



Implosia FX

Ultra-fast, stable fracturing in XSI

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Introduction

At the moment there's no proper free shatter tool in Softimage, all the available solutions have a low develop rate or low stability. In general most solutions will not work properly and need the help of another 3D package.

Implosia FX is an experiment that's designed as a geometry shatter tool for ICE. Working with booleans, the node has the ability to tie a basic cut from randomly crumpled planes. Implosia FX is quite fast, and has the ability to cut very high-polygon models (> 100K triangles).

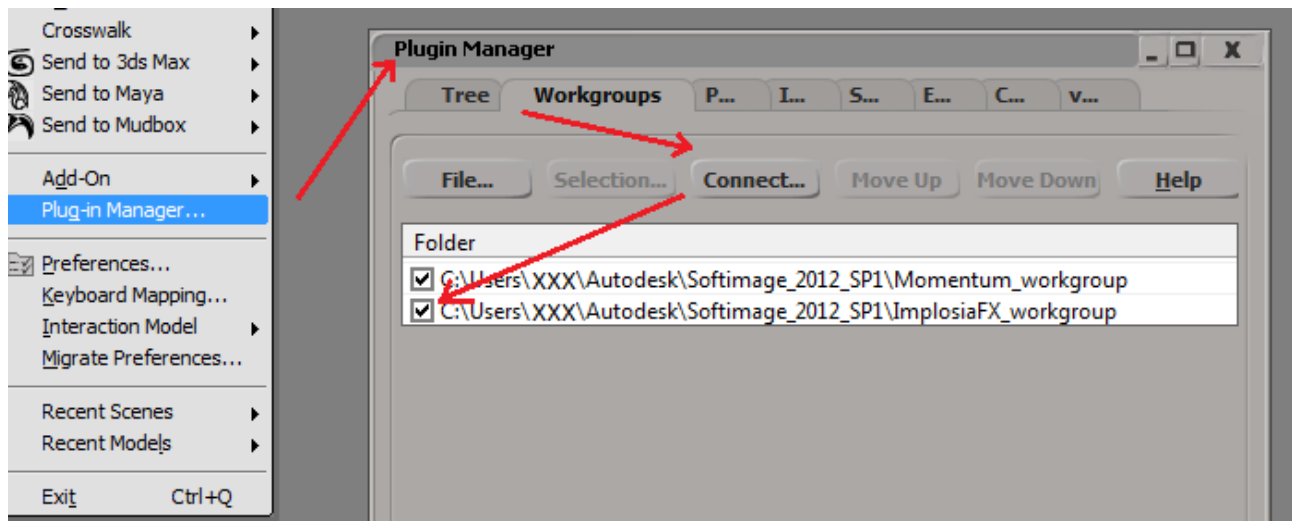
This is mainly due to the Carve CSG library, written in C++ and was originally designed for the processing of scan results from real objects.

As a result, Implosia is a full-fledged shatter tool that can be operated directly from within ICE. The current version only works with the 2012 64-bit version of Softimage, and requires the VC++ 2010 redistributable that can be downloaded here:

<http://www.microsoft.com/download/en/details.aspx?id=14632>).

Installation requires connecting the workgroup "ImplosiaFX_workgroup" within the plugin manager of Softimage.

