Papervision 3D

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Papervision 3D

- Developed to enable 3D graphics with Flash
- Uses ActionScript as the language
- Developed by a core team and released to public in 2007, has since become open source
- Report/presentation is based on 1.5 but 2.0 is in public beta

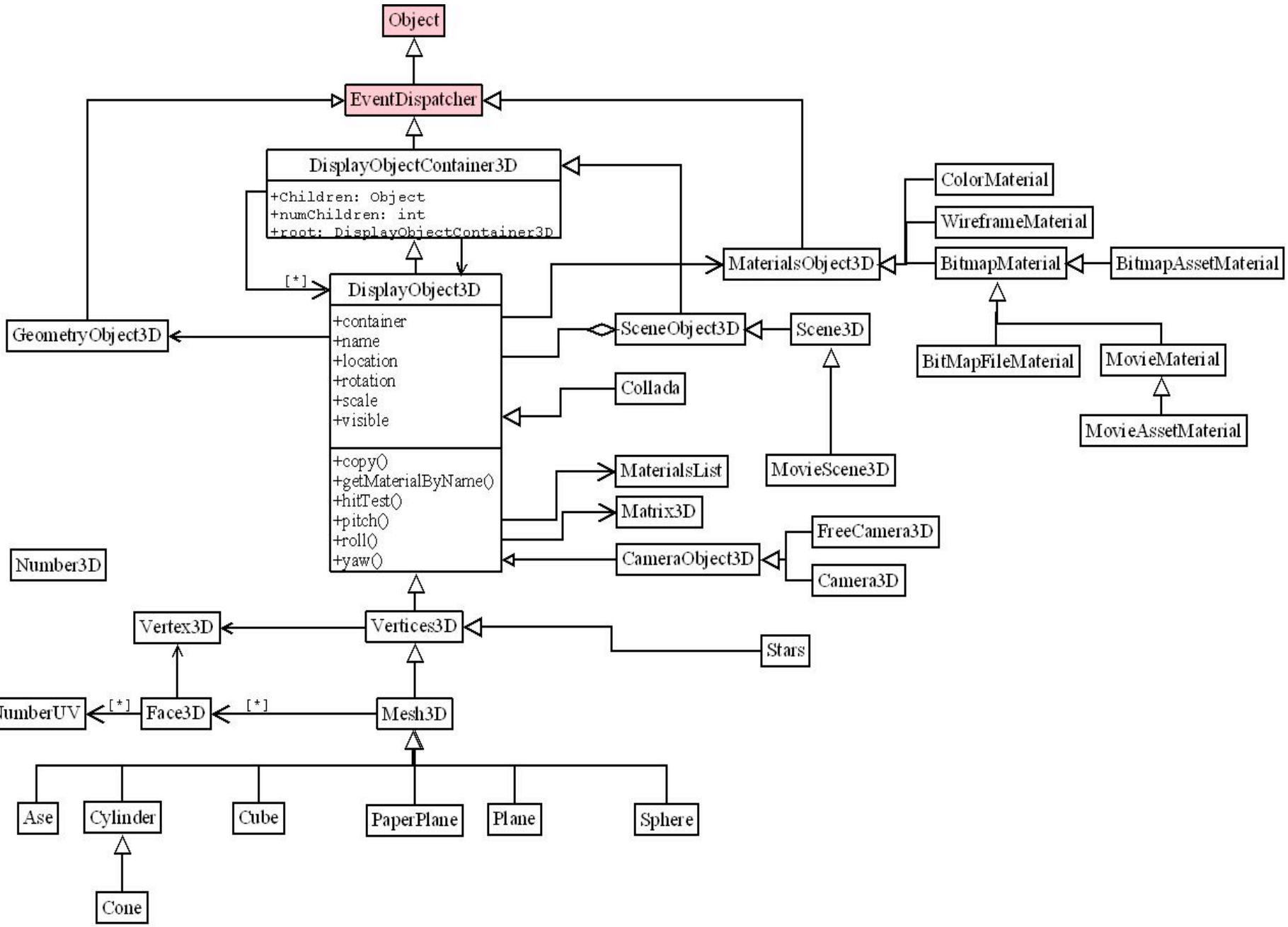
Abilities

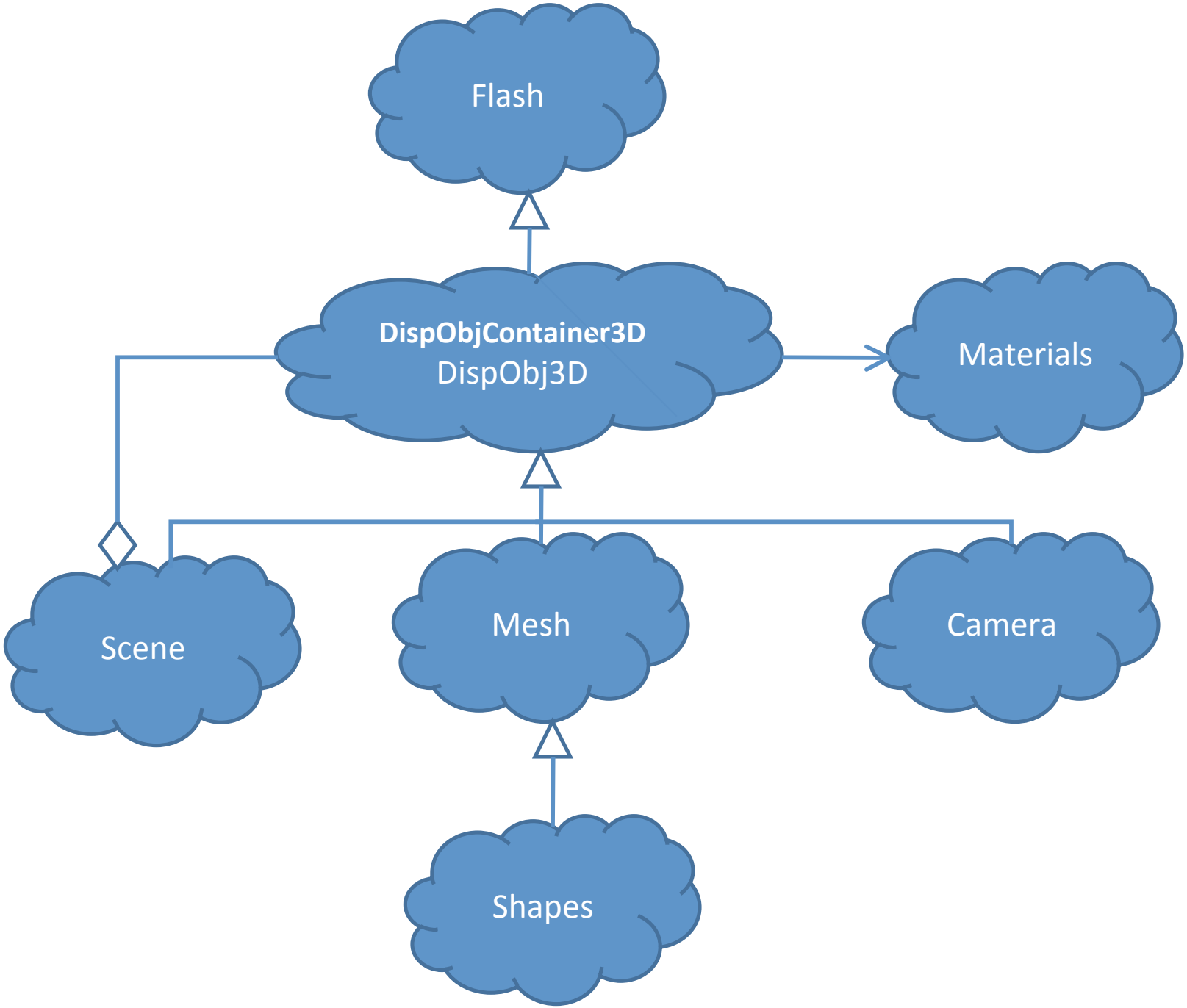
- Papervision allows you to make 3D objects, and manipulate them.
- Works by making a scene, having a camera object and then adding any other needed objects to the scene.
- Demo tease

Demo

Flash & Papervision

- Papervision takes care of all calculations and keeps track of all objects in the scene
- Flash presents Papervison's objects and calculations
- Flash handles any I/O


