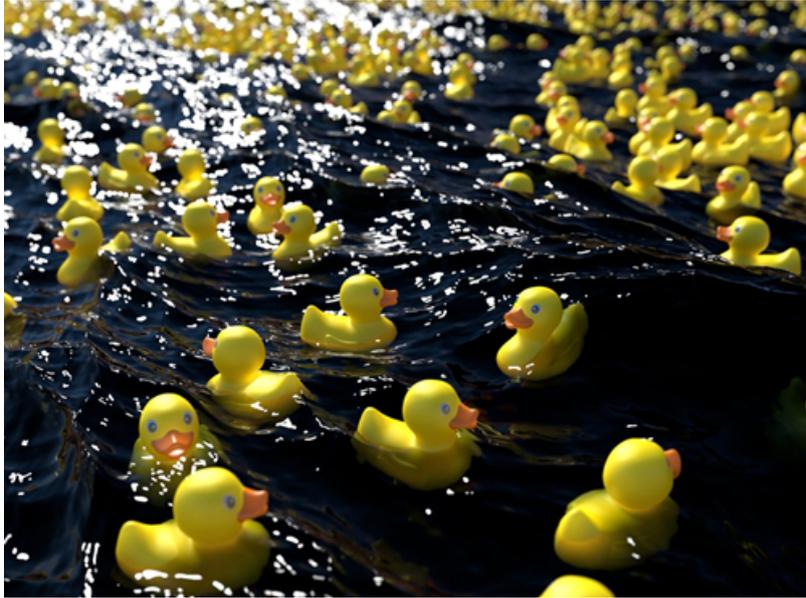


Procedural



Duck model exported as .ass file and imported as a *procedural*

You can export any object as a [.ass](#) file. A *procedural* (also called stand-in, proxy or placeholder) references the .ass file on disk (or other procedural formats supported by Arnold such as .abc, .obj, .ply, .usd etc). They allow you to keep your working scene light and workable by deferring the loading of geometry data until render time.

i During export, Arnold's current render settings will be used. Therefore, you should finalize these settings before exporting the *Stand-in*. For example, you should choose whether you wish to export with motion blur enabled or not.

w The *utility* shader's *object* mode does not work with procedurals (*stand-ins*). This is a known limitation. The color of the spheres changes when the *utility* shader's mode is *object*. However, the *stand-ins* color remains the same.



Spheres



Stand-ins/Procedurals



✔ Sharing Arnold Procedurals Between Plug-ins

Some users may be in a studio environment where a combination of Maya, 3DS Max, Houdini, and C4D are used. It is perfectly possible to export .ass Arnold Procedurals (stand-ins) and reuse them in other Arnold plug-ins (and vice versa), as long as Arnold can find both the plug-in and shaders. To do this, you must ensure that the Arnold shader path environment variable ARNOLD_PLUGIN_PATH is set to pick up both sets of shaders.

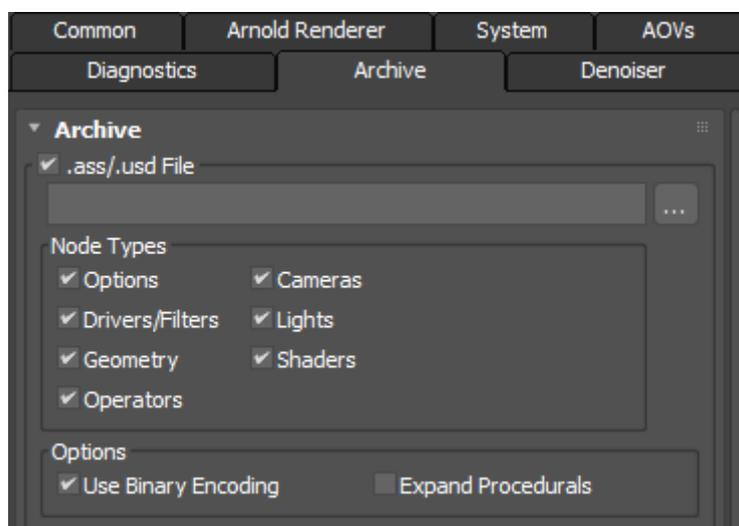
ℹ An 'Introduction to Procedurals' tutorial can be found [here](#).

Export .ASS File

Before you can use procedurals, you will have to first export some geometry to be used later.

