**Create Raster Catalog (Data Management)**

# Creating raster catalogs in a geodatabase

ArcGIS 10

When you create a raster catalog in a geodatabase, you are creating an empty location to contain multiple raster datasets. You can then load one or more raster datasets into your empty raster catalog. You can create a raster catalog using the context menu in ArcCatalog or using the [Create Raster Catalog tool](JavaScript:IDA5AX1.Click()).

Raster datasets within raster catalogs can be managed in two ways by the file and personal geodatabases: either managed by the geodatabase or not. To have the raster catalog managed by the geodatabase means that the raster datasets are copied and stored alongside the geodatabase. When a row is deleted from the catalog, it is deleted from the geodatabase. When you do not have your raster managed by the geodatabase, there is only a pointer connecting the raster catalog row to the file-based raster dataset.

When creating a raster catalog, the coordinate system needs to be set for the geometry column. If your coordinate system is unknown, you need to specify the domain for the geometry column. Otherwise, if neither of these is set, your datasets may not be visible in the display.

Legacy:

The SDERASTER command line loader loads raster catalogs with the 8.x schema. These raster catalogs must be upgraded by clicking Register With Geodatabase on the ArcCatalog context menu.

[Learn more about raster catalogs](mk:@MSITStore:C:/PROGRA~1/ArcGIS/DESKTO~1.0/Help/RASTER~1.CHM::/009t0000000n000000.htm)

Steps:

1. Right-click a geodatabase and click New > Raster Catalog.
2. Optionally, choose a template raster catalog on which to base your new raster catalog.

You may want to use an existing raster catalog as a template if you have created additional fields in it that you want to have in your new raster catalog. The new raster catalog will then have the same fields as the template raster catalog.

1. Type a name for the new raster catalog.

The raster catalog name cannot have spaces. You can use underscores to separate letters.

1. Optionally, click the Coordinate System for Raster Column button to choose a coordinate system for the raster catalog.
2. Click the Coordinate System for Geometry Column button to set a coordinate system for the geometry column.

If your coordinate system for the geometry column is unknown, you need to set the domain. Setting the domain for a raster catalog works the same way as it does for a feature class.

[Learn how to create feature datasets](JavaScript:IDAWFX1.Click())

1. Optionally, you can set a configuration keyword.
2. Optionally, set a spatial grid.

Note:

You do not need to specify a spatial index grid for a file geodatabase since it uses its own optimized index.

1. Choose whether you want your raster catalog to be managed or unmanaged by the geodatabase.
2. Click OK.

ArcGIS 10

**Summary**

Creates an empty raster catalog in a geodatabase.

**Usage**

* Once the raster catalog is created, raster datasets can be loaded into it.
* Raster catalogs can be created in any type of geodatabase: personal, file, or ArcSDE.
* Once a raster catalog is created, raster datasets can be loaded into it by right-clicking the raster catalog and selecting Load Data. Raster datasets can also be loaded into a raster catalog using the [Workspace To Raster Catalog tool](mk:@MSITStore:C:/PROGRA~1/ArcGIS/DESKTO~1.0/Help/DATA_M~1.CHM::/001700000093000000.htm).
* Raster catalogs can be managed or unmanaged by the geodatabase. When the raster catalog is managed by the geodatabase means then the raster datasets inside the raster catalog will be physically stored within the geodatabase. When a row or raster is deleted from the catalog, it is deleted from the geodatabase. When the raster catalog is unmanaged, the raster catalog only contains links or pointers connecting a raster catalog row to a raster dataset stored outside the geodatabase. These raster datasets are stored outside the geodatabase. All raster datasets loaded into an unmanaged raster catalog must be a file on disk. Geodatabase raster datasets can only be loaded into raster catalogs that are managed. Raster Catalogs stored in an ArcSDE geodatabase are always managed.
* If the default value of zero is used for the spatial grid index, it is recommended that you load data in the raster catalog using the [Workspace To Raster Catalog](mk:@MSITStore:C:/PROGRA~1/ArcGIS/DESKTO~1.0/Help/DATA_M~1.CHM::/001700000093000000.htm) tool. If the [Workspace To Raster Catalog](mk:@MSITStore:C:/PROGRA~1/ArcGIS/DESKTO~1.0/Help/DATA_M~1.CHM::/001700000093000000.htm) tool is used to load raster datasets, the spatial grid size will be automatically calculated. If another tool is used to load raster datasets into a raster catalog, the [Calculate Default Spatial Grid Index](mk:@MSITStore:C:/PROGRA~1/ArcGIS/DESKTO~1.0/Help/DATA_M~1.CHM::/00170000002n000000.htm) tool needs to be used after the loading is completed.

[Learn more about geodatabase items - Spatial indexes and grid size](JavaScript:IDA4LJAB.Click())

* When creating a raster catalog in an ArcSDE geodatabase, the raster dataset name cannot have spaces. Use underscores to separate words in raster dataset names.

