

Tilesets

Tile Image Formats

TNTmips can prepare tilesets whose structure conforms to those described by Google, Microsoft, and NASA for their popular viewers. These include:

- Tile Overlays for Google Maps
- Super-Overlays for Google Earth
- Custom Tile Layers for Microsoft Bing Maps
- Tile Layers for NASA's World Wind

and also TNT raster object tilesets for use in MicroImages' commercial products. Each of these standard tilesets must conform to its vendor's specific file naming and directory structure. Each directory level contains tile files of specified size, image file format, and zoom level. These tileset structures are designed to ensure rapid retrieval and display of the required tiles at any zoom level.

The Export to Tilesets and Auto Mosaic processes in TNTmips allow you to choose from the allowed range of image formats and tile sizes for the tileset structure you select from the Target menu. The options on the Image Format and Tile Size menus in these processes are summarized in Table 1 below. Compression and transparency characteristics of the different image formats are summarized in Table 2.

Image Formats

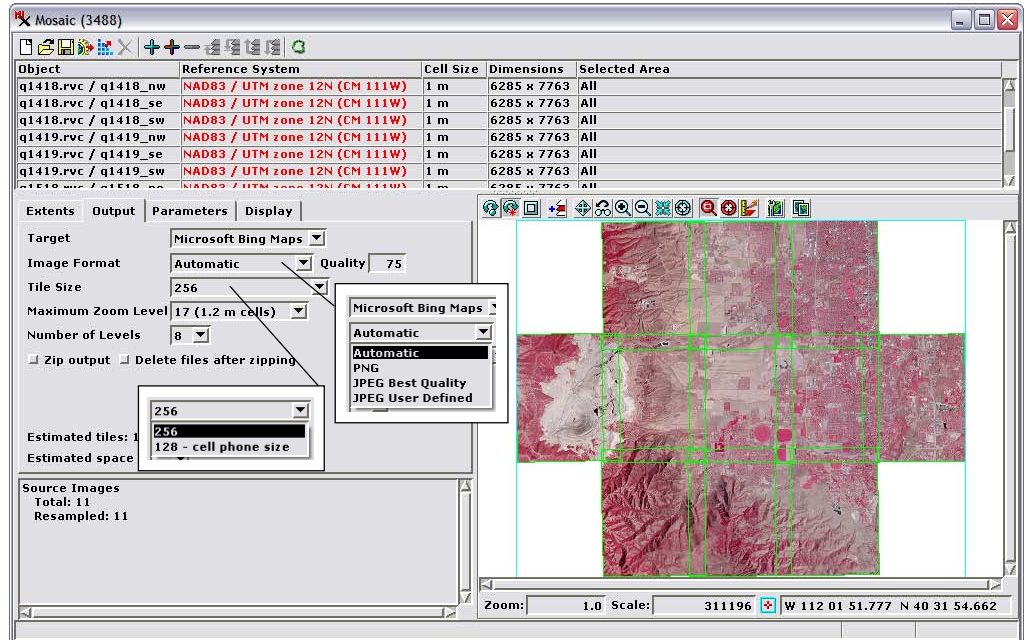
Tiles in a Google Maps, Microsoft Bing Maps, or NASA World Wind tileset are JPEG and/or PNG files. Google Earth is more flexible with regard to tile formats, including TIFF files in addition to JPEG and PNG. The Automatic format option (described herein) that is provided for these tileset structures creates an optimal combination of these tile formats for most uses. A TNT tileset raster object contains tile files in a single format chosen from PNG, GeoTIFF, or JPEG2000 (GeoJP2) image formats.

JPEG Format

The JPEG format provides greater compression than PNG or TIFF, reducing the storage required for the

tileset, but the compression is always lossy and thus most appropriate for continuous-tone images. If you choose the JPEG User Defined format option you can specify the desired compression quality using the Quality numeric field. If there are non-image areas (whether set to null or left black) within or around the edge of the input image set, JPEG tiles that cross these boundaries are black in the non-image area. The Automatic format option described herein provides an optimal solution to this situation.

(over)



Mosaic window showing input color-infrared orthoimages, with target set to Microsoft Bing Maps. Insets show image format and tile size options for Bing Maps. These format and size options are also summarized for all tileset structures in the table below. Bing Maps tilesets from this layout using different file format options are shown on the reverse of this page.

Table 1. Image formats and tile sizes available for different tileset structures.