File-> Plug-in Manager-> Workgroups -> connect

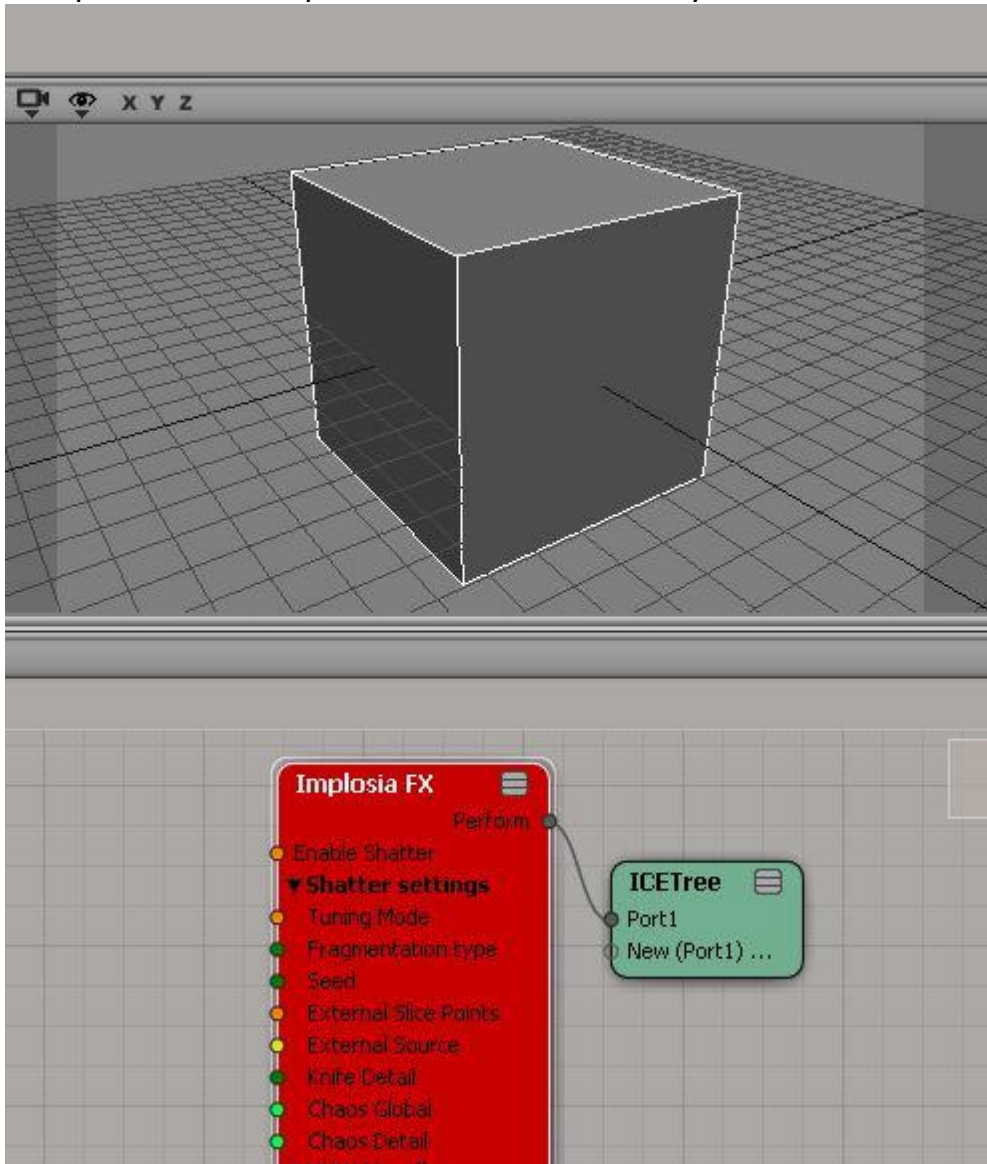


Restart Softimage to properly connect to the newly added workgroup.