**Syntax**

CreateRasterCatalog\_management (out\_path, out\_name, {raster\_spatial\_reference}, {spatial\_reference}, {config\_keyword}, {spatial\_grid\_1}, {spatial\_grid\_2}, {spatial\_grid\_3}, {raster\_management\_type}, {template\_raster\_catalog})

|  |  |  |
| --- | --- | --- |
| Parameter | Explanation | Data Type |
| out\_path | The geodatabase to contain the raster catalog. This can be any type of geodatabase: personal, file, or ArcSDE. | Workspace |
| out\_name | The name of the raster catalog to be created. | String |
| raster\_spatial\_reference  (Optional) | The coordinate system for the raster column in the raster catalog.  The spatial reference of the raster column is used during data loading as   * A default spatial reference for those raster datasets that have an unknown spatial reference * A target spatial reference if you choose to project your raster datasets that have different spatial references from the raster column   The default value is the coordinate system set in the environment settings. | Coordinate System |
| spatial\_reference  (Optional) | The coordinate system for the geometry column.  The spatial reference for the geometry column defines the spatial reference of the footprints of the raster datasets.  The default value is the coordinate system set in the environment settings. | Spatial Reference |
| config\_keyword  (Optional) | Specifies the storage parameters (configuration) for a file geodatabase and an ArcSDE geodatabase. Personal geodatabases do not use configuration keywords.  ArcSDE configuration keywords are set up by your database administrator. | String |
| spatial\_grid\_1  (Optional) | The Output Spatial Grid 1, 2, and 3 parameters are used to compute a spatial index and only apply to file geodatabases and ArcSDE geodatabases. If you are unfamiliar with setting grid sizes, leave these options as 0,0,0 and ArcGIS will compute optimal sizes for you.  If you use the default spatial grid index (of zero), it is recommended that you load data using the [Workspace To Raster Catalog tool](mk:@MSITStore:C:/PROGRA~1/ArcGIS/DESKTO~1.0/Help/DATA_M~1.CHM::/001700000093000000.htm). If the Workspace To Raster Catalog tool is used to load raster datasets, the spatial grid size will be automatically calculated. If another tool is used to load raster datasets into a raster catalog, the [Calculate Default Spatial Grid Index (Data Management) tool](mk:@MSITStore:C:/PROGRA~1/ArcGIS/DESKTO~1.0/Help/DATA_M~1.CHM::/00170000002n000000.htm) needs to be used after the loading is completed.  For more information about this parameter, refer to the [Add Spatial Index tool](mk:@MSITStore:C:/PROGRA~1/ArcGIS/DESKTO~1.0/Help/DATA_M~1.CHM::/001700000060000000.htm) documentation. | Double |
| spatial\_grid\_2  (Optional) | Cell size of the second spatial grid. Leave the size at 0 if you only want one grid. Otherwise, set the size to at least three times larger than Spatial Grid 1. | Double |
| spatial\_grid\_3  (Optional) | Cell size of the third spatial grid. Leave the size at 0 if you only want two grids. Otherwise, set to at least three times larger than Spatial Grid 2. | Double |
| raster\_management\_type  (Optional) | Raster datasets within raster catalogs can be managed in two ways: managed or unmanaged (by the geodatabase).   * MANAGED —With a managed raster catalog, the raster datasets inside the raster catalog will be physically stored within the geodatabase. When a row (or raster) is deleted from the catalog, it is deleted from the geodatabase * UNMANAGED —With an unmanaged raster catalog, the raster catalog only contains links or pointers connecting a row to a raster dataset stored outside the geodatabase. All raster datasets loaded into an unmanaged raster catalog must be a file on disk. | String |
| template\_raster\_catalog  (Optional) | If you want to base your new raster catalog on a template, you can specify a template raster catalog. The new raster catalog will then have the same fields as the template raster catalog. | Raster Catalog Layer |

**Code Sample**

CreateRasterCatalog example 1 (Python window)

This is a Python sample for the CreateRasterCatalog tool.

import arcpy

arcpy.CreateRasterCatalog\_management("c:/data/CreateRC.gdb", "fgdb\_unman",\

"Albers\_Conical.prj", "Albers\_Conical.prj",\

"MAX\_FILE\_SIZE\_4GB", "1000", "3000", "9000",\

"UNMANAGED", "")

CreateRasterCatalog example 2 (stand-alone window)

This is a Python script sample for the CreateRasterCatalog tool.

##========================

##Create Raster Catalog

##Usage: CreateRasterCatalog\_management out\_path out\_name {raster\_spatial\_reference} {spatial\_reference} {config\_keyword}

## {spatial\_grid\_1} {spatial\_grid\_2} {spatial\_grid\_3} {MANAGED | UNMANAGED}

## {template\_raster\_catalog;template\_raster\_catalog...}

try:

import arcpy

arcpy.env.workspace = r"C:\PrjWorkspace\"

##Create PGDB Unmanaged Raster Catalog

arcpy.CreateRasterCatalog\_management("CreateRC.mdb", "Unmanaged", "Albers\_Conical.prj", "Albers\_Conical.prj", "", "12000", "", "", "UNMANAGED", "")

##Create FGDB Unmanaged Raster Catalog

arcpy.CreateRasterCatalog\_management("CreateRC.gdb", "Unmanaged", "Albers\_Conical.prj", "Albers\_Conical.prj", "MAX\_FILE\_SIZE\_4GB", \

"1000", "3000", "9000", "UNMANAGED", "")

##Create SDE Managed Raster Catalog with FGDB template

arcpy.CreateRasterCatalog\_management("SDE94.sde", "Managed", "Albers\_Conical.prj", "Albers\_Conical.prj", "DEFAULTS","2000", "6000", \

"18000", "MANAGED", "CreateRC.mdb\\Unmanaged;CreateRC.gdb\\Unmanaged")

except:

print "Create Raster Catalog example failed."

print arcpy.GetMessages()

Loading raster data into a raster catalog

ArcGIS 10

There are two main geoprocessing tools that are used to load raster data into a raster catalog. The [Raster To Geodatabase tool](JavaScript:IDA5AX1.Click()) allows you to load multiple selected rasters into a raster catalog. The [Workspace To Raster Catalog tool](JavaScript:IDAHBX1.Click()) allows you to load all the rasters within a location on disk into a raster catalog. The steps below describe using the latter tool.

To use either of these tools, you must first have a raster catalog in the geodatabase. To create a raster catalog in a geodatabase, see [Creating raster catalogs in a geodatabase](ms-its:C:\Program%20Files\ArcGIS\Desktop10.0\Help\raster_and_image_data.chm::/009t00000032000000.htm).