Object
EventDispatcher
DisplayObjectContainer3D
+Children: Object
+numChildren: int
+root: DisplayObjectContainer3D
[*]
DisplayObject3D
+container
+name
+location
+rotation
+scale
+visible
+copy()
+getMaterialByName()
+hitTest()
+pitch()
+roll()
+yaw()
GeometryObject3D
SceneObject3D
Scene3D
MaterialsObject3D
ColorMaterial
WireframeMaterial
BitmapMaterial
BitmapAssetMaterial
BitMapFileMaterial
MovieMaterial
MovieAssetMaterial
Collada
MaterialsList
MovieScene3D
Matrix3D
FreeCamera3D
CameraObject3D
Camera3D
Number3D
Vertex3D
Vertices3D
Stars
NumberUV
[*]
Face3D
[*]
Mesh3D
Ase
Cylinder
Cube
PaperPlane
Plane
Sphere
Cone

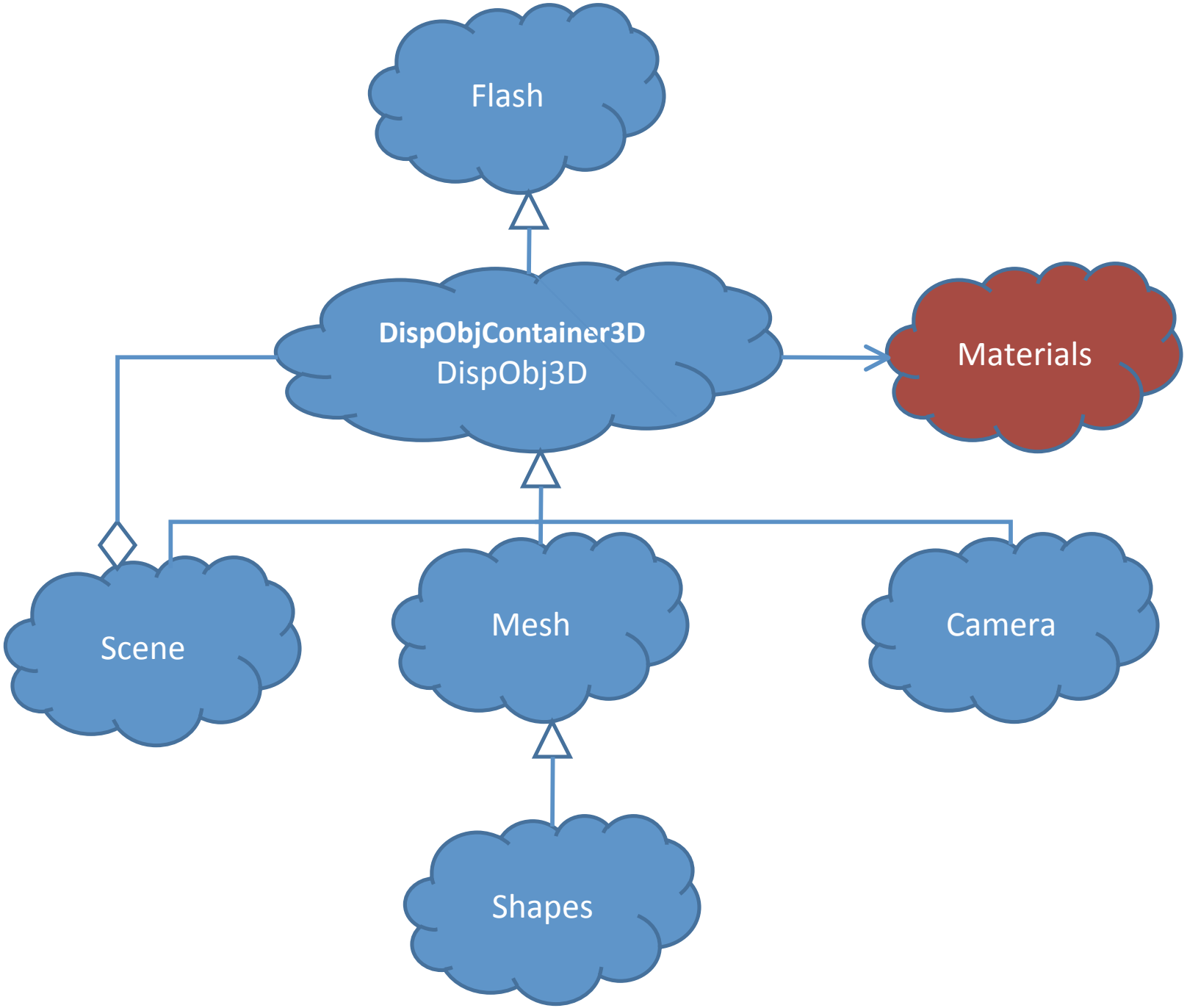

Flash
DispObjContainer3D
DispObj3D
Materials
Scene
Mesh
Camera
Shapes

DisplayObject3D

- Directly below flash in our Hierarchy is the DisplayObjectContainer3D (abstract class)
  - Is the base class for anything that can contain 3D objects (scenes, shapes, etc...)
- Its children are displayObject3D and sceneObject3D which are the base for the objects needed to create a “movie”