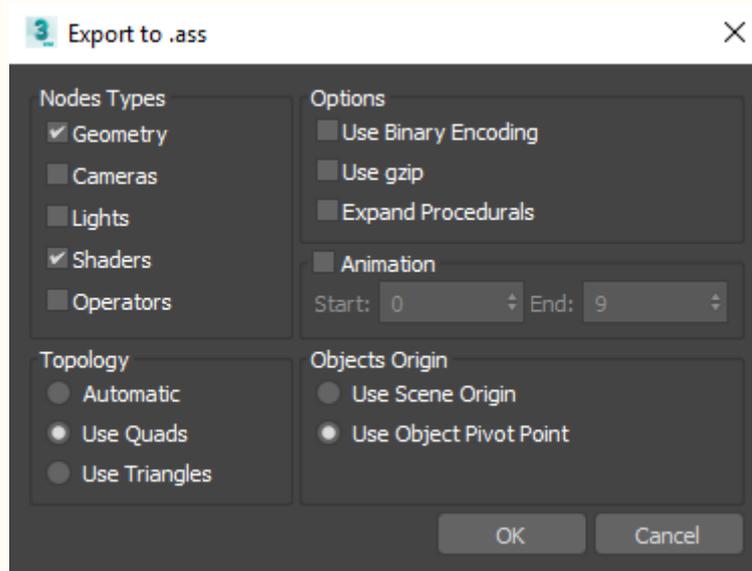
To export the geometry you must:

1. Select the geometry you want to export.
2. Go to the **Archive** tab in the **Render Setup** window.
3. Enable **.ASS File**.
4. Choose where you want to save the **.ass** file.



Export .ass file from *Render Setup: Arnold* -> *Archive*

 You can also export a .ass file by going to *File->Export->ASS*.



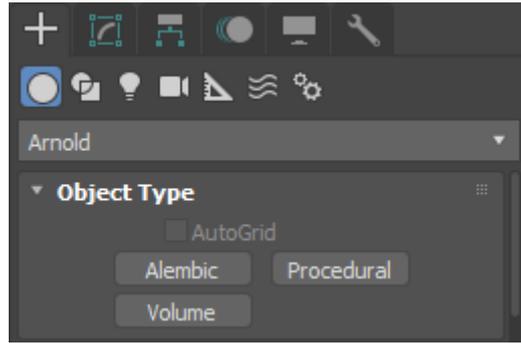
The archive is saved as an [Arnold Scene Source \(.ASS\) file](#). You may export single objects as well as a whole hierarchy made out of multiple objects. You can also export single or a sequence of frames. In this situation, the frame padding value from the 3ds Max Render Setup will be used in the names of the ass files.

 During export, Arnold's current render settings will be used. Therefore, you should finalize these settings before exporting the procedural. For example, you should choose whether you wish to export with motion blur enabled or not.

Opening a .ass File via a Procedural

To open the .ass file, you will first need to create an Arnold Procedural primitive.

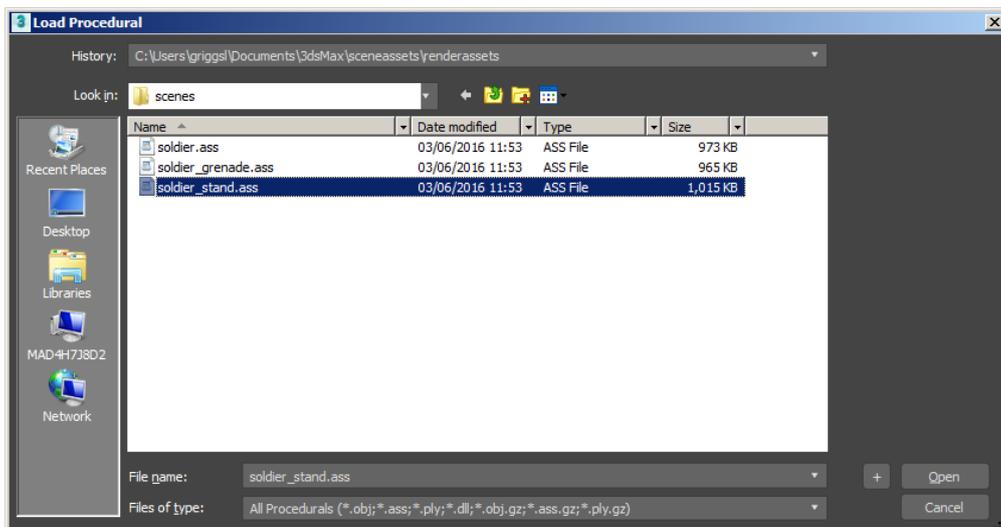
- To create an Arnold Procedural choose **Arnold** from the drop-down menu in the Create tab.



Create an Arnold *procedural* here

Note that in addition to archive (.ass) files, pre-compiled custom procedural programs in the form of a dynamic library can also be loaded at this point, though none are shipped with MAXtoA currently.