Creating raster catalogs in a geodatabase

ArcGIS 10

When you create a raster catalog in a geodatabase, you are creating an empty location to contain multiple raster datasets. You can then load one or more raster datasets into your empty raster catalog. You can create a raster catalog using the context menu in ArcCatalog or using the [Create Raster Catalog tool](JavaScript:IDA5AX1.Click()).

Raster datasets within raster catalogs can be managed in two ways by the file and personal geodatabases: either managed by the geodatabase or not. To have the raster catalog managed by the geodatabase means that the raster datasets are copied and stored alongside the geodatabase. When a row is deleted from the catalog, it is deleted from the geodatabase. When you do not have your raster managed by the geodatabase, there is only a pointer connecting the raster catalog row to the file-based raster dataset.

When creating a raster catalog, the coordinate system needs to be set for the geometry column. If your coordinate system is unknown, you need to specify the domain for the geometry column. Otherwise, if neither of these is set, your datasets may not be visible in the display.

**LegacyLegacy:**

The SDERASTER command line loader loads raster catalogs with the 8.x schema. These raster catalogs must be upgraded by clicking Register With Geodatabase on the ArcCatalog context menu.

[Learn more about raster catalogs](ms-its:C:\Program%20Files\ArcGIS\Desktop10.0\Help\raster_and_image_data.chm::/009t0000000n000000.htm)

**Steps:**

1. Right-click a geodatabase and click **New** > **Raster Catalog**.
2. Optionally, choose a template raster catalog on which to base your new raster catalog.

You may want to use an existing raster catalog as a template if you have created additional fields in it that you want to have in your new raster catalog. The new raster catalog will then have the same fields as the template raster catalog.

1. Type a name for the new raster catalog.

The raster catalog name cannot have spaces. You can use underscores to separate letters.

1. Optionally, click the **Coordinate System for Raster Column** button Spatial Reference Propertiesto choose a coordinate system for the raster catalog.
2. Click the **Coordinate System for Geometry Column** button Spatial Reference Propertiesto set a coordinate system for the geometry column.

If your coordinate system for the geometry column is unknown, you need to set the domain. Setting the domain for a raster catalog works the same way as it does for a feature class.

[Learn how to create feature datasets](JavaScript:IDAWFX1.Click())

1. Optionally, you can set a configuration keyword.
2. Optionally, set a spatial grid.

**NoteNote:**

You do not need to specify a spatial index grid for a file geodatabase since it uses its own optimized index.

1. Choose whether you want your raster catalog to be managed or unmanaged by the geodatabase.
2. Click **OK**.

Related Topics

[Creating a mosaic dataset](ms-its:C:\Program%20Files\ArcGIS\Desktop10.0\Help\raster_and_image_data.chm::/009t0000003p000000.htm)

[Exploring geodatabase raster catalogs](ms-its:C:\Program%20Files\ArcGIS\Desktop10.0\Help\raster_and_image_data.chm::/009t00000030000000.htm)

[How raster data is stored in a geodatabase](ms-its:C:\Program%20Files\ArcGIS\Desktop10.0\Help\raster_and_image_data.chm::/009t0000002z000000.htm)

[Migrating your raster catalog](ms-its:C:\Program%20Files\ArcGIS\Desktop10.0\Help\raster_and_image_data.chm::/009t00000068000000.htm)

**LicenseLicense:**

Importing or loading raster data into an ArcSDE geodatabase requires an ArcEditor or ArcInfo license.

**Steps:**

1. In ***ArcCatalog*** or the ***Catalog*** window, right-click the raster catalog, point to **Load**, then click **Load From Workspace**.
2. Click the **Input Workspace** browse button Browseand navigate to the workspace from which you want to load the raster datasets.
3. Make sure that the output raster catalog is correct. If not, click the browse button Browseand navigate to the correct raster catalog.
4. Optionally, check **Include Sub-directories** to load raster datasets from all the subfolders in your workspace.
5. Optionally, check **Project on-the-fly** to reproject the raster datasets to the raster catalog's projection.
6. Click **OK**.

**TipTip:**

You cannot build pyramids on a raster catalog; however, you can build pyramids for each raster dataset within a raster catalog.

**TipTip:**

Building pyramids for Oracle GeoRaster raster datasets must be performed as a separate step following the loading of the raster.

About importing or loading raster data

ArcGIS 10

Whether you create a new geodatabase or are working with an existing one, you will most likely need to import (load) some data. Importing data allows you to take existing data and make it available for use within a geodatabase.

There are three raster storage mechanisms in a geodatabase:

* Raster datasets—You can store many raster datasets in a geodatabase, or mosaic all your rasters into a single raster dataset. Importing rasters to a raster dataset will add the raster dataset into an empty raster dataset or mosaic it with a raster dataset that is already present.
* Raster catalogs—You can store the rasters within the catalog (managed) or store a link to the source rasters that you can store elsewhere (unmanaged). Importing a raster dataset into a raster catalog will add the raster dataset to the raster catalog as a new raster catalog item, or you can choose to mosaic it into an existing raster catalog item.
* Mosaic datasets—These are designed to manage the access to your raster data collections. When you add raster data to a mosaic dataset, the raster data is not stored within the mosaic dataset, but a link to the source raster is stored. Additionally you can add functions to perform on-the-fly processing.

Raster data can be imported into a geodatabase in several ways: by using Import raster datasets (geodatabase context menu), the [Copy Raster tool](JavaScript:IDASRW1.Click()) (geoprocessing tools), or Load Data (ArcCatalog dataset context menu).