DisplayObject3D Services

- A displayObjectContainer3D is a container class for displayobject3Ds
  - Think of the space where all the 3D objects “live” (this includes the camera and any shapes you might want)
  - Anything and everything that you see in a Papervision movie is a displayobject3D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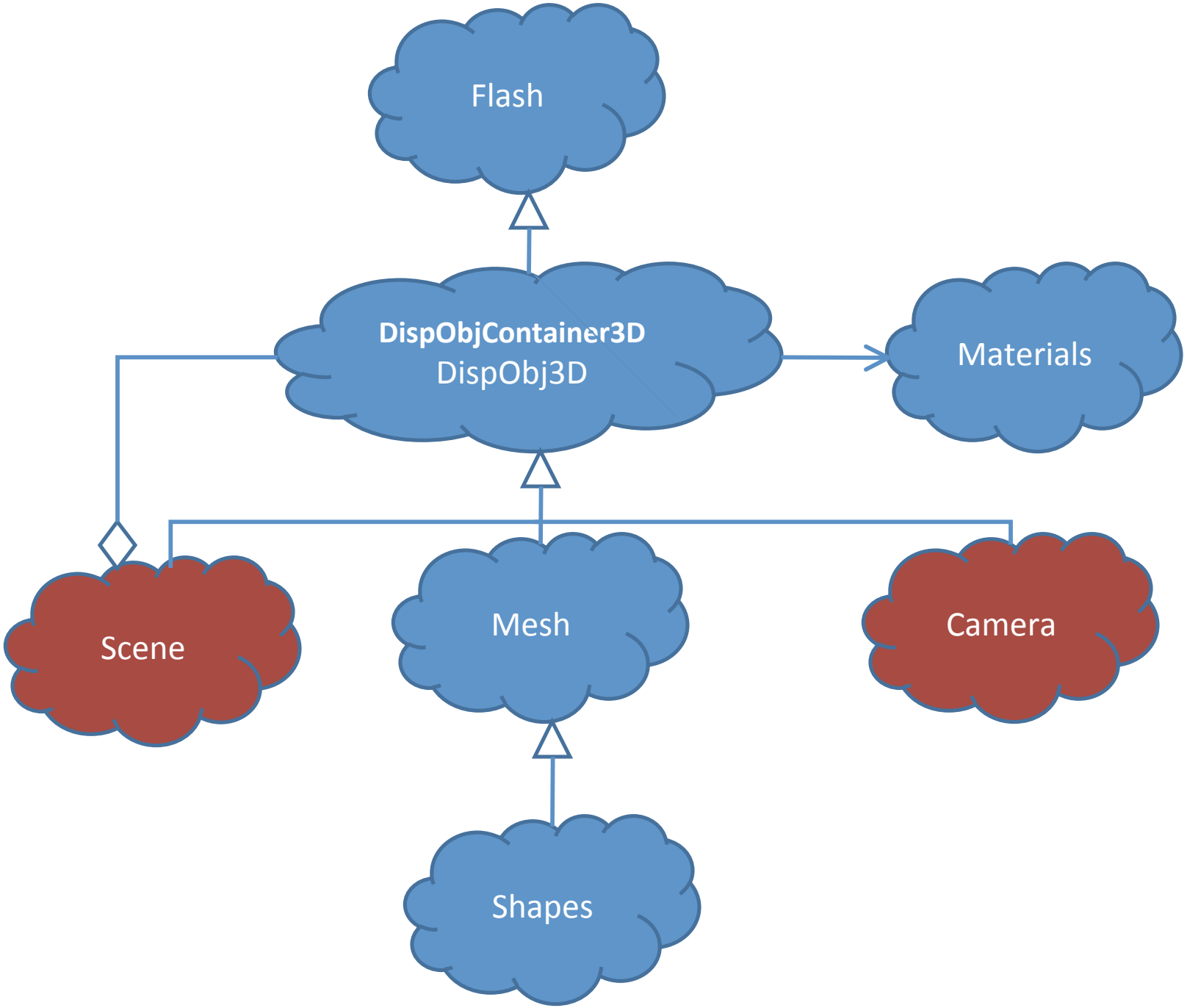
Materials

- Materials collects data about how objects appear when rendered.
- Materials get assigned to entire objects or faces of an object.
- The materials package provides different ways to create and manage materials
- Ex. Bitmap, color, movie, etc.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Scenes

- A scene is the place where objects are placed, it contains the 3D environment.

