

Glist File Format

From DirsigWiki

The geometry list file (glist) describes the geometry present in a scene. It is the XML replacement for the old object database (odb) file format.

A geometry list contains:

- Zero or more `object` elements
- Zero or more `geometrylistinclude` elements.

A complete example geometry list follows:

```
<geometrylist>
  <object>
    <basegeometry>
      <gdb><filename>foo.gdb</filename></gdb>
    </basegeometry>

    <staticinstance>
      <translation>
        <point><x>0</x><y>0</y><z>0</z></point>
      </translation>

      <rotation>
        <cartesiantriple><x>0</x><y>0</y><z>90</z></cartesiantriple>
      </rotation>

      <scale>
        <cartesiantriple><x>1</x><y>1</y><z>1</z></cartesiantriple>
      </scale>
    </staticinstance>

    <dynamicinstance>
      <keyframemovement>
        <filename>foo.mov</filename>
      </keyframemovement>
    </dynamicinstance>
  </object>

  <geometrylistinclude name="Cars" enabled="true">static_cars.glist</geometrylistinclude>
</geometrylist>
```

The example geometry list specifies that the "foo.gdb" facetized geometry appears in the scene as two separate instances. One instance is located at the scene origin and is rotated 90 [deg] counterclockwise around the Z+ axis. The other instance is moving; its position is specified in the "foo.mov" movement file.

The example geometry list also includes verbatim another geometry list: "static_cars.glist". The contents of this second list file will also be included in the scene.

The `object` element specifies a piece of geometry which may be reused, or "instanced", multiple times in the scene. Instancing is a technique that saves memory. In Megascene1 there are only 15 unique tree geometries which are instanced over 1000 times.

Each `object` element specifies the geometry inside `basegeometry` section. The following base geometries are

currently supported:

Geometry Type	Example
Facetized Geometry (GDB Format)	<pre data-bbox="440 331 987 401"> <basegeometry> <gdb><filename>foo.gdb</filename></gdb> </basegeometry> </pre>
Facetized Geometry (OBJ Format)	<pre data-bbox="440 520 987 590"> <basegeometry> <obj><filename>foo.obj</filename></obj> </basegeometry> </pre>
Axis-Aligned Box	<pre data-bbox="440 699 1235 936"> <basegeometry> <box> <matid>8000</matid> <lowerextent> <point><x>-1000.0</x><y>-1000.0</y><z>-1.0</z></point> </lowerextent> <upperextent> <point><x> 1000.0</x><y> 1000.0</y><z> 0.0</z></point> </upperextent> </box> </basegeometry> </pre>
Sphere	<pre data-bbox="440 1056 1146 1251"> <basegeometry> <sphere> <matid>8000</matid> <center> <point><x>10.0</x><y>10.0</y><z>5.0</z></point> </center> <radius>1.0</radius> </sphere> </basegeometry> </pre>
Regular Grid	<pre data-bbox="440 1371 1040 1608"> <basegeometry> <regulargrid> <gridfilename>regular.grid</gridfilename> <insertpoint> <point><x>0</x><y>0</y><z>0</z></point> </insertpoint> <voxeldeltax>1.0</voxeldeltax> <voxeldeltay>1.0</voxeldeltay> <voxeldeltaz>0.5</voxeldeltaz> </regulargrid> </basegeometry> </pre>

For both Axis-Aligned Boxes and Spheres, an optional `temperature [K]` element may be assigned, bypassing the thermal model. Also, if a gas material id is assigned either of these entities, then the `concentration [ppm]` element must be included.

Each object element may have:

- zero or more static (nonmoving) instances
- zero or more dynamic (moving) instances

An example static instance follows:

```

<staticinstance>
  <translation>
    <point><x>10</x><y>0</y><z>0</z></point>
  </translation>

  <rotation>
    <cartesiantriple><x>0</x><y>0</y><z>45</z></cartesiantriple>
  </rotation>

  <scale>
    <cartesiantriple><x>1</x><y>1</y><z>1</z></cartesiantriple>
  </scale>
</staticinstance>

```

This places the origin of the `basegeometry` at scene coordinate (10,0,0). The geometry is rotated counterclockwise 45 [deg] around the Z+ axis. The scale factors of 1 indicate that, for each dimension, each unit in the geometry represents 1 [m] in the scene.

It is also possible to geolocate static instances. The following example shows an instance at 43.12 North, 78.45 West with an altitude of 300 [m] above the WGS84 ellipsoid. Note that the `sceneorigin` in the XML scene file geolocates the local scene coordinate system. If the `sceneorigin` were also at 43.12 North, 78.45 West but with an altitude of 200 [m], then the equivalent local coordinates of the following example would be (0,0,100) [m].

```

<staticinstance>
  <translation>
    <geodeticlocation>
      <latitude>43.12</latitude>
      <longitude>-78.45</longitude>
      <altitude>300</altitude>
    </geodeticlocation>
  </translation>

  <rotation>
    <cartesiantriple><x>0</x><y>0</y><z>45</z></cartesiantriple>
  </rotation>

  <scale>
    <cartesiantriple><x>1</x><y>1</y><z>1</z></cartesiantriple>
  </scale>
</staticinstance>

```

Moving geometry is introduced using a `dynamicinstance`. The position is described in a separate movement (`mov`) file. An example follows:

```

<dynamicinstance>
  <keyframemovement>
    <filename>foo.mov</filename>
  </keyframemovement>
</dynamicinstance>

```

Finally, it is possible to include other geometry lists using the `geometrylistinclude` element. This allows for hierarchical organization of scenes. For instance, `Megascene1's` Tile 1 geometry list further includes geometry lists representing each street (with houses and trees) in the scene. An example follows:

```
<geometrylistinclude name="Cars" enabled="true">static_cars.glist</geometrylistinclude>
```

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