How raster data is stored in a geodatabase

ArcGIS 10

Storing your raster data in a geodatabase is useful when you want to manage rasters, add behavior, and control the schema; when you want to manage a well-defined set of raster datasets as part of your DBMS; and when you want one data architecture for managing all your content. There are three main types of geodatabases: ArcSDE, personal, and file.

Storing raster data in a file geodatabase

The storage method used by file geodatabases shares features from both the ArcSDE geodatabase and the personal geodatabase. Managed raster data is stored in the same way as an ArcSDE geodatabase, and unmanaged raster data is stored in the same way as a personal geodatabase. File geodatabases are similar to personal geodatabases in that they are designed to be edited by a single user and do not support versioning. They reside in your file system directory, thus do not require a password to access. Raster data storage in file geodatabases is similar to the storage structure in ArcSDE geodatabases.

There are several advantages of using a file geodatabase instead of a personal geodatabase. The file geodatabase stores data in blocks, like ArcSDE. This allows more efficient access to data—especially when mosaicking. When mosaicking data in a file geodatabase, the data being mosaicked is simply appended to the current data. In addition, the partial pyramid updating can be employed. This saves time when building pyramids. Since the data structure for the file geodatabase is the same as ArcSDE, it is faster to copy and paste data between a file geodatabase and an ArcSDE geodatabase. The file geodatabase also allows you to use configuration keywords. Unlike ArcSDE, these configuration keywords are already set for a file geodatabase. For more information regarding configuration keywords, see [Configuration keywords for file geodatabases](JavaScript:IDALRW1.Click()).

By default, the file geodatabase has a 1 terabyte (TB) limit per dataset. This means that each dataset in the file geodatabase can be up to 1 TB in size, but you can have multiple 1 TB datasets inside any given file geodatabase. You can increase this limit for each raster dataset by using the MAX\_FILE\_SIZE\_256TB configuration keyword.

When storing raster datasets within a geodatabase, there are five constituent tables: one is a business table and the other four are for raster storage. There are also many indexes on those tables. One of the other tables is the feature, where only one row in the feature table stores the envelope of that raster. The main table, which is the largest, stores the actual pixel information and pyramids. All these tables are stored in a native file format that is hidden from the user; they are not directly accessible. The main table storing the actual pixel information stores one row per block per band in a raster dataset and per pyramid level. The column containing the pixel data for the block is a BLOB.

The bands are tiled into blocks of pixels according to a user-defined dimension (the default is 128 by 128). Tiling the raster band data enables efficient storage and retrieval of the raster data. The pyramid information is stored according to a declining resolution. The height of the pyramid is determined by the number of levels specified by the application.

A raster catalog is stored as multiple rows in the business table, whereas a raster dataset is only a single row in the business table. The table schema is the same as that of a raster dataset. The only difference is that the feature table will have many rows, whereas each row represents the extent of a raster dataset in the raster catalog.

A mosaic dataset is stored as a collection of up to nine tables. The catalog, boundary, log, and raster type tables are created by default when a mosaic dataset is created. Additional tables that may be added are the levels, overviews, color correction, seamline, and stereo tables.

When storing a raster dataset as an attribute, the storage architecture for the raster dataset is the same as for raster catalogs. Each record in the business table will have an attribute value for the column of type RASTER. This attribute will be used to relate the business table to the supporting raster tables.

When storing mosaic datasets or unmanaged raster catalogs, each is represented by tables that contain the path location where the raster datasets are stored. In the case of a raster dataset, the table only has one row, and for mosaic datasets and raster catalogs, it has a row for each raster dataset it contains. If you delete a raster dataset, its reference is only deleted from the file geodatabase and not from its stored location on disk. Likewise, if you delete a raster dataset from a mosaic dataset or unmanaged raster catalog, it will only be deleted from the mosaic dataset or raster catalog and not deleted from the disk.

When storing a raster dataset as an attribute, the raster is stored as it is in the file system, and only the path location on disk where the raster datasets are stored exists in the file geodatabase.

Working with a file geodatabase is just like working with any other type of geodatabase. All functions and procedures are the same as with a personal or ArcSDE geodatabase, except where it is specified otherwise in the tool. For information regarding any tool or procedure, refer to the appropriate Help section. One of the few differences that do exist with file geodatabases is in regard to SQL queries on raster catalogs. For more information about this, see [Migrating to the file geodatabase](JavaScript:IDAOSW1.Click()).

Storing raster data in an ArcSDE geodatabase

When raster data is stored within the ArcSDE geodatabase, it offers an enterprise level of functionality, such as security, multiuser access, and data sharing. The following are three main reasons to store your raster data in ArcSDE:

* It will not be updated very regularly (such as, every two or three years or longer)
* It will be accessed in read-only use cases (such as, using it as basemap data under vector data)
* There are hundreds of users or more that will access it as a basemap

Because of its storage structure, the raster data is said to be managed, or fully controlled, by the geodatabase. ArcSDE geodatabases always store all the raster information (pixels, spatial reference, any associated table, and other metadata) for raster datasets, raster catalogs, and raster attributes within the associated relational database (for example, Oracle, SQL Server, DB2, or Informix). This means that all input raster information is loaded into the database and can be thought of as a format conversion.

When storing a raster dataset in ArcSDE, there can be as many as seven constituent tables. The main table is the business table, which will have, at a minimum, a raster column and a rowid column. In the case of a raster attribute, that raster column could be the only other column besides the required rowid column in a business table.

For all other raster models, including the mosaic dataset, raster dataset, and raster catalog, the business table includes a geometry column that holds the raster footprint. A geometry column will also be present in the business table if a raster attribute is added to a feature class. The geometry column can have two associated tables. One is the feature table that stores the actual geometry data. The feature table, also referred to as the F table, is present if the geometry storage type is ESRI binary. The feature table is absent if an object relational storage type such as an ESRI or IBM ST\_GEOMETRY type or an Oracle SDO\_GEOMETRY type is employed. The geometry column will also have a spatial index table, also referred to as an S table, associated with it unless an RTREE index is employed. Informix, PostgreSQL, and Oracle Spatial all employ an RTREE index.