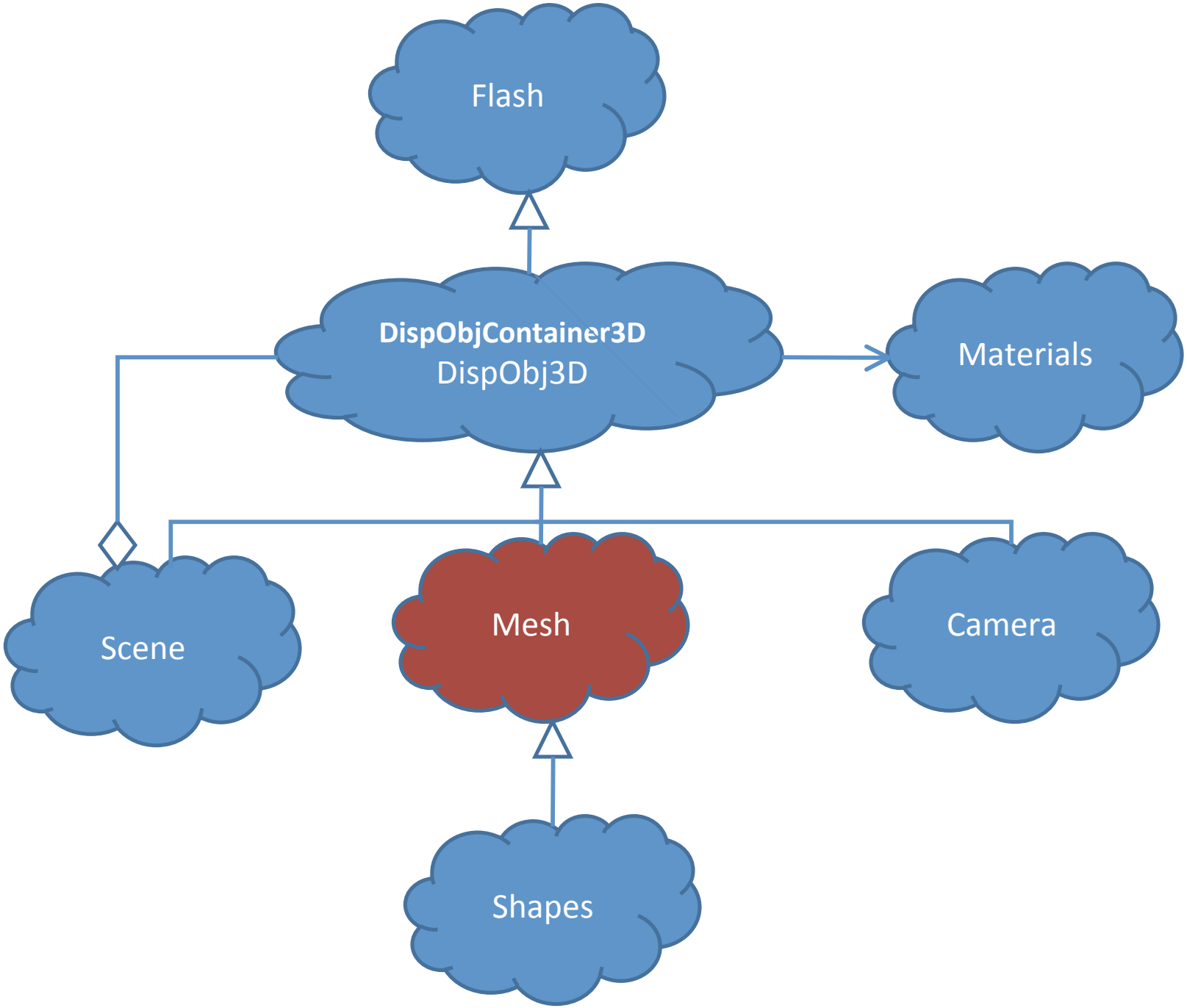
- MovieScene3D lets you create a scene where each object is rendered in its own container.
- Scene3D lets you create a scene where all objects are rendered in the same container.
  - Contains multiple display objects (shapes)

Cameras (passed into scene)

- A camera defines the view from which a scene will be rendered. Different camera settings would present a scene from different points of view.