 3ds Max maps cannot be exported to an Arnold Scene Source file, and will not render outside of MAXtoA.

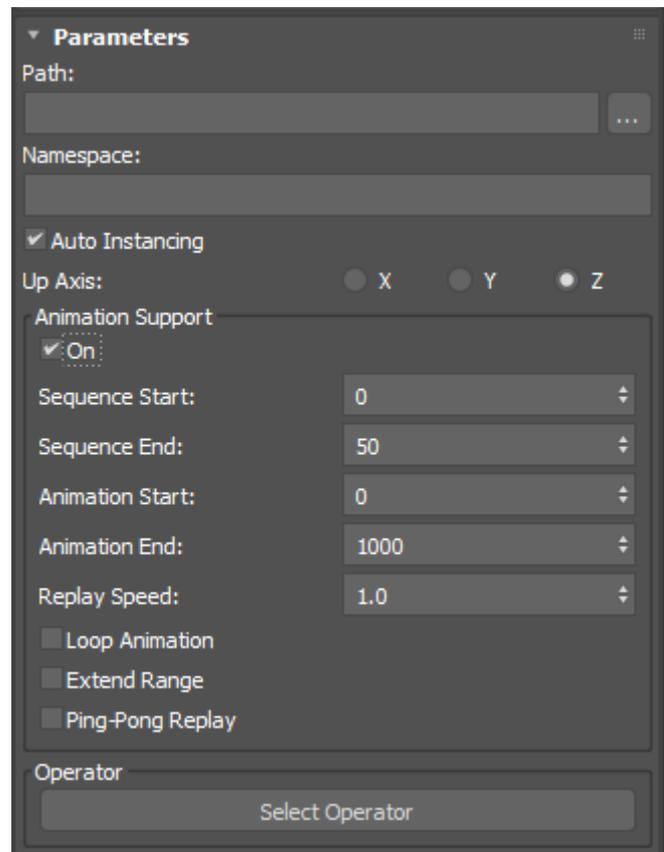


Load .ass file as procedural

This will create a *procedural* node that you can use in place of regular geometry. The parameters of the *procedural* node are described below.

The Procedural Node

Procedurals are supported via the Arnold *procedural* node. This node has the following parameters:



Arnold *procedural* parameters

Path

The path to the archive (.ass) file.

Sequences are automatically recognized if they use four-digit padding for the frame number (for example name1001.ass, name1002.ass, ...).

In the case of a sequence, the Animation Support group can be used to define the sequence range and some playback options.

Namespace

This custom namespace can be used instead of the procedural name, to reference contents through absolute or relative paths.

Up Axis:

The Up Axis for the procedural. Z is the default.

Animation Support

On

Enable reading a sequence of files.

Sequence Start

The start frame of the .ass file sequence.

For example, if your sequence on disk goes from name1001.ass to name 1100.ass, you can pick the files from 1050 to 1080 by entering these values as the Sequence Start and the Sequence End respectively.

Sequence End

The end frame of the .ass file sequence.

Animation Start

The timeline's frame at which the .ass sequence starts to be used.

Animation End

The timeline's frame at which the .ass sequence ends to be used.

If there are not enough files in the sequence to cover the Animation Start-End range, the sequence can be repeated, either from its start or in ping-pong mode.

Replay Speed

Sets the playback speed of the procedural's animation.

Loop Animation

When on, if the animation range exceeds the sequence range, the sequence is looped.

Extend Range

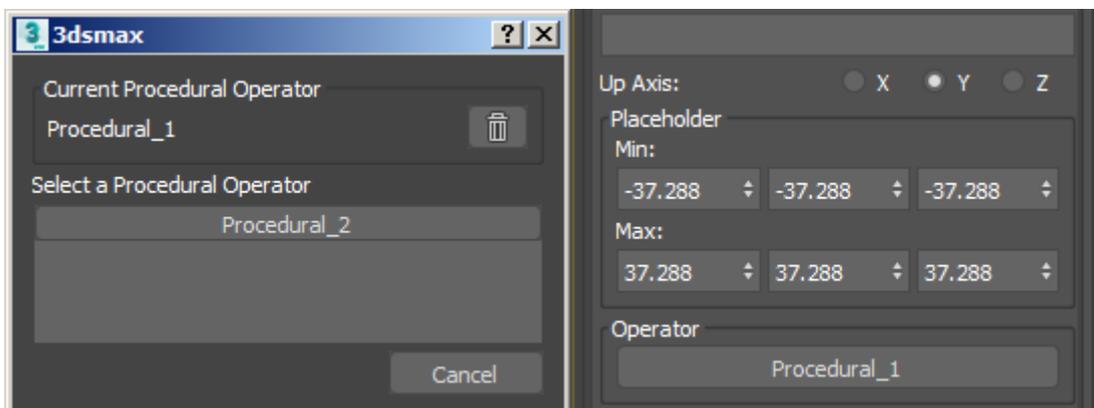
If on, the first and last .ass file of the sequence is used before and after the Animation start and end frame respectively. Else, for those frames, nothing gets rendered.