Another table that is always present and is associated with the raster column is the raster blocks table. It stores the raster data for all raster models except the mosaic dataset. In the case of the mosaic dataset, this table remains empty, since the raster data for a mosaic dataset is not stored in the DBMS; instead the raster data is referenced from an image file.

If the raster blocks table stores raster data, it will be the largest of all tables in an ArcSDE geodatabase and, depending on the size of the raster, could require special storage handling such as a devoted DBTUNE configuration. The Oracle SDO\_GEORASTER raster storage type has a raster blocks table, but it has no other raster tables associated with it.

The raster auxiliary table stores optional raster band metadata including raster statistics, coordinate transformation, and a color map. For mosaic datasets, the raster auxiliary table also holds the function raster.

The raster column also has an associated raster table and raster bands table if the default ESRI binary raster storage type is used. However, if the optional object relational ST\_RASTER storage type is used, these two tables are absent.

The feature table holds the footprint for the raster dataset, which is the same as when you have a feature class—one table stores the geometry and the other stores the spatial index information. For each raster dataset, there is one row in the feature table that stores the envelope.

The raster storage tables include the following:

* Business table—Stores attributes as well as raster and geometry columns
* Raster auxiliary table (AUX)—Stores optional metadata, such as raster statistics, a color map, or coordinate transformation information
* Raster block table (BLK for ESRI types and RDT for Oracle SDO\_GEORASTER)-—Stores the pixels of each block in a raster band

The block table is the largest table and the one that stores the actual pixel information and pyramids.

* Raster band table (BND)—Stores band information
* Raster table (RAS)—Stores a record for each raster dataset

ArcSDE evenly tiles the bands into blocks of pixels according to a user-defined dimension (the default is 128 by 128). Tiling the raster band data enables efficient storage and retrieval of the raster data. The pyramid information is stored according to a declining resolution. The height of the pyramid is determined by the number of levels specified by the application or user.

The raster block table stores one row per block (tile) per band in a raster dataset and per pyramid level. For example, a three-band raster divided into 12 blocks with no pyramids built will have 36 rows in the BLK table—12 separate blocks for each of the bands. The column containing the pixel data for the block is a binary large object (BLOB).

The mosaic dataset and raster catalog is stored in ArcSDE as multiple rows in the business table, whereas a raster dataset is only a single row in the business table. The table schema is the same as that of a raster dataset. The only difference is that the feature table will have many rows, whereas each row represents the extent of a raster dataset in the raster catalog. Additionally, a mosaic dataset can contain a pointer to the raster dataset stored outside the ArcSDE geodatabase.

When storing a raster dataset as an attribute, the storage architecture for the raster dataset is the same as for raster catalogs. Each record in the business table will have an attribute value for the column of type RASTER. This attribute will be used to relate the business table to the supporting raster tables. When you load the image, it will be converted to an ArcSDE raster format, and the pixels will be stored in the raster blocks table.

[Learn about storing raster datasets and raster catalogs in a geodatabase in DB2](JavaScript:IDA2VW1.Click())

[Learn about storing raster datasets and raster catalogs in a geodatabase in Informix](JavaScript:IDAHWW1.Click())

[Learn about storing raster datasets and raster catalogs in a geodatabase stored in Oracle](JavaScript:IDASWW1.Click())

[Learn about storing raster datasets and raster catalogs in a geodatabase in SQL Server](JavaScript:IDA3WW1.Click())

Storing raster data in a personal geodatabase

In a personal geodatabase, the raster dataset is converted to an Imagine (.img) file and stored inside an image database (IDB) folder. The IDB folder is located in the directory next to the personal geodatabase. When you delete a raster dataset, the raster in the IDB folder is permanently deleted.

When storing a mosaic dataset or raster catalog in a personal geodatabase, the mosaic dataset or raster catalog is a table that points to the stored raster datasets it contains. In a mosaic dataset, the raster datasets are stored as unmanaged, whereas in a raster catalog, the raster datasets can be stored as either managed or unmanaged. If they are managed, the entry in the raster catalog table points to the location in the IDB file where the raster dataset is stored. The IDB folder is organized so that it can be referenced to a row in a raster catalog. In an unmanaged case, the mosaic dataset or raster catalog contains the path location where the raster datasets are stored. Each row in the raster catalog business table points to the stored raster dataset. The operations on a mosaic dataset or unmanaged raster catalog do not affect the stored raster files; therefore, if you delete the raster datasets in a mosaic dataset or raster catalog, they will only be deleted from the raster catalog and not from the disk.

When storing a raster dataset as an attribute, the raster is stored as an IMG file in the system-defined location or as it is in the file system; this depends on whether it is managed or not. The storage is similar to a raster catalog.