- The Camera3D class creates a camera that views the area around a target object.

- The FreeCamera3D class creates a camera that views the area in the direction the camera is aimed.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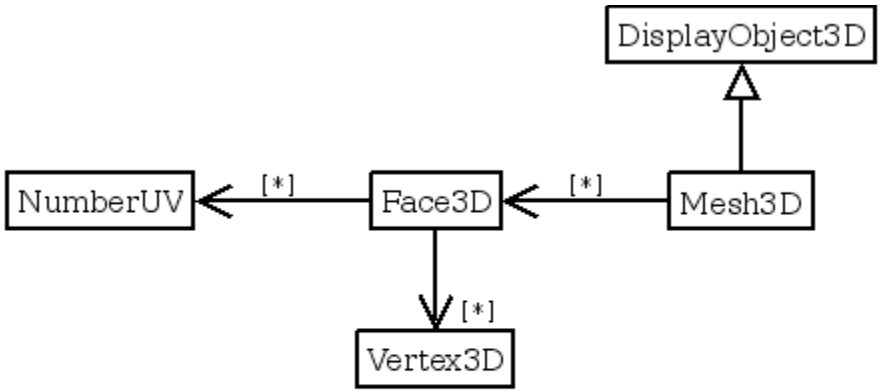
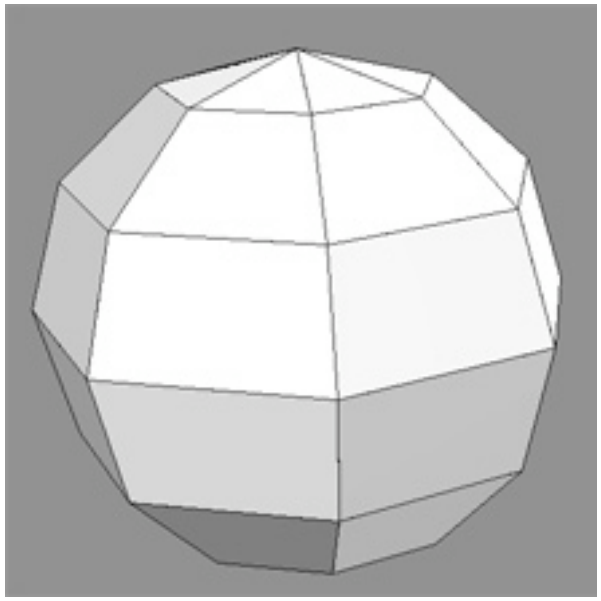
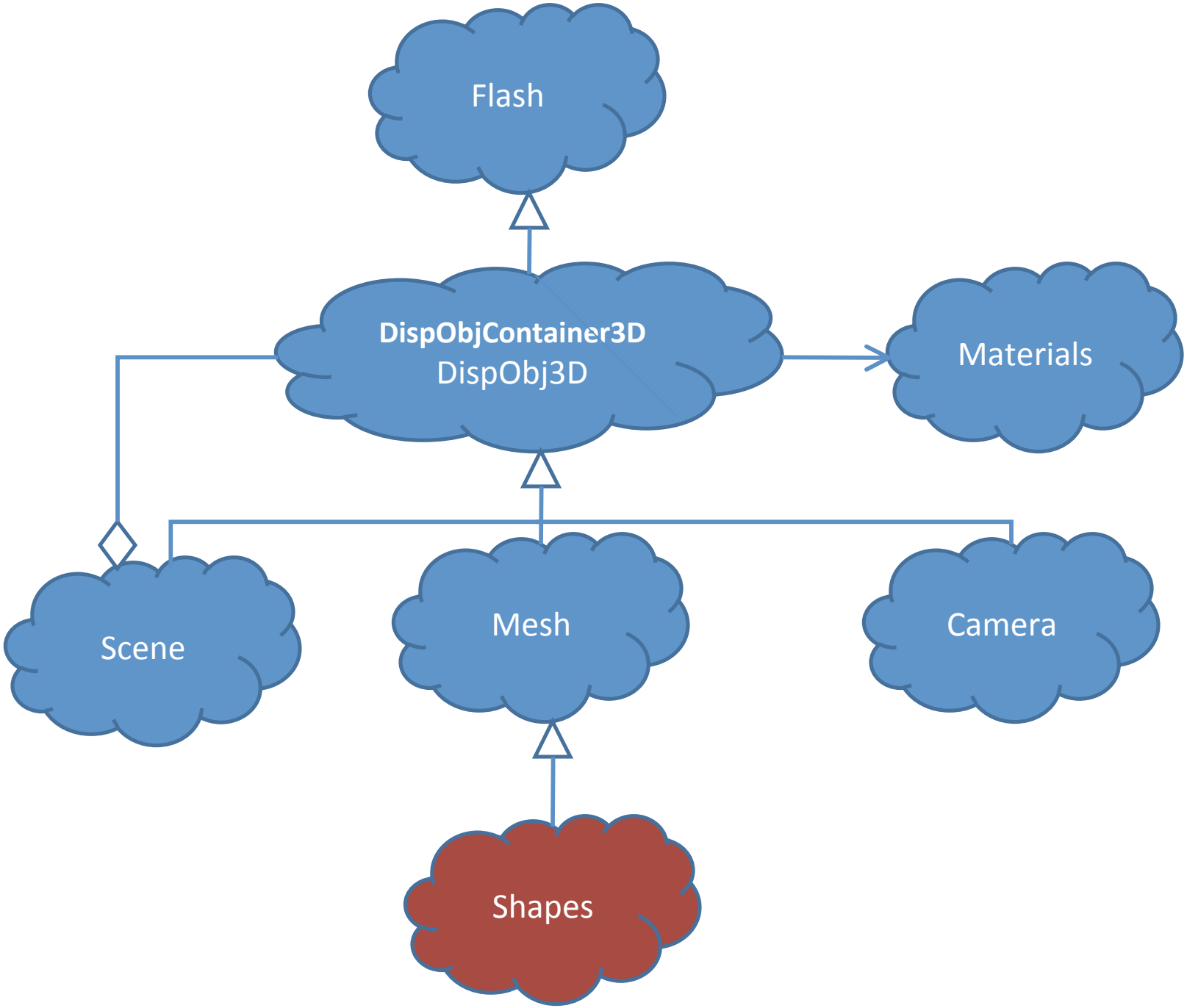
Mesh3D





