

Group

- Container that hold lower level nodes
- Used to compile node graph, & is passed off to rtTrace for ray intersection
- Commonly used to contain several Geometry Groups that move dynamically to each other *
- Group children can be shared with other Groups**

Transform

- Represents Geometry transformation info (translation, rotation, scale...)
- Transforms are passed via 4x4 matrix

Selector

- Similar to a Group – collection of higher level graph nodes
- Don’t have an acceleration structure association; use a visit program instead, which specifies which child node a ray should continue to traverse
- Typically used for dynamic, per-ray level of detail*** (like a switch statement)

Geometry Group

- A container for 1/+ Geometry Instances
- Can share multiple Geometry Instances w/ other Geometry Groups

Acceleration****

- Tool for speeding up traversal & intersection ray tracing queries
- Represents hierarchy breakdown of scene geometry
- Used to quickly remove space not intersected by rays
- Different types of structures (typically differ in construction speed & ray tracing performance)

Geometry Instance

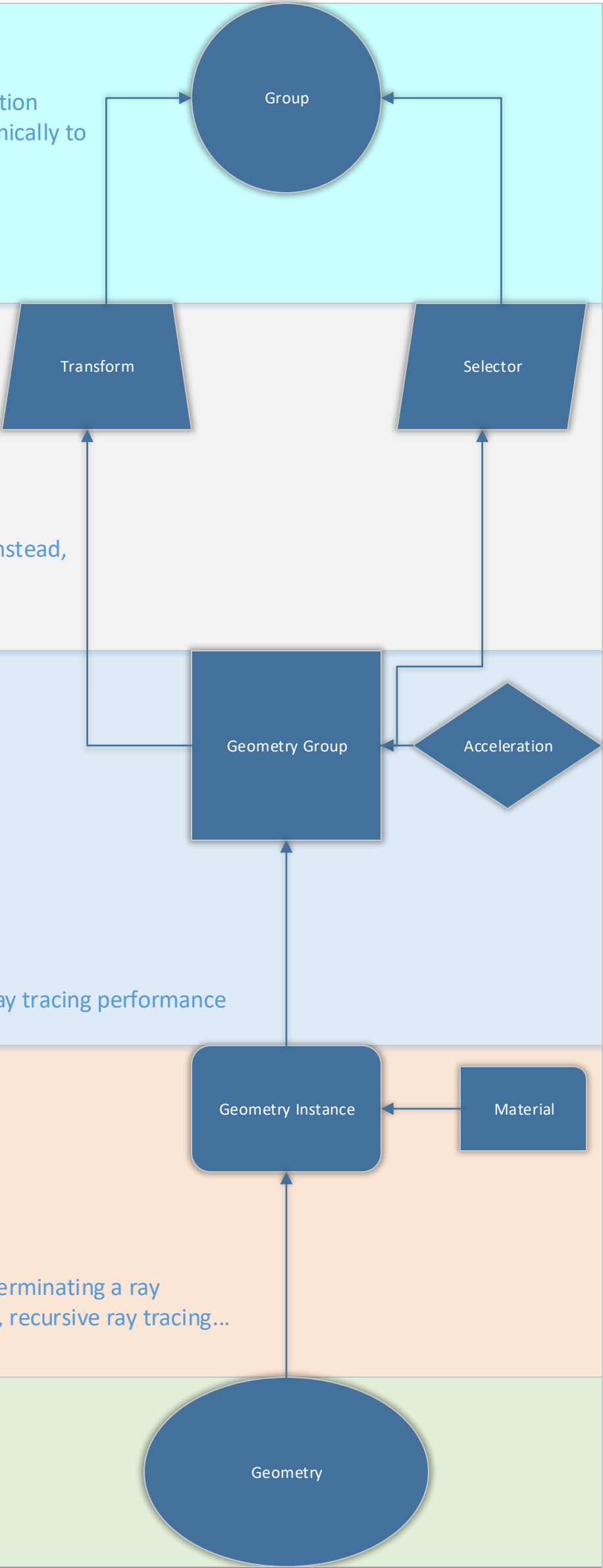
- Represents an instance of 1 Geometry w/ 1/+ Materials

Material

- Actions taken during ray intersection*****
- E.g., reflectance color, tracing additional rays, ignoring intersections, terminating a ray
- ClosestHit() – texture lookups, reflectance color, light source sampling, recursive ray tracing...
- AnyHit() – shadow rays termination, binary transparency...

Geometry

- Collection of user defined primitives (meshes)



- * “The individual position, rotation, and scaling parameters can be represented by transform nodes, so the only acceleration structure that needs to be rebuilt between calls...is the one for the top level group.”i.e., Transform nodes can hold the transform parameters, thus only the highest Acceleration structure node needs to be updated. This is cheaper than having the all of the other Acceleration structures in the scene.
- ** “This allows for very flexible and lightweight instancing scenarios...”
- *** “...an object in the scene may be represented by a number of geometry nodes, each containing a different lvl of detail versions of the object. The Geometry Groups containing these different representations can be assigned as children of a selector. The visit program can select with child to intersect using any criterion (e.g. based on the footprint of length of the current ray), and ignore the others.”
- **** Note, there are several Acceleration sections in the NVIDIA OptiX 5.0 Programming Guide that should be reviewed to fully understand the capabilities and applicability with these structures.
- ***** “...each material can actually hold more than one closest hit or any hit program . This is useful if an application can identify that a certain kind of ray only performs specific actions.”