**PLY (file format)**

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[Jump to navigation](https://en.wikipedia.org/wiki/PLY_(file_format)#mw-head) [Jump to search](https://en.wikipedia.org/wiki/PLY_(file_format)#searchInput)

For other uses, see [Ply (disambiguation)](https://en.wikipedia.org/wiki/Ply_(disambiguation)).

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| https://upload.wikimedia.org/wikipedia/en/thumb/f/f2/Edit-clear.svg/40px-Edit-clear.svg.png | This article's **tone or style may not reflect the** [**encyclopedic tone**](https://en.wikipedia.org/wiki/Wikipedia:Writing_better_articles#Tone) **used on Wikipedia**. See Wikipedia's [guide to writing better articles](https://en.wikipedia.org/wiki/Wikipedia:Writing_better_articles#Tone) for suggestions. *(May 2015) (*[*Learn how and when to remove this template message*](https://en.wikipedia.org/wiki/Help:Maintenance_template_removal)*)* |

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| --- | --- |
| Polygon File Format | |
| [**Filename extension**](https://en.wikipedia.org/wiki/Filename_extension) | .ply |
| [**Internet media type**](https://en.wikipedia.org/wiki/Media_type) | text/plain |
| [**Type code**](https://en.wikipedia.org/wiki/Type_code) | [ASCII](https://en.wikipedia.org/wiki/ASCII)/[Binary file](https://en.wikipedia.org/wiki/Binary_file" \o "Binary file) |
| [**Magic number**](https://en.wikipedia.org/wiki/File_format#Magic_number) | ply |
| **Developed by** | [Greg Turk](https://en.wikipedia.org/wiki/Greg_Turk), [Stanford University](https://en.wikipedia.org/wiki/Stanford_University) |
| **Initial release** | 1994[[1]](https://en.wikipedia.org/wiki/PLY_(file_format)#cite_note-1) |
| **Type of format** | 3D model format |

**PLY** is a computer file format known as the **Polygon File Format** or the **Stanford Triangle Format**. It was principally designed to store three-dimensional data from 3D scanners. The data storage format supports a relatively simple description of a single object as a list of nominally flat polygons. A variety of properties can be stored, including: color and transparency, surface normals, texture coordinates and data confidence values. The format permits one to have different properties for the front and back of a polygon. There are two versions of the [file format](https://en.wikipedia.org/wiki/File_format), one in [ASCII](https://en.wikipedia.org/wiki/ASCII), the other in [binary](https://en.wikipedia.org/wiki/Binary_file).

[](https://en.wikipedia.org/wiki/File:David_von_Michelangelo.jpg)

[The Digital Michelangelo Project](http://graphics.stanford.edu/projects/mich/) at [Stanford University](https://en.wikipedia.org/wiki/Stanford_University) used the PLY format for an extremely high resolution 3D scan of the [Michelangelo](https://en.wikipedia.org/wiki/Michelangelo) "[David](https://en.wikipedia.org/wiki/David_(Michelangelo))" sculpture.



**Contents**

* [1 The file format](https://en.wikipedia.org/wiki/PLY_(file_format)#The_file_format)
* [2 ASCII or binary format](https://en.wikipedia.org/wiki/PLY_(file_format)#ASCII_or_binary_format)
* [3 History](https://en.wikipedia.org/wiki/PLY_(file_format)#History)
* [4 See also](https://en.wikipedia.org/wiki/PLY_(file_format)#See_also)
* [5 References](https://en.wikipedia.org/wiki/