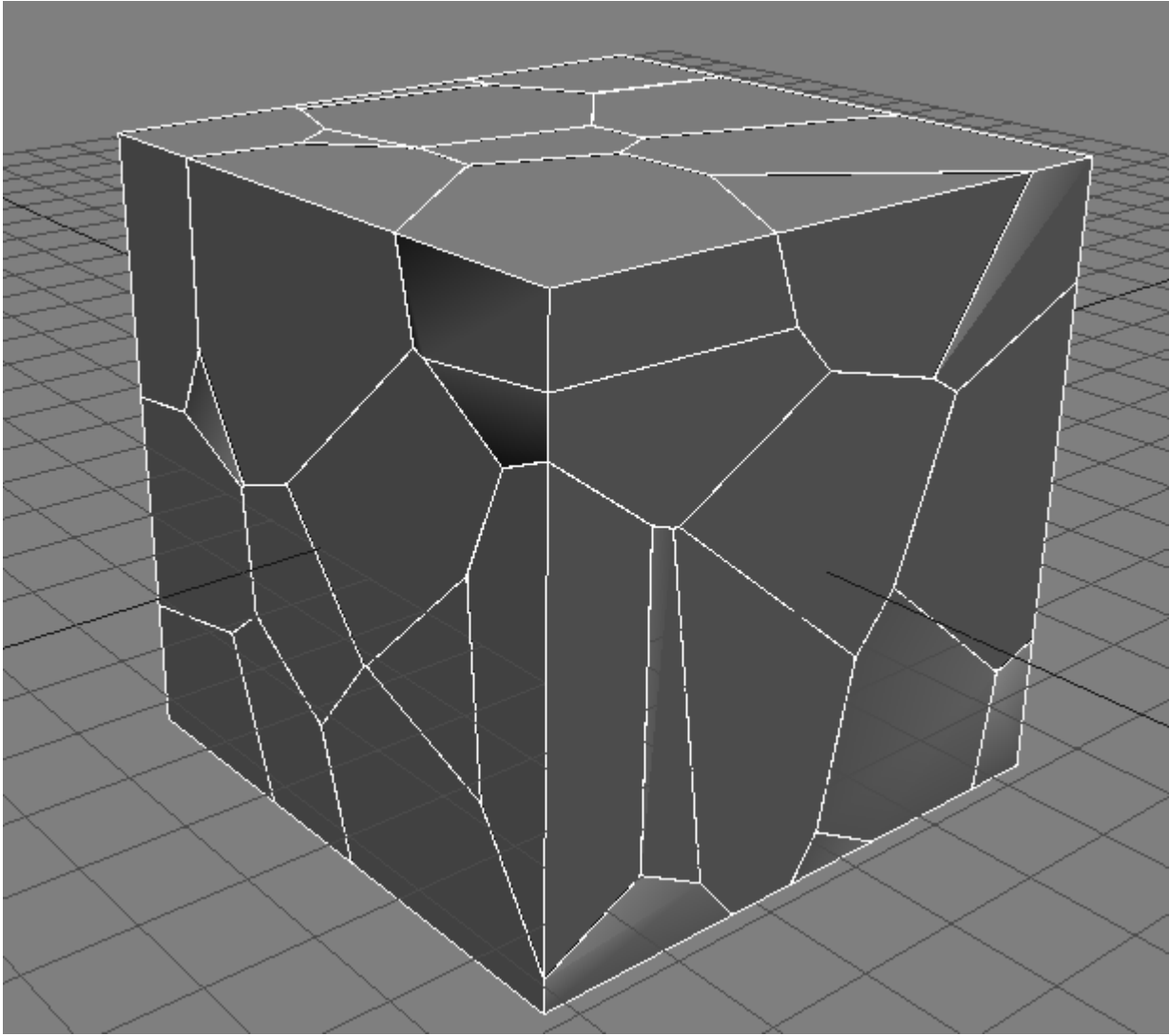
Quick Start

Crumbling simple cube as an example

- 1) Create a polygon cube.
- 2) Create a non-simulated ICE tree for the cube.
- 3) Drag the central compound of Implosia FX from the preset manager.
Compound shows up red because it contains yet to be resolved UV-attributes.



- 4) Doubleclick the compound to get to the PPG, and check the Port ENABLE SHATTER, then uncheck the TUNING MODE port.



5) Freeze shattered geometry.

Complex shattering

At the moment **Implosia FX** provides two cutting algorithm - Voronoi and Continuous.

Voronoi partition.

The method is based on cutting geometry on the basis of input points, the resulting output will be convex pieces. The principle is based on cutting each piece, so that each side of this piece is located on equal distance between two adjacent points.

The method is the fastest existing shatter algorithm, but the result is not too realistic at times. By randomization of the input points you can vary the size of the pieces.

Continuous partition.

In this mode, the fractured geometry is based on a set of input knives - randomly triangulated crumpled boxes, flattened along the axis Y. The method is slightly slower than Voronoi, but it gives very realistic results.

A flexible control, allowing to have a plane in space almost at will, will get you effects like conventional non-uniform concrete rubble, wood chips and finishing cut \ rings of a tree.

Before shattering you must:

- 1) Apply a texture projection
- 2) Close all holes in the geometry
- 3) Remove any self-intersection geometry
- 4) Freeze scale geometry
- 5) If the object is complex (high-poly \ presented in non-triangle polygons \ object has a very irregular topology) triangulation is required.

After preparing the geometry, you have to create a non-simulated ICE tree, and connect the central compound Implosia FX to the ICE node. It contains all the necessary shatter components, including procedural generation of knives from SE-coordinates of the cache and other attributes.

There are current support and implementation of UV and clusters within the ICE node is very bad, for this purpose and should be caching related attributes.

Look at the "Central compound" section for the various modes of fragmentation and settings.

After having set up and applied the compound, before the final cutting be sure to set up the

following check boxes correctly:

[illegible]

3) Assign Island ID - purpose and caching of the index range of the island-groups of polygons. Can be further used to quickly extract the fragments into a single geometry with scripts.

