

Three Tips for Managing Raster Data in an Enterprise Geodatabase

Transcript

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Welcome to the ESRI Instructional Series podcast. I am Derek Law and I work at ESRI's main office in Redlands, California. I specialize in geodata management and ArcSDE technology. In this podcast, I will discuss three tips for managing raster data in an enterprise geodatabase, also called enterprise ArcSDE. This podcast is intended for geodatabase administrators, ArcGIS Server users, and GIS managers who would like some general guidance on managing raster data in an enterprise geodatabase.

Tip #1: Raster Dataset Mosaic vs. Raster Catalog

When users have a series or collection of rasters—for example, from an air photo survey or a sequence of satellite imagery—a common question is, "How should the raster data be stored in the geodatabase? Should it be stored as a raster dataset mosaic or in a raster catalog?" The answer: it really depends on how you intend to use the raster data.

First, let's review the two data structures in detail. A raster dataset mosaic is a single raster dataset that is composed of multiple adjacent rasters that have been combined into a single image. The process of aggregating the rasters together is called mosaicking. All participating rasters in a mosaic must have the same spectral properties; will be projected to the same spatial reference, if they are different; the same attributes, if applicable; and overlapping areas are not preserved. Since it is a single image, it is easy to manage. A raster dataset mosaic is typically used as a background image for mapping applications.

A raster catalog is an intelligent image storage system within the geodatabase. It is a collection of rasters stored in a table structure where each record in the table references an individual raster dataset. Participating rasters in a raster catalog can have different spectral properties, different spatial references and transformations, different compression algorithms applied, separate value attribute tables (also called VAT tables), and overlapping areas are preserved. In other words, a raster catalog enables you to store a collection of rasters in one central structure, while maintaining the unique characteristics of each individual raster image. Attribute fields can also be added to the raster catalog's table structure to store other metadata. For better performance in ArcCatalog and ArcMap, at low resolutions, you can display a wire frame of the spatial extents of the rasters in a raster catalog instead of the actual pixel data. Definition queries can also be used to display only a specific set of rasters from the catalog.

A raster catalog is useful for the following: storing multiple rasters as a single structure, but still preserving the unique properties of individual rasters; supporting raster data that is frequently updated; and storing a sequence of images for the same location from different sources or dates—for example, for animation or time series applications.

So, if you had a collection of a thousand rasters, should you store them as a raster dataset mosaic or in a raster catalog? In general, for the same number of images, a raster dataset mosaic will typically have better display performance than a raster catalog because ArcGIS treats it as one single entity; whereas, a raster catalog references multiple raster objects. Therefore, a general rule of thumb: try to store a collection of rasters as a raster dataset mosaic when possible. Only use a raster catalog if your application requires it.

Tip # 2: Raster Catalog View

For security and management reasons, perhaps for certain users, you may want to only grant them access to certain raster datasets that reside within a raster catalog. A raster catalog view is an option to control access to individual rasters in a raster catalog. It is conceptually similar to a database view. First, you would need to add an attribute field to the raster catalog table structure that specifies which users have privileges to specific rasters in the catalog. For example, if you had a raster catalog with images covering an entire state, the field could contain county names. Users working in certain counties would only be granted privileges to rasters of their respective counties.

Next, to create a raster catalog view, you would use the following ArcSDE command: `sddtable -o create_view`. Initially, the raster catalog view will appear in ArcCatalog as a feature class. You simply register it with the geodatabase by right-clicking the context menu, and then it will behave just like a standard raster catalog. You would treat the raster catalog view like a standard raster catalog and grant users access to the view within ArcCatalog. For more information on the `sddtable` command, look on the ArcSDE command line help documentation.

Tip #3: Associating Multiple Rasters to the Same Feature in a Feature Class

By default, a table in the geodatabase only supports one attribute field of data type raster. For example, in a land parcels feature class, each record could only have one image associated with it using an attribute field of data type raster. However, using a one-to-many relationship, it is possible to associate multiple images to the same feature—in other words, multiple attribute fields of data type raster to the same feature. The one-to-many relationship could be modeled either with a relate in ArcMap or with a relationship class in the geodatabase.

For example, let's say there are two tables called A and B. Table A is a feature class with one field of data type raster. Table B is a regular table with one field of data type raster. Both tables must have a common key field that is used to relate them to each other. By setting up a one-to-many relationship between table

A and table B—in other words, one record in table A is associated with many records in table B—you can associate multiple records in table B, each containing a different image to the same feature record in table A. Using this workaround, it is possible to relate multiple rasters to the same feature in a feature class.

To review, three tips for managing raster data in an enterprise geodatabase are:

1. When storing a collection of rasters in the geodatabase, use a raster dataset mosaic over a raster catalog, if possible.
2. Raster catalog views can be used to restrict user access to certain rasters stored within a raster catalog.
3. A one-to-many relationship can be used as a workaround to associate multiple images to the same feature in a feature class.

Note that tips one and three are applicable for all types of geodatabases. Raster data is typically very large in size on the order of gigabytes and can occupy several terabytes within a database. Therefore, it is important to manage raster data in an enterprise geodatabase as efficiently as possible.

For more detailed information on these tips and raster data management, read the following ESRI technical white papers: *Raster Data in ArcSDE* and *Managing a Raster Database*. Both are available from the ESRI Support site, <http://support.esri.com>. ESRI also offers several instructor-led training classes on the configuration and tuning of enterprise ArcSDE geodatabases based on DB2, Oracle, and SQL Server database platforms.

Thank you for listening and stay tuned for future podcasts.