Services Exported by Mesh3D

- Project the object from 3D to 2D
- Move the object in space
- Add/remove objects composing the 3D shape
- Render the object onto a scene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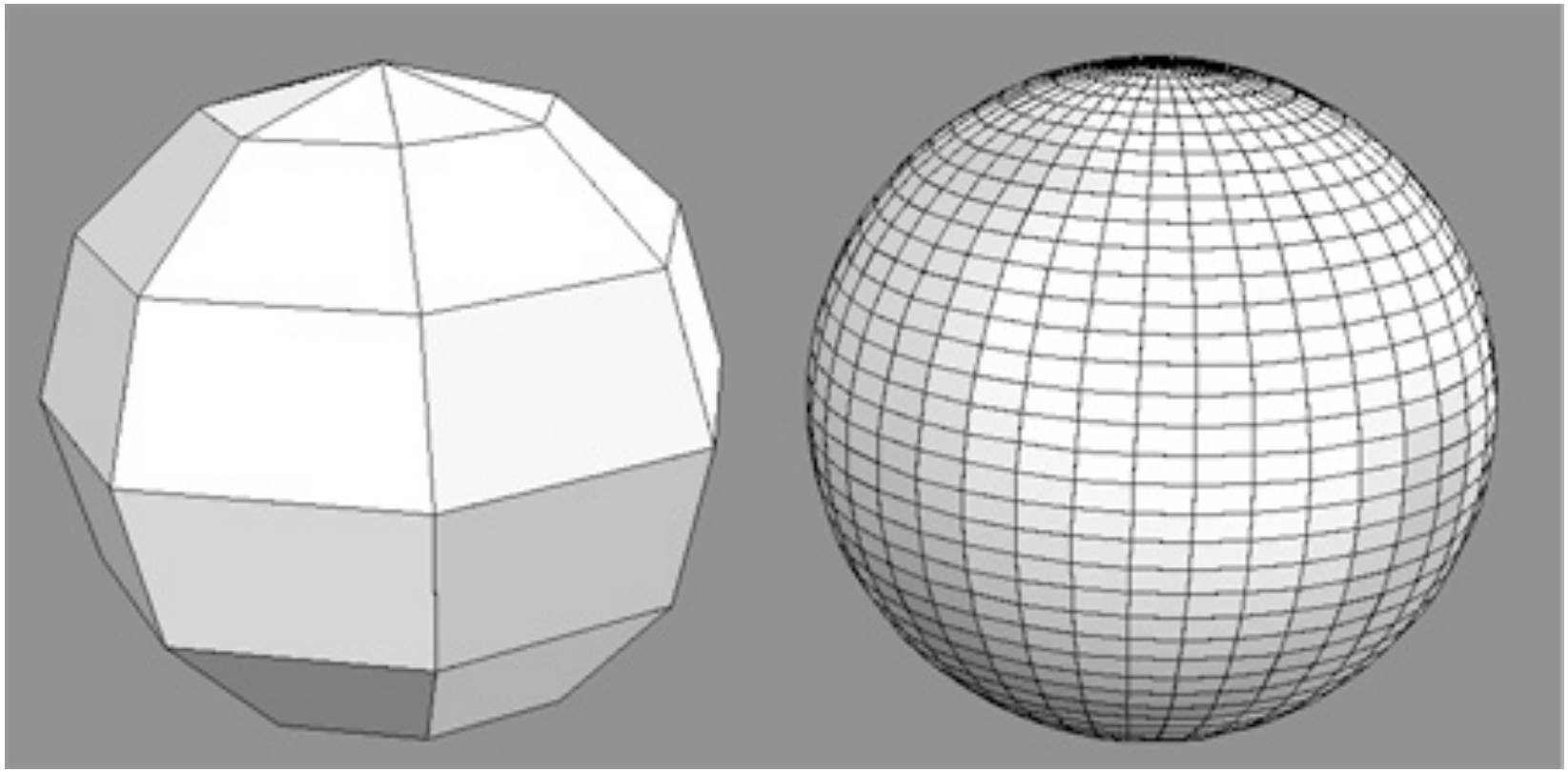
Shapes

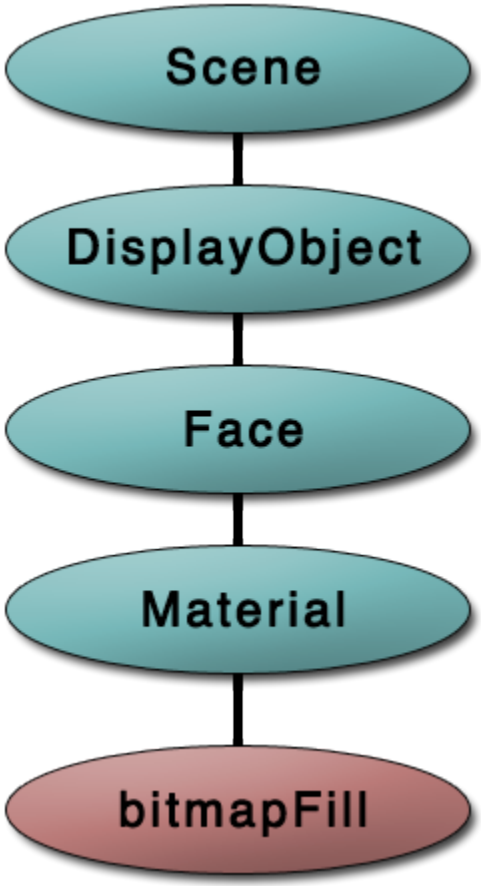
- All shapes inherit from Mesh3D
- The shape classes allow you to easily construct common objects
- Cylinder
- Cone
- Cube
- Plane
- Sphere
- Paper Plane
- Collada
- Ase

Shapes

- The shape constructors allow you to define segmentation



Rendering



Getting Papervision to Work

- #include papervision source code
- Create a Scene
- Create a Camera
- Create shapes & add them as children to the Scene
- On every frame, call scene's 'render' method and pass it the Camera object

Demo

Critique

- Kick ass documentation
- Excellent use of inheritance and polymorphism
- Easier to use than OpenGL
- Has the advantages and disadvantages of Flash
- Easy to create/extend framework

Why use Papervision?

- Open source with a large community
- Well maintained
- Agile core developers