Ping-Pong Replay

When on, if the animation range exceeds the sequence range, the sequence is read forward, then in reverse, then forward again and so on.

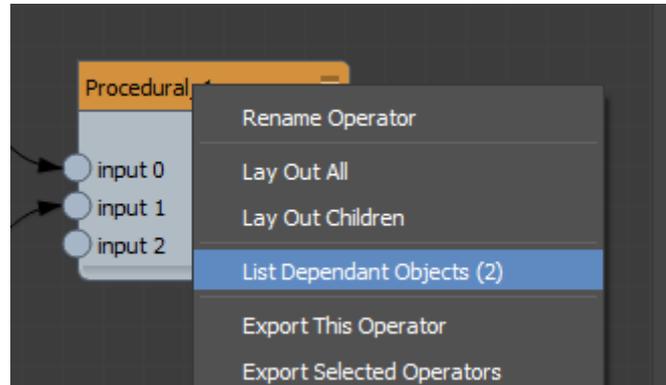
Select Operator

Gives the ability to connect Procedural/Alembic nodes in the [Operator Graph Editor](#).

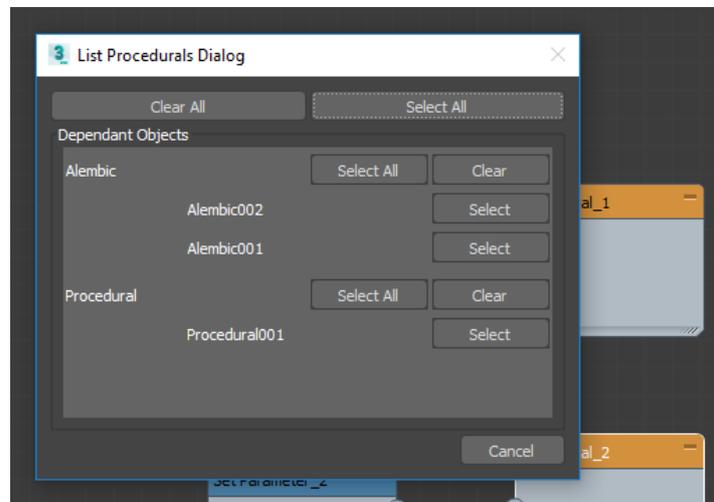


Choose which Procedural to use

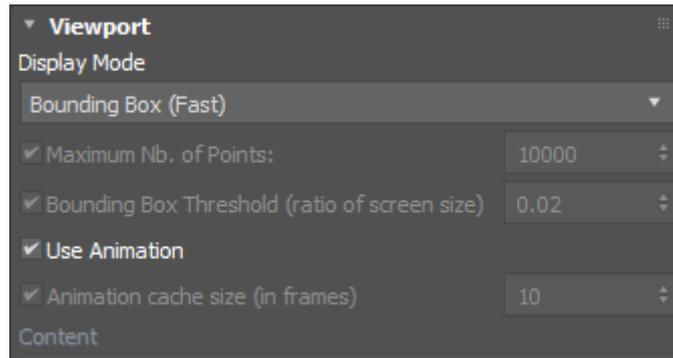
From the *Operator Graph Editor*, you can list the objects connected to the operator.



In this case, there are three INodes, two of them being 3ds MAX instances of the same Arnold [Alembic](#) object.



Viewport



Procedural/Alembic files can be introspected to retrieve geometry and display it in the viewport.

Display Mode

The available viewport display modes are:

- **Bounding Box (Fast):** Displays the contents as a bounding box. It does not need the full ass file load, it simply looks for "bounds" being present. If it is not, it keeps the previous behavior.
- **Bounding Box (Content List):** Displays the contents as a bounding box and in the content list.
- **Points:** Displays the contents as points.
- **Wireframe:** Displays the contents as a wireframe.
- **Shape:** Displays as a shape with full shading.

Bounding Box Threshold (ratio of screen size)

Defines how much to extend the bounding box of the object. The default value is 0.02.

Animation Cache Size (in frames)

Animation frames load on demand and are kept in a cache of the size defined in the UI. If the cache is not used, the data is always trashed (same as the cache size is 1).

Content

Shows the contents of the file. The content tree view selection cannot be used for selection. Double-clicking copies the sub-node name (path) and can be pasted in an operator.