Comparing raster storage in file, personal, and ArcSDE geodatabases

|  |  |  |  |
| --- | --- | --- | --- |
| **Raster storage characteristic** | **File geodatabase** | **Personal geodatabase** | **ArcSDE geodatabase** |
| Size limit | 1 TB for each raster dataset or raster catalog | 2 gigabytes (GB) per geodatabase (This is a table size limit, not a limit on the raster dataset size.) | Unlimited; limit dependent on DBMS limits |
| Raster dataset file format | File geodatabase raster dataset | ERDAS IMAGINE, JPEG, or JPEG 2000 | ArcSDE raster dataset |
| Storage | * Raster dataset: managed * Mosaic dataset: unmanaged * Raster catalog: managed/unmanaged * Raster as attribute: managed/unmanaged | * Raster dataset: managed * Mosaic dataset: unmanaged * Raster catalog: managed/unmanaged * Raster as attribute: managed/unmanaged | * Managed * Mosaic dataset: unmanaged |
| Stored in the file system | Stored in Microsoft Access | Stored in an RDBMS |
| Compression | LZ77, JPEG, JPEG 2000, or None | LZ77, JPEG, JPEG 2000, or None | LZ77, JPEG, JPEG 2000, or None |
| Pyramids | Supports partial pyramiding | Rebuilds entire pyramid | Supports partial pyramiding |
| Mosaicking | Allows you to append to a raster dataset when mosaicking | Rewrites a new dataset every time you mosaic to a raster dataset | Allows you to append to a raster dataset when mosaicking |
| Updating | Allows incremental updating |  | Allows incremental updating |
| Number of users | Single user and small workgroups; some readers and one writer | Single user and small workgroups; some readers and one writer | Multiuser; many users and many writers |

*File vs. personal vs. ArcSDE geodatabases*

Managed versus unmanaged raster data

There are two ways of storing the raster data within a geodatabase, either managed or unmanaged. Geodatabases always store raster datasets as a managed source.

|  |
| --- |
| raster dataset geodatabase storage |

Raster catalogs and rasters as attributes can use the managed or unmanaged sources.

|  |  |  |  |
| --- | --- | --- | --- |
| |  | | --- | | Managed raster catalog | | |  | | --- | | Unmanaged raster catalog | |

Mosaic datasets are always stored as unmanaged.

In an ArcSDE geodatabase, raster datasets and raster catalogs are always stored as managed.

Managed file geodatabase raster data is stored on disk in a proprietary tiled format that is directly compatible with how ArcSDE stores raster data (including ArcSDE raster compression types). This makes the file geodatabase, managed raster solution, an excellent choice for data transfer between ArcSDE instances (which do not have network connectivity between them). This functionality replaces previous data transfer workflows such as SDE export/import and database export/import (for example, transportable table spaces and detached databases).

Managed personal geodatabase raster data is stored on disk as one of three common file-based raster formats that ArcGIS can write: either ERDAS IMAGINE, JPEG, or JPEG 2000. The raster file format used to store the data is chosen internally by ArcGIS and is based on the type of compression utilized; therefore, if you choose a JPEG compression, the file is stored using the JPEG format, whereas if you choose no compression or LZ77, the raster is stored using the ERDAS IMAGINE format. The input raster datasets are converted from their original format and stored in a special folder (IDB), which resides next to the personal geodatabase .mdb file. The personal geodatabase manages these raster files based on the user's actions. (None of the pixel information is stored within the underlying Microsoft Access database.)

Unmanaged file geodatabase and personal geodatabase raster implementations simply point to the existing raster files on disk that ArcGIS can read. In these scenarios, the geodatabase does not manage the raster files but, rather, only manages the tables that reference the raster files. Unmanaged file and personal geodatabase mosaic datasets, raster catalogs, and rasters as attributes are the quickest to build because no raster format conversion or copying of pixel data occurs.

Compression, pyramids, and tile size

There are other storage structures to consider when storing data in a geodatabase, including compression, pyramids, and tile size.

All three types of geodatabases can store raster data using one of three compression techniques: LZ77 (lossless), JPEG (lossy), or JPEG 2000 (lossy). Lossless compression means the values of pixels in the raster dataset are not changed, whereas lossy compression results in altered pixel values. The amount of compression depends on the type of pixel data; the more homogeneous the image, the higher the compression ratio. You should store data that will be used for analysis, not just display, using a lossless compression. The primary benefit of compressing your data is that it requires less storage space; the amount of savings depends on the method of compression and the redundancy in the data. An added benefit is the overwhelmingly improved performance because you are transferring fewer packets of data. For example, when accessing raster data over a network with low bandwidth, the use of compression can offer improved performance because the amount of information to be transferred is reduced significantly, making it possible to store large, seamless raster datasets and raster catalogs (as large as several terabytes) and serve them quickly to a client for display.

[Learn more about raster compression](ms-its:C:\Program%20Files\ArcGIS\Desktop10.0\Help\raster_and_image_data.chm::/009t00000021000000.htm)

Pyramids are reduced-resolution representations of your dataset that are stored alongside the data. It is always recommended that you build pyramids. Pyramids can speed up the display of raster data because ArcGIS only needs to process the extent and resolution required for the display instead of resampling the entire dataset. As you zoom in from the full extent, pyramids with finer resolution are used to display the image.

Pyramids are created by resampling the original data into several different layers, each representing an increasingly larger resolution. The resampling methods instruct the server how to resample the data to build the pyramids. Nearest neighbor should be used for discrete (nominal) data or raster datasets with color maps, such as land-use or pseudo color images. Bilinear interpolation or cubic convolution should be used for continuous data, such as satellite imagery or aerial photography. Prototyping the most appropriate resampling technique for your particular data is highly recommended. Remember that pyramid resampling only affects the display, not the original data.

[Learn more about raster pyramids](ms-its:C:\Program%20Files\ArcGIS\Desktop10.0\Help\raster_and_image_data.chm::/009t00000019000000.htm)

When working with file and ArcSDE geodatabases, ArcGIS allows you to choose the number of levels and the resampling technique, fine-tuning the pyramids in a way that optimizes the display performance of your application. When you update part of a raster dataset in a file geodatabase or ArcSDE geodatabase, you need to only update the part of the pyramid that contains the changes. As a result, you can complete the update in a fraction of the time it takes for other implementations because you do not have to rewrite the entire raster dataset or all its pyramids. Additionally, during an update, other users can continue to access the raster dataset with only a small performance drop.