Next on frozen geometry into a tree on modeling compound is added to the stack Apply

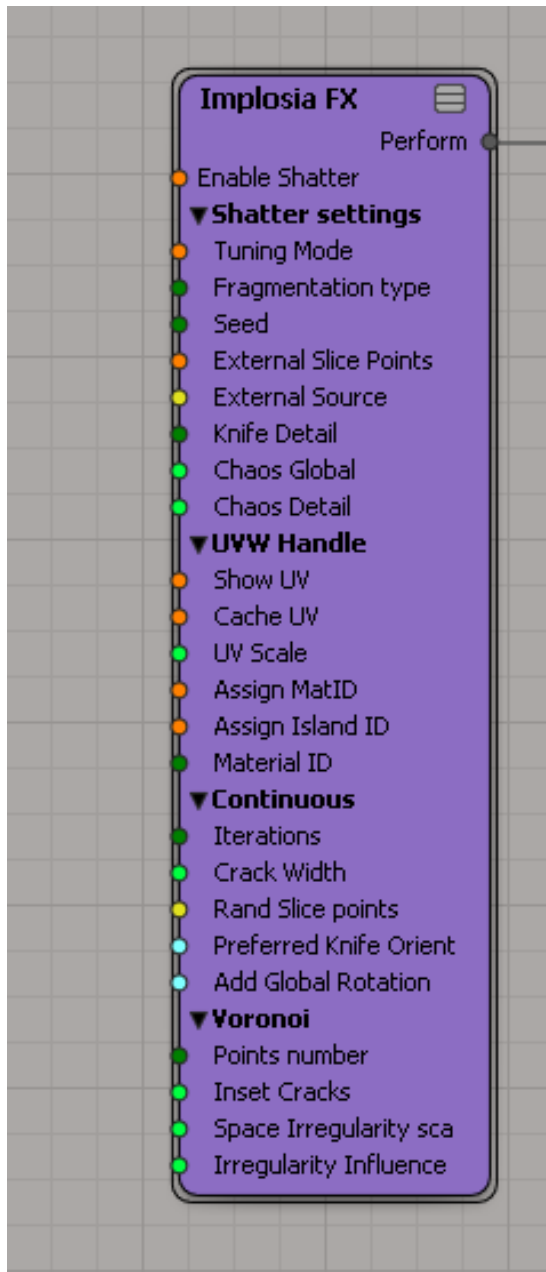
Material Data, where appropriate checkboxes are marked for reading attributes from the cache.

Note - at this point, attribute Island ID required to correctly render the inclusion of an attribute Face ID.

Finally freeze geometry.

The Main compound

The main compound - Implosia FX - contains a number of controls, responsible for a certain shattering level.



1) Shatter settings determine the basic settings for shutter.

- **Tuning mode** - allows you to customize shattering by visual observation of the main parts of slicing algorithms.

- **Fragmentation type** - to select the type of fracturing.

- **Seed** - the value of the reference sample (the number of unique partitions)

- **External Slice points** - determines whether to use a points value of the compound of internality, or external data (works for both types of partition).

– **External Source** - lets you specify the point of cutting, in case of a black data will be used as the centers of the Voronoi diagram for continuous - centers knife (use with caution if you select the type of continuous, with values > 50 the number of fragments at sites with an approximate bounding box on the form of a cube can be very large, as well as cutting time).

- **Knife detail** - currently determines the details of the type of knives for continuous, handed down in the global setting in relation to potential use in other types of fragmentation, based on the knives.

- **Chaos Global** - determines the strength of large dents knife.

– **Chaos Detail** - determines the strength of small dents knife.

2) Scroll **UVW Handle** SE-processing determines the coordinates \ utilitarian materials and other data.

- **Show UV** - mapping a texture to geometry to cut into the frieze. Can not correctly display the data for the above bugs ICE. Caching eliminates these problems.

- **Cache UV**-SE caches attribute.

- **UV Scale** - SE-scale projections on the cut parts.

- **Assign MatID** - assigns a unique index on the original polygon and caches it.

- **Assign Island ID** - assigned to group polygons forming a single piece of sub-object (polygon island) unique index and caches it.

– **Material ID** - a unique index for the original polygon. Can not be negative for business purposes.

3) **Continuous** Scroll determines specific settings of continuous fracture.

- **Iterations** - number of cutting blades.

- **Crack Width** - The thickness of the blade.

- **Rand Slice points** - determines the deviation from the center of knives bounding-box object to its borders. (0 - no deviation \ 1 - the maximum deviation).

- **Preferred Knife orient** - the first three fields define the axis on which the blades will be aligned (large values ??lead to greater alignment of orientation), the fourth parameter specifies the permissible range of a random rotation on an axis.

– **Add Global Rotation** - rotates all the knives in this rotation.