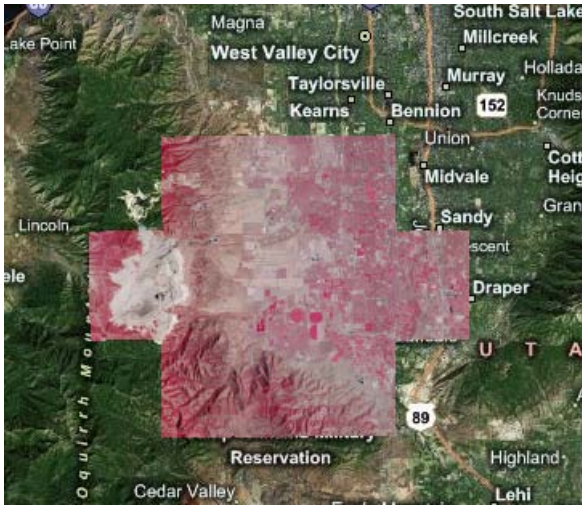
Tileset Structure	Tile Image Format				Tile Sizes (width & height in cells)
	JPEG	PNG	GeoTIFF	GeoJP2	
Google Maps Tile Overlay	Yes	Yes			256, 128*
Bing Maps Custom Tile Layer	Yes	Yes			256, 128*
NASA World Wind Tile Layer	Yes	Yes			512
Google Earth Super Overlay	Yes	Yes	Yes		256, 512, 1024, 2048
TNT tileset raster object		Yes	Yes	Yes	256, 512, 1024, 2048, 4096, 8192

* option for tileset display on cell phones

Table 2. Characteristics of different tile file image formats.

Format Characteristics	JPEG	PNG	TIFF	GeoTIFF	GeoJP2
Compression	Lossy	Lossless	Lossless	Lossless	Lossless or Lossy
Transparency	No	Yes	No	Yes [†]	Yes [†]

[†] TNT tileset transparency in the TNT products via null mask



Microsoft Bing Maps Custom Tile Layers created from the mosaic layout shown on the front side of this page. The tile overlay on the left was created using the Automatic format option, which uses JPEG format for complete image tiles and automatically switches to PNG format for tiles that cross the edge of the image, providing transparency for null areas. The tile overlay on the right was created with the JPEG Best Quality format option. Non-image pixels around the edges of the image in the tile overlay are black. In zoomed-out views these marginal black areas may extend far beyond the edges of the image because Bing Maps tiles have a fixed size of 256 by 256 cells at all zoom levels and are aligned on a predetermined grid for faster display.

PNG Format

PNG tiles use a lossless compression scheme that is appropriate for continuous-tone images as well as map images with a few colors and large areas of uniform color. However, PNG tiles of continuous-tone images are usually significantly larger than JPEG tiles, which use lossy compression. Unlike JPEG and TIFF formats, PNG tiles can incorporate transparency. For example, each PNG tile that includes the boundary of the image area (or of the bounding area you specify) is automatically set to be transparent over the non-image area of the tile.

Automatic Format Selection

The Automatic format option for Google Maps, Bing Maps, World Wind, and Google Earth structures produces a tileset with mixed tile formats. It uses JPEG User Defined format for interior tiles to provide maximum compression and automatically switches to PNG format for edge tiles to provide transparency for nonimage areas.

TIFF and GeoTIFF Formats

You can use TIFF files in a Google Earth tileset. They are actually GeoTIFF tiles that can also be used as georeferenced images in other processes. You can also select GeoTIFF tile format directly for TNT tileset raster objects. TIFF and GeoTIFF

format options include uncompressed and two lossless compression options (PackBits and LZW). TIFF format is suitable for any type of image but provides less compression than JPEG or GeoJP2 and does not provide transparency for non-image pixels when used in Google Earth tilesets. If you wish to use a format with lossless compression and/or transparency for Google Earth tiles, PNG format is thus preferable to TIFF.

JPEG2000 (GeoJP2) Format

JPEG2000 (GeoJP2) image format is available for use in TNT tileset raster objects within the TNT products. JPEG2000 is an advanced image format that provides either lossless or lossy compression that is superior to that found in JPEG and TIFF formats. Menu options for JPEG2000 format include Lossless and two lossy compression options, Best Quality and User-Defined. If you choose User-Defined lossy compression you can set the desired compression ratio using the Ratio field (see the Technical Guide entitled *Mosaic Directly into JPEG2000*).

Although GeoTIFF and GeoJP2 tile formats do not directly support transparency, TNT Tileset Rasters provide transparency for non-image areas by means of a null mask that is stored with the tileset and used automatically when the tileset is displayed.