In the ArcSDE geodatabase, raster data is stored in a structure where the data is tiled, indexed, pyramided, and most often compressed. Because of tiling, indexing, and pyramiding, each time the raster data is queried, only the tiles necessary to satisfy the extent and resolution of the query are returned instead of the whole dataset. The tile size controls the number of pixels you want to store in each database memory block. This is specified as a number of pixels in x and y. The default tile size is 128 by 128 pixels, and most applications do not warrant deviating from these default values. In the ArcSDE geodatabase, the tiles of raster data are compressed before storing them in the geodatabase.

Importing rasters

Raster data is imported into a geodatabase via the user interface in several ways. Raster data can be imported into a geodatabase using the Import shortcut menu by clicking a geodatabase. Data can also be loaded into a raster dataset or raster catalog in a geodatabase with the Load Data command found in ArcCatalog. Several geoprocessing tools can be used to load or import data into the geodatabase, for example, the Copy Raster tool can be used to import raster datasets, the Workspace To Raster Dataset tool loads and mosaics all the raster datasets stored within the specified workspace into one raster dataset, and the Workspace To Raster Catalog tool loads all the raster datasets stored in the same workspace into an existing raster catalog. The Add Rasters To Mosaic Dataset tool only adds pointers to the source data in a mosaic dataset and does not move or load the raster data to the location of the mosaic dataset.

Learn more about loading and importing raster datasets

When you create a raster catalog in a geodatabase, you are creating an empty location to contain multiple raster datasets. You can then load one or more raster datasets into your empty raster catalog. You can create a raster catalog using the context menu in ArcCatalog or using the [Create Raster Catalog tool](JavaScript:IDA5AX1.Click()).

Raster datasets within raster catalogs can be managed in two ways by the file and personal geodatabases: either managed by the geodatabase or not. To have the raster catalog managed by the geodatabase means that the raster datasets are copied and stored alongside the geodatabase. When a row is deleted from the catalog, it is deleted from the geodatabase. When you do not have your raster managed by the geodatabase, there is only a pointer connecting the raster catalog row to the file-based raster dataset.

When creating a raster catalog, the coordinate system needs to be set for the geometry column. If your coordinate system is unknown, you need to specify the domain for the geometry column. Otherwise, if neither of these is set, your datasets may not be visible in the display.

**LegacyLegacy:**

The SDERASTER command line loader loads raster catalogs with the 8.x schema. These raster catalogs must be upgraded by clicking Register With Geodatabase on the ArcCatalog context menu.

[Learn more about raster catalogs](ms-its:C:\Program%20Files\ArcGIS\Desktop10.0\Help\raster_and_image_data.chm::/009t0000000n000000.htm)

**Steps:**

1. Right-click a geodatabase and click **New** > **Raster Catalog**.
2. Optionally, choose a template raster catalog on which to base your new raster catalog.

You may want to use an existing raster catalog as a template if you have created additional fields in it that you want to have in your new raster catalog. The new raster catalog will then have the same fields as the template raster catalog.

1. Type a name for the new raster catalog.

The raster catalog name cannot have spaces. You can use underscores to separate letters.

1. Optionally, click the **Coordinate System for Raster Column** button Spatial Reference Propertiesto choose a coordinate system for the raster catalog.
2. Click the **Coordinate System for Geometry Column** button Spatial Reference Propertiesto set a coordinate system for the geometry column.

If your coordinate system for the geometry column is unknown, you need to set the domain. Setting the domain for a raster catalog works the same way as it does for a feature class.

[Learn how to create feature datasets](JavaScript:IDAWFX1.Click())

1. Optionally, you can set a configuration keyword.
2. Optionally, set a spatial grid.

**NoteNote:**

You do not need to specify a spatial index grid for a file geodatabase since it uses its own optimized index.

1. Choose whether you want your raster catalog to be managed or unmanaged by the geodatabase.
2. Click **OK**.

Related Topics

**Key concepts about adding raster data to a map**

ArcGIS 10

When you add a raster dataset layer to ArcMap, you can choose to display a single band of data or a color composite from three bands of data.

You can also choose to add a raster dataset as a picture (map element) in the layout view. These rasters usually represent nongraphic images, such as a company logo or a picture of a house for a real estate map.

If you have data covering the same geographic area but in different coordinate systems, ArcMap uses the coordinate system of the first dataset added to the data frame and transforms any other data on the fly into this coordinate system. This applies to any feature class or raster data (including raster datasets, raster catalogs, and mosaic datasets).

For ArcMap to recognize your raster's coordinate system, it must be defined. If it is not already defined in the file format, you can modify it [from the Properties dialog box](mk:@MSITStore:C:/PROGRA~1/ArcGIS/DESKTO~1.0/Help/RASTER~1.CHM::/009t0000002m000000.htm) or by using the [Define Projection tool](JavaScript:IDANBW1.Click()).

If your raster dataset does not have any georeferencing information associated with it (such as pixel size, coordinates, or a coordinate system), you can georeference it in ArcMap. See [Georeferencing a raster dataset](mk:@MSITStore:C:/PROGRA~1/ArcGIS/DESKTO~1.0/Help/RASTER~1.CHM::/009t000000mq000000.htm).

Raster catalogs are used to display multiple or adjacent raster datasets without merging or mosaicking them into one larger file. They appear on the Add Data dialog box in ArcMap within geodatabases as raster catalog objects (or as ordinary tables).

When displayed in ArcMap, the raster datasets in the raster catalog are drawn in order from the first to last record in the catalog's table. If there are more than nine rasters in the raster catalog, the layer will draw as a wireframe, representing the boundaries of each raster. You can change this default setting on the Layer Properties dialog box under the Display tab.

