Components of the Tileset Definition File

TNTmips can prepare, display, and process tilesets in their native structures defined by Google, Microsoft, and NASA for use in their web geobrowsers and local geoviewer applications. In order to use such a tileset in the TNT products, the tileset structure must be defined in a TileSet Definition (TSD) file, a small XML text file that serves as a descriptive link to the tileset structure. The name of a TSD file matches the name of the tileset and has a .tsd file extension. A TSD file is created by TNTmips processes that create or modify tilesets: Export to Tilesets, Auto Mosaic, Link to Tileset, Validate Tileset, and Merge Tilesets. The Link to Tileset process can build a TSD link file for any valid, supported tileset structure created outside (or inside) of the TNT products (see the Technical Guide entitled *Tilesets: Link to a Structure*).

A TSD file specifies the reference system and geographic extents of the tileset, the size and file formats of the tiles, and the zoom levels available. A TSD file can link to a tileset structure that resides on a local or network drive or anywhere on the Internet. The sample TSD file shown and described below links to a local tileset. It also includes alternate forms of key elements (commented out) for use if the tileset is posted on the Internet.

Sample TSD file for a Local Tileset

TSD file for a Google Maps Tile Overlay with Zoom Levels 5 through 17 created from 1-meter orthoimage mosaic of the state of Tennessee (below; see the Technical Guides entitled *Tilesets: Understanding Sizes* and *Tilesets: Google Maps Structure*.) Numbered elements of the TSD file are explained below and on the reverse of this page.

```
1  <?xml version="1.0" encoding="UTF-8"?>
   <TileSet version="1.0.1">
2      <Version>2010</Version>
       <BuildDate>08 Apr 2010</BuildDate>
3      <Structure>Hierarchical</Structure>
4      <CRS>EPSG:3857</CRS>
5      <BoundingBox minx="-10053352.258394" miny="4161687.061004" maxx="-9088946.741912" maxy="4394497.729754"/>
       <LatLonBox north="36.679290" south="34.983853" east="-81.647398" west="-90.310800"/>
6      <TileFormat size="256" extension="png" mime-type="image/png"/>
       <TileFormat size="256" extension="jpg" mime-type="image/jpeg"/>
7      <ZoomLevels TopLevel="0">
           <ZoomLevel level="5"/>
           <ZoomLevel level="6"/>
           <ZoomLevel level="7"/>
           <ZoomLevel level="8"/>
8          <ZoomLevel level="9"/>
           <ZoomLevel level="10"/>
           <ZoomLevel level="11"/>
           <ZoomLevel level="12"/>
           <ZoomLevel level="13"/>
           <ZoomLevel level="14"/>
           <ZoomLevel level="15"/>
           <ZoomLevel level="16"/>
           <ZoomLevel level="17"/>
       </ZoomLevels>
9      <Locations>
           <!-- <href>http://www.yoursite.com/TN2008_NC_GoogleMaps_Tiles/[z]/[y]/[x].[ext]</href> -->
           <path cacheremote="no">.\TN2008_NC_GoogleMaps_Tiles\[z]\[y]\[x].[ext]</path>
       </Locations>
   </TileSet>
```

Google Maps Tile Overlay Described by this TSD File

1-meter Natural Color Orthoimage Mosaic, State of Tennessee, USA

This tileset can be zoomed in from the overview shown above to a maximum zoom level with pixel size of 1 meter.

1 TileSet

The TileSet element of the TSD file contains all of the elements that provide a complete definition of the structure of the tileset.

2 Version and Build Date

The version and build date of TNTmips that created this TSD file for the tileset.

3 Structure

Tile files in a tileset can be stored in different directory structures and have different file name conventions for use with particular web geoviewers. The Structure element specifies one of three structures:

- *Hierarchical*: nested folders starting with zoom level, usable with Bing Maps, Google Maps, Google Earth, and Open Layers
- *Flat*: all tile files in one folder, usable with Microsoft Bing Maps 2D/3D (recommended for small tilesets only)
- *WorldWind*: usable in NASA World Wind

(over)

4 CRS (Coordinate Reference System)

The CRS element specifies the Coordinate Reference System used by the tileset structure, expressed in the form of a code number in the widely-used European Petroleum Survey Group (EPSG) Geodetic Parameter Dataset. In this example, EPSG:3857 specifies the Web/Spherical Mercator CRS used in Google Maps and Microsoft Bing Maps (described as WGS84 / Pseudo-Mercator in the EPSG database).

