HowTo: Convert (nearly) any file to STL, PLY or VTK

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Overview

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Introduction

The following document describes how to convert several file formats into either PLY, STL or VTK. These three formats can then be used in DualSPHysics to define geometries. This guide is intended for the advanced user only. The documentation is by no means complete in the sense of a step-by-step instruction, however all crucial steps should be listed. If you find any mistakes in this document or have additional material please send your comment to arnom@amconception.de. I also welcome any additional suggestions for conversions. Note however, that only conversions involving open-source programs will be accepted.

To write this guide the following programs and versions were used:

- Blender (2.49b)
- ParaView (3.8)
- Quantum GIS (1.4.0)
- FreeCAD (0.10)

The procedures described below can be different with other versions. A few hints on how to install these programs can be found in the appendix.

GIS

Vector Data

- If QGis is started for the first time define a “New mapset” (Plugins → Grass → New mapset)
- Otherwise, “Open mapset” (Plugins → Grass → Open mapset)
- Open the Grass toolbox (Plugins → Grass → Open Grass tools)
- Go to “Modules List” and find “v.in.ogr” (this can be different if the file-type is not SHP)
- Select the SHP file and define a name for the output
- Press “Run”
- Press “View Output”
- Go back to the modules list and find “v.out.vtk”
- Select appropriate (newly created layer and specify the filename (file has to exist already)
- Press “Run”
- Close QGis

- Load the VTK file in ParaView
- Apply Filters:
  - “Cell Data to Point Data”
  - “Wrap by Scalar”
  - “Delauney2D” (best filling plane)
  - “Transform” such that one corner is at (0,0,0)
- Save data as PLY, STL or VTK

Raster Data

This should work similar to the Vector Data described above. Note however, that the module names will change and in general will begin with “r.*”

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*.3DS

- Import 3Ds in Blender
- Export as STL

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*.VTP

- Load in ParaView
- Save data as PLY, STL or VTK

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*.H5PART

- Load in ParaView with PVMeshless Plugin
- Apply Delauney2D filter
- Save data as PLY, STL or VTK

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*.CSV

- Load in ParaView
- Apply Filters:
  - Table to Points (no headers and separate columns)
  - Delauney2D
- Save data as PLY, STL or VTK

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*.MAX

Closed Format. Needs to be converted with appropriate proprietary software (e.g. 3D Studio Max) to a free format.

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*.DWG

- Convert with EveryDWG converter to *.dxf

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*.DXF

- Start QGis
- Load Plugin Dxf2Shp
- Plugins → Dxf2Shp → Dxf2Shp Converter
- Convert the desired *.dxf to *.shp
- Proceed as in Section GIS

3D CAD

- Open file with FreeCAD
- File → Export
- Save as STL

Appendix: Installation and Setup

QGis
Install as needed (Ubuntu see: https://launchpad.net/~ubuntugis/+archive/ubuntugis-unstable)
Load Grass Plugin: Open QGis, go Plugins → Fetch Plugins and get the current version of all plugins. Then go Plugins → Manage Plugins and enable *dxf2shp converter* as well as *GRASS.*
QGis user guide for problems (available here: http://www.qgis.org/en/documentation/manuals.html)

ParaView & pv-meshless
With the recent version of pv-meshless, it is no longer necessary to compile ParaView. So install it as appropriate for your system. To install pv-meshless follow: https://hpcforge.org/plugins/mediawiki/wiki/pv-meshless/index.php/Download

Blender
Install Python first and after that install Blender.

FreeCAD
Direct download

EveryDWG converter
Also called ODA Teigha File Converter
Available at: http://www.opendesign.com/guestfiles
The *.EXE file can be executed with WINE under Linux