alter the path according to your installation location.
3. Right-click the Raster folder and click **New** > **Folder**.
4. Name the folder `Exercises`.
5. Right-click the Exercises folder and click **New** > **File Geodatabase**.
6. Rename the new file geodatabase `ImageGDB`.

Set the default geodatabase

Each map document has a default geodatabase, which is the home location for the spatial content of your map. This location is used for adding datasets and saving resulting datasets created by various editing and geoprocessing operations.

Learn about the default geodatabase

Steps:

1. Right-click the ImageGDB geodatabase in the ***Catalog*** window and click **Make Default Geodatabase**.

Create a new mosaic dataset

Steps:

1. Right-click the ImageGDB in the ***Catalog*** window, point to **New**, then click **Mosaic Dataset**. This opens the Create Mosaic Dataset tool.
2. Type `Viewpoint` for the **Mosaic Dataset Name**.
3. Click the **Coordinate System** browse button .
4. Click **Select**.
5. Double-click the Projected Coordinate Systems folder, double-click the National Grids folder, then select Germany Zone 4.prj and click **OK**.
6. Click **OK** to close the ***Spatial Reference Properties*** dialog box.
7. Click **OK** on the Create Mosaic Dataset tool window.
   The reporter window opens.
8. Once the process is complete, click **Close**.
   The Viewpoint mosaic dataset is created in the geodatabase and added to the ArcMap table of contents. This is an empty mosaic dataset. You will be adding raster datasets to it in the next steps.

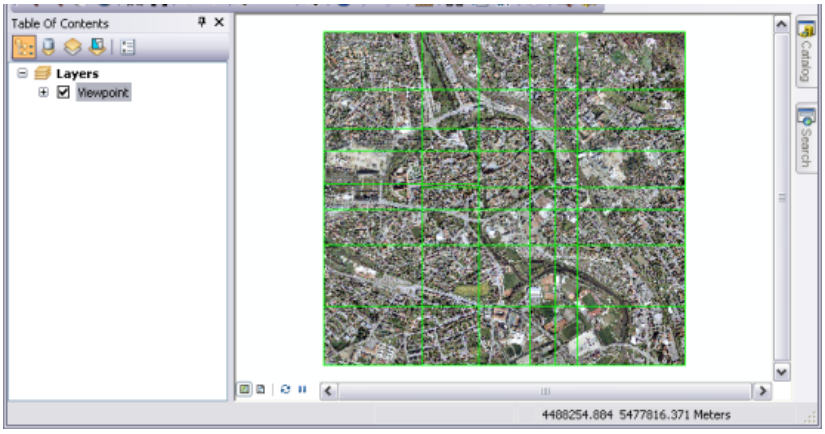
When the mosaic dataset is added to the table of contents, it is added as a group layer. The top level has the name of the mosaic dataset—Viewpoint. There are also empty Boundary, Footprint, and Image layers.

Add rasters to the mosaic dataset

Steps:

1. Click the **Catalog** tab to expand the window.
2. Right-click the Viewpoint mosaic dataset and click **Add Rasters**.
3. The **Raster Type** should be **Raster Dataset**.
4. Click the drop-down arrow and click **Workspace**.
5. Click the **Input** browse button.
6. Navigate to D:\your_folder\Data\Amberg_tif and click **Add**.
7. Check **Update Overviews**.
8. Click **OK** to run the tool.
9. Once the process is complete, click **Close**.
   The raster datasets are added to the mosaic dataset. The footprints are created for each raster dataset, and the boundary is generated for the entire mosaic dataset. The overviews are then generated for the entire mosaic dataset.