4) Scroll of **Voronoi** identifies specific for this type of partitioning options.

- **Points Number** - the number of pieces.

- **Inset Cracks** - the thickness of the gaps between the pieces.

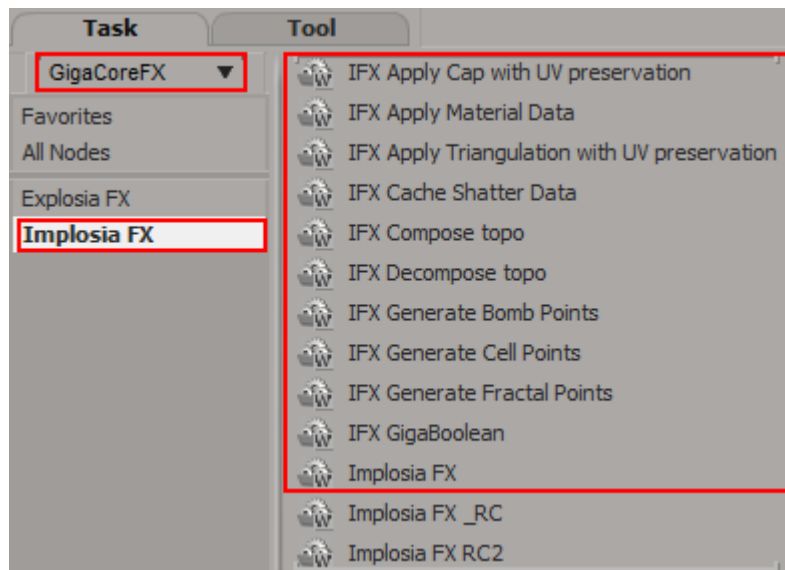
- **Space Irregularity Scale** - defines the size of the irregularities in the distribution of points generated by the internality.

- **Irregularity Influence** - ranging from 0 to 1, regulates the filling of uneven points. Is not based on simple filtering, so that saves a specified number of initial points.

Additional compounds

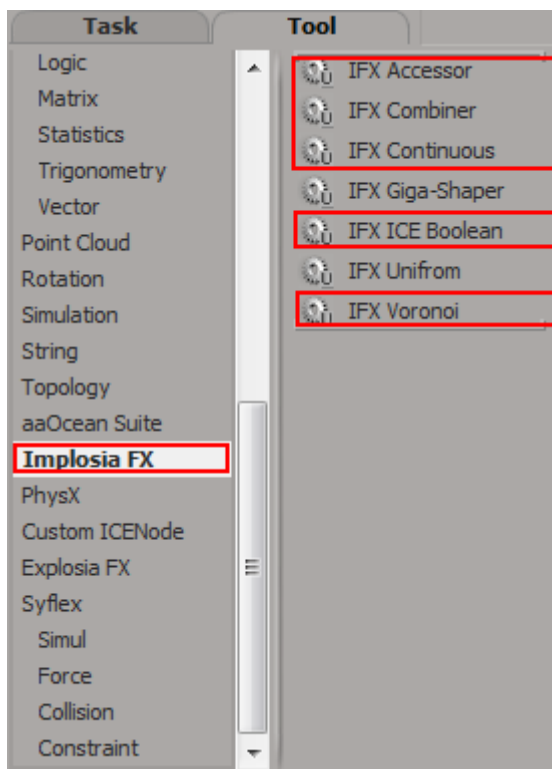
- **IFX Apply Material Data** : used to transfer data and SE-match different parts of the material cut into the geometry in traversal bugs ICE.
- **IFX Cache Shatter Data** : used to cache the topology of secondary data, such as SE \ index materials \ index polygonal islands. Used internally as a central compound, can be used to build custom shattering.
- **IFX Compose topo \ IFX Decompose topo** : used to convert the geometry including primary and secondary attributes. Can be used in custom shattering.
- **IFX GigaBoolean** : boolean module replaces the built-in one.
- **IFX Generate Points** : a set of compounds designed to generate the external points.

The remaining compounds are betaversions, and can produce unpredictable results, use at your own risk.



List of Compound Nodes

- **IFX ICE Boolean** - Boolean implementation of the Carve CSG library under ICE, using a compound boolean module, and can also be used as the core of custom shattering.
- **IFX Accessor** - converter, extracts data from the type gtopo.
- **IFX Combiner** - combines source data in type gtopo, can be filtered based on the input values of Port Face ID.
- **IFX Voronoi** – a voronoi shatter compound.
- **IFX Continuous** - wired continuous algorithm, using the same limited central compound.