A raster catalog can contain multiple raster types, formats, resolutions, and file sizes. To create a raster catalog in a geodatabase, there are two main steps: Create the raster catalog in the geodatabase and load the raster datasets into the raster catalog. These operations can be performed with tools in both ArcCatalog and ArcToolbox.

You can also create a legacy image catalog using a table file format. Any table format can be used to define an image catalog, including text files (for example, .dbf). For these image catalogs, the table requires five columns: IMAGE, XMIN, YMIN, XMAX, and YMAX.

Mosaic datasets are a hybrid of a raster catalog and raster dataset—they represents an on-the-fly mosaic view of a raster catalog. Like raster catalogs, mosaic datasets can contain multiple raster types, formats, resolutions, and file sizes; however, when you view them in ArcMap, you can view the footprints for each raster and the mosaicked image. The method in which the images are mosaicked and displayed is controlled through the mosaic properties, such as the mosaic method.

**Understanding the Image layer**

ArcGIS 10

The Image layer is a component of the mosaic dataset layer when it's added to ArcMap. It is used to control the rendering of the dynamically mosaicked image of the mosaic dataset. Modifications you make to the Image layer properties do not affect the mosaic dataset but only how it is rendered at the time you are viewing it. The Image layer is just like a raster layer—you can change the display properties, such as changing the renderer, band combination, or enhancement, as well as some specific properties, such as modifying the mosaic methods and viewing the properties of the dynamically mosaicked image.

|  |
| --- |
|  |

The Image layer is not optimized for speed, but it is dynamic, and any changes made to the mosaic dataset are reflected in the Image layer. When you are using a mosaic dataset, any processing required to generate the mosaicked image is done on the local desktop. Whereas if the mosaic dataset is served and you are connecting to the image service, the processing to generate the mosaicked image is done on the server.

When there are problems with the mosaic dataset, such as the boundary not having been generated or the functions defined in the function chain not generating a valid output, the Image layer may not be checked, and it will appear with a small red .

Right-clicking the Image layer in ArcMap displays the shortcut menu with the following options:

* Zoom To Layer—Sets the display extent to the extent of the Image layer.
* Zoom To Source Resolution—Sets the display scale to view the raster data at its optimum resolution.
* Visible Scale Range—Allows you to set or clear a visible scale range. When the scale of the data frame is outside the layer's visible scale range, the layer will not draw.
  + Set Minimum Scale—Sets the minimum visible scale for the layer to display.
  + Set Maximum Scale—Sets the maximum visible scale for the layer to display.
  + Clear Scale Range—Clears the minimum and maximum scale ranges.
* Export Data—Allows you to export the mosaicked image and save it as a raster dataset.
* Properties—Opens the Layer Properties dialog box.

**Image layer properties**

To access the Layer Properties dialog box of the Image layer, right-click the Image layer and click Properties.

The Image layer properties of the mosaic dataset are somewhat unique and are very similar to the layer properties of the image service serving the mosaic dataset. Through the Display tab, you can change the transmission compression. A highly compressed image is transmitted faster than an uncompressed image; however, the image quality may not be as good.

|  |
| --- |
|  |

* None—No compression is applied to the imagery, which provides the highest quality but results in the maximum volume of data transfer across the network.
* LZ77—An efficient lossless compression method that is primarily for imagery with similar cells, such as scanned maps or results of classifications.
* JPEG—An efficient compression method that can often compress imagery by about three to eight times with little degradation of the image quality. When choosing the JPEG method, you can also edit the quality by typing a value from 0 to 100.

The Mosaic tab is unique to the mosaic dataset (or an image service created from a mosaic dataset). Since the mosaicked image can be created from a number of input rasters, there are two settings to assist you in viewing the mosaicked image you need. The mosaic method defines how the mosaic is created from different rasters, such as By Attribute, where a field containing values is used to sort the images, or Closest to Center, where the image closest to the center of the display is on top.

The mosaic methods include

* Closest to Center—Enables rasters to be sorted based on a default order where rasters that have their centers closest to the view center are placed on top.
* Closest to Nadir—Enables rasters to be sorted by the distance between the nadir position and view center. This is similar to the Closest to Center method but uses the nadir point to a raster, which may be different than the center, especially for oblique imagery.
* Closest to Viewpoint—Orders rasters based on a user-defined location and nadir location for the rasters using the Viewpoint tool.
* By Attribute—Enables raster ordering based on a defined metadata attribute and its difference from a base value.
* North-West—Enables raster ordering in a view-independent way, where rasters with their centers to the northwest are displayed on top.
* Seamline—Cuts the raster using the predefined seamline shape for each raster using optional feathering along the seams.
* Lock Raster—Enables a user to lock the display of a single or multiple rasters based on an ID or name.

The mosaic operator allows you to define how to resolve the overlapping cells, such as choosing a blending operation.

The mosaic operators include

* First—The overlapping areas will contain the cells from the first raster dataset listed in the source.
* Last—The overlapping areas will contain the cells from the last raster dataset listed in the source.
* Min—The overlapping areas will contain the minimum cell values from all the overlapping cells.
* Max—The overlapping areas will contain the maximum cell values from all the overlapping cells.
* Mean—The overlapping areas will contain the mean cell values from all the overlapping cells.
* Blend—The overlapping areas will be a blend of the cell values that overlap; this blend value relies on an algorithm that is weight based and dependent on the distance from the cells to the edge within the overlapping area.

Both First and Last minimize the amount of data that is read; therefore, they will be the fastest methods. Min, Max, Mean, and Blend require the overlapping cells to be read, so these methods can be slower.

The Status tab presents the image properties of the mosaicked image, including the extent, number of rows and columns, number of bands, pixel depth, and compression information.