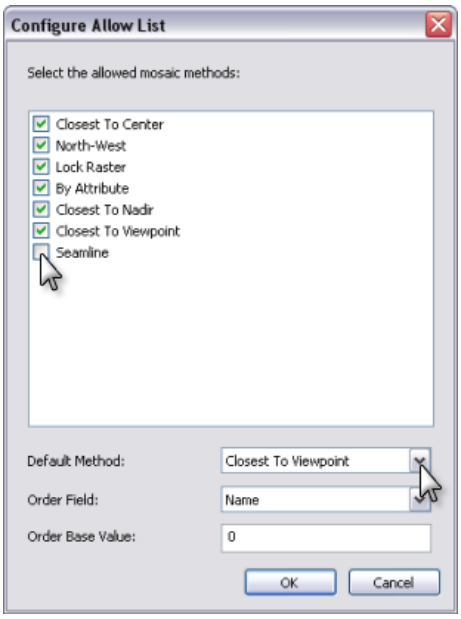
10. You may need to click the Full Extent button to view the mosaic dataset.



Set the mosaic methods

Steps:

1. Right-click the Viewpoint mosaic dataset and click **Properties**.
2. Click the **Defaults** tab.
3. Click the **Allowed Mosaic Methods** ellipse button .
   This opens the ***Configure Allow List*** dialog box.
4. Uncheck **Seamline**.
5. Verify that **Closest To Viewpoint** is checked.
   This is the mosaic method that will be used to view the multiple viewpoints in your mosaic dataset.
6. Click the **Default Method** drop-down arrow and click **Closest To Viewpoint**.
   By setting this as the default, the user of the mosaic dataset does not have to change the properties so they can use the Closest To Viewpoint mosaic method.



7. Click **OK** to close the ***Configure Allow List***.
8. Click **OK** to close the ***Mosaic Dataset Properties*** dialog box.

Set the mosaic method in the Image

The default mosaic method change is not reflected in the Image. You can either remove the mosaic dataset from the map document and re-add it, or you can modify the properties of the Image layer. In the steps below, you will edit the Image layer properties.

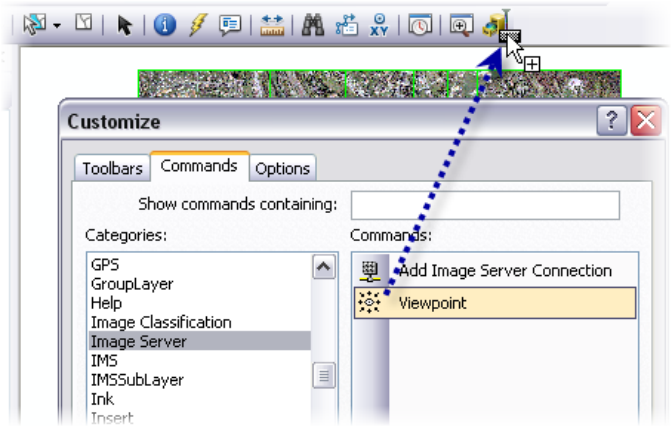
Steps:

1. Expand the **Viewpoint** layer in the table of contents.
2. Right-click **Image** and click **Properties**.
3. Click the **Mosaic** tab.
4. Click the **Mosaic Method** drop-down arrow and click **Closest To Viewpoint**.
5. Click **OK** to close the ***Layer Properties*** dialog box.

Add the Viewpoint tool

Steps:

1. Click **Customize** on the main menu and click **Customize Mode**.
2. Click the **Commands** tab.
3. Scroll through the **Categories** list and click **Image Server**.
4. Drag the **Viewpoint** button and drop it onto a toolbar.



5. Click **Close** on the ***Customize*** dialog box.

Explore the different view points

Steps:

1. Click the **Viewpoint** button you added.
   This opens the dockable ***Viewpoint*** window. You can move this window around your display to an appropriate location.
2. Zoom in to an area in the mosaicked image that appears to have lots of overlapping raster datasets. You will need to zoom in to a scale of approximately 1:1100.
3. Click one of the arrow buttons on the ***Viewpoint*** window and click **Apply**.
4. Continue clicking the arrow buttons and **Apply** to see the different viewpoints.
   You may want to pan around the image to test this functionality in different areas using different overlapping images.

You have now learned **how to create a mosaic dataset to use the Closest To Viewpoint mosaic method** and **how to modify the properties of a mosaic dataset to use the Closest To Viewpoint mosaic method**. You have also learned **how to access the Viewpoint window**.