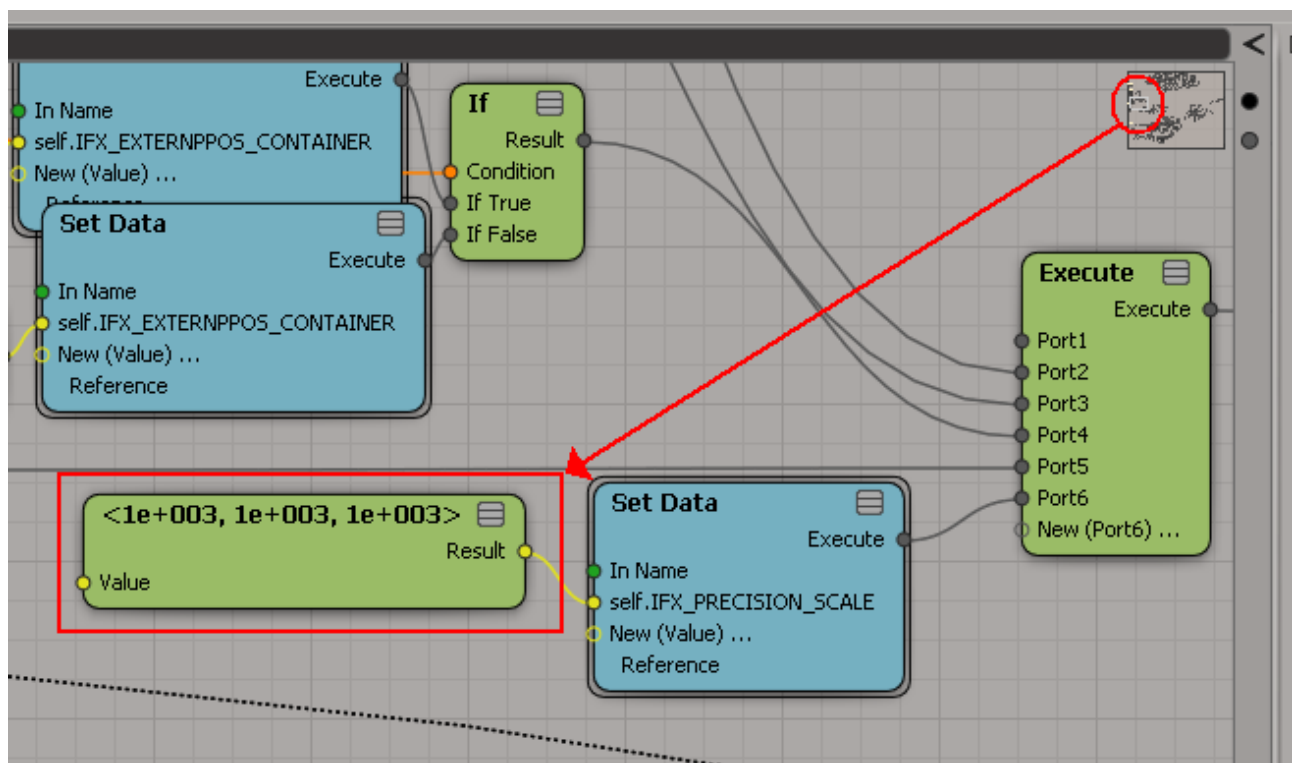


Current limitations and bugs

Implosia FX is a non-commercial experiment in R&D\FX, written by the author without a deep understanding of C++ and programming in general. It also uses some third party libraries without documentation related to them, so small bugs may be present at time.

When having incorrect results, be sure to have triangulated the geometry to start with, it removes 90% of the artifacts associated directly with the topology. If the geometry is small in size or have very small parts, it makes sense to scale it by hand in 10 ... 10,000 times before the shattering, and after shattering scale back in the same steps, respectively in 0.1 ... 0.0001.

This can, in some cases, eliminate inaccurate computations with floating-point numbers. Instead of manually scaling the same way, you can take advantage of some internal nodes inside the central compound, and increase the value in the same number of times.



Possible bugs with incorrect transfer of UV are yet to be solved properly, but practice shows that in 90% of cases, simply forgetting to specify the desired attribute SW \ forget check caching.

Feedback

Questions and suggestions are welcome, e-mail to GbotFx@gmail.com

If possible, please send an email with a link to your work that uses the FX Implosion compounds, unless they are under DNA ;-)

Kharkov
2011