

(this draft is not complete)

## Animations

- **shadow.animation** is a new package containing few animations functionalities. All Animations. SFAnimation is the base abstraction for all animations in such package.

## Pipeline

- Grids have been reworked. Now a grid can only be one of three types, that's being Triangle, Quad or Line. Custom defined grids aren't allowed anymore. Each grid can be assigned a size, and it is intended to be a regular grid of given type with that size.
- The **Program Component** system has been reworked to be more simple. Now a program must have 4 module: a **Primitive**, a **Transform**, a **Material** and a **Light** module. Each module may be the composition of more components.
- **Transform**, **Material** and **Light module** share the same structure and same rule, **Primitive** is quite different; for example, transform may use Structure and Textures, and materials can use matrices.
- **PrimitiveComponent** can now write generic Block as assigned blocks, in order to fulfill different Primitive Design.
- **Tessellation** module has been removed from **Primitive**. Now, any **PrimitiveComponent** may play the tessellator role.
- The pipeline shading language has been reworked: pipeline functions now are defined by strings instead of chars. This has allowed the introduction of a greater number of functions.

## Images and Textures (High Level)

- the whole shadow.image.bitmaps is changed. The most important novelties are:
  - a renewed **PerlinNoise** engine
  - the new **Voronoi Bitmap** models.

## Materials (High Level)

- shadow.material has been definitively removed, as it was intended from the beginning. All materials properties can now be described directly using sf files.

## Geometries (High Level)

- **SFGeometry** : some unused methods have been removed.
- **SFSurfaceFunction** is an interface now.
- **SFSurfaceGeometryTexCoordFunctionuv** has been removed. Now all surface functions can be used both for geometries and texCoords.
- **SFCurve** is more complex now, in order to allow better modeling of SurfaceFunctions.
- **SFUnOptimizedCurve** is a new utility class which contains an unoptimized but generic version of curve-related functionalities. Curves may extend this class for a fast implementations, or avoid it for a more optimized one.
- **SFUniformCurvespline** : added some useful methods.
- **SFTransformedCurve** : a new Curve which generates a transformed version of another

curve.

- many curves and curves-data have been aligned to the new Curve requirements.
- **SFExpressionSurfaceFunction**, **SFNormalBasedObjPlaneTexCoordGeometry**, **SFSimpleObjTexCoordGeometry**, **SFSimpleTexCoordGeometryuv**, **SFTensorProductSurface**, **SFUnoptimizedSurfaceFunction** and **SFUnoptimizedSurfaceFunctionUV** are now new available SFSurfaceFunctions. SFSurfaceFunction mechanism has slightly changed, in order to better serve to MeshGeometries building process.
- **SFArcLengthuv**, **SfCompositeGeometryuv**, **SFSimpleObjPlaneTexCoordGeometry** and **SFSimpleTexCoordGeometryuv** are no more.
- **SFCompositeGeometry**, **SFCurvesGeometry**, **SFCurvesMesgGeometry**, **SFDerivedTexCoord**, **SFGroupMeshGeometry**, **SFParametrizedGeometry**, **SFPointsCloud**, **SFQuadsGridGeometry**, **SFSurfaceMeshGeometry**, **SFTilesTexCoord** are new geometric models. We are slowly achieving the definition of a minimal set of geometries able to resemble all the requirements of real-life objects.
- extrusion modules have been removed, because the framework contains better ways to build the same geometries now.
- **shadow.operational.grid** is a utilities package used by the new geometries.

## Data

### General

- The Data system has been integrated to allow data to be represented in string format. String formats are used to translate sf data into valid xml files.
- The system actually allows to description of SFDataAsset and SFObjectLibraries into XML files, allowing the files to be compiled so that a related .sf version can be stored. It is always possible to switch from the xml version to the sf and back.
- Many SFDataAssets have been reworked to improve the quality of both the sf and xml data format.

### Animations

- **shadow.animation.data** contains the data modules for the new shadow.animation package.

### Geometry

- **SFFixedFloat16** and **SFFixedFloatUnit8** are 2 new Data elements used to describe values.
- **SFSurfaceGeometryTexCoordFunctionuv** related data Asset have been removed.
- **shadow.geometry.functions.data** has changed in order to fulfill the many changes on shadow.geometry.functions.
- **shadow.geometry.geometries.data** has changed in order to fulfill the many changes on shadow.geometry.geometries.
- **shadow.geometry.vertices** is a new important package, playing an important role on geometry-data; now it's possible to abstract on how values elements are stored into SF files, that meaning that you can select the precision of floating point values.