5 BoundingBox and LatLonBox

The BoundingBox element lists the minimum and maximum X and Y coordinates of the tileset in its native CRS.

The LatLonBox element lists the minimum and maximum latitude and longitude of the tileset in the WGS84 Geographic CRS, the most commonly-used global reference system for map coordinates.

6 TileFormat

A TSD file includes a TileFormat element for each tile file format used in the tileset. In this TSD file example there are two TileFormat elements, one for PNG tiles and one for JPEG tiles.

Each format element specifies the size (width and height) of the square tiles in pixels. The *extension* attribute specifies the file extension used for that file format in local use. For Internet use there is also an attribute that specifies the "mime-type" (internet media type) of the tiles.

7 ZoomLevels

The ZoomLevels element brackets a list of the zoom levels (sets of tiles pre-rendered at different scales) included in the tileset. The TopLevel attribute indicates the number of the top or least-detailed zoom level in the tileset structure.

8 ZoomLevel

There is one ZoomLevel element for each numbered zoom level in the tileset defined by the TSD file. The zoom level number is indicated by the *level* attribute value. If the tiles for some zoom levels are stored in a location different from the default specified by the Locations element, the relevant ZoomLevel elements have *path* or *href* attributes to specify these alternate storage locations (see the following discussion of the form of the *path* and *href* attributes for the Locations element).

9 Locations

The Locations element specifies the default physical location of the tileset and its tiles on a local or network drive or on the Internet. The Locations element for a local tileset includes a *path* element, whereas the corresponding element for an Internet tileset is called *href*. In this TSD file example for a local tileset, the href element for Internet use is included but commented out.

The path and href elements specify a model or template path to the tiles in the tileset; this template corresponds to the directory structure and file name convention used for this particular tileset structure. The first part of this template for the *path* element is the relative directory path to the master tiles folder, in which all tiles are stored. For an Internet tileset, the *href* element begins with the absolute web address (URL) of the master tiles folder.

The remainder of the *path* or *href* element (following the master tile directory location) indicates the naming pattern of nested subdirectories (if any) and tiles in the structure. This path structure is described in a comment line above the Locations element in each TSD file (not shown on the reverse). For the Google Maps tileset in the example presented here,

```
<path  cacheremote="no">
      .\TN2008_NC_GoogleMaps_Tiles\[z]\[y]\[x].[ext]</path>
```

[z] = Zoom Level directory
[y] = Tile Row directory
[x] = Tile Column directory
[ext] = File Extension

When a TSD file is created for a tileset by TNTmips, the path element is automatically filled in with the local or network path to the tileset. An alternate href element for Internet use is also automatically created with a dummy internet address, and this element is commented out by default:

```
<!-- <href>http://www.yoursite.com/TN2008_NC_GoogleMaps_Tiles/[z]/
[y]/[x].[ext]</href> -->
```

If you move a tileset to your Web space and wish to use it in the TNT products, you need to uncomment the href element and edit its contents to provide the correct web address and directory path for the master tiles directory:

```
<href>http://www.microimages.com/geodata/epsilon/TN2008_NC/
TN2008_NC_GoogleMaps_Tiles/[z]/[y]/[x].[ext]</href>.
```

For an internet tileset, both href and path elements can be active (uncommented); TNTmips automatically uses the location specified in the href element as the source for the tileset.

TNTmips automatically caches tiles downloaded during display of a remote tileset to speed up redisplay and reuse of the tileset. If the href element is active, the path element can be used to specify a particular local drive location for these cached tiles (otherwise TNTmips uses its default temporary directory). To enable a specific cache location, set the value of the *cacheremote* attribute of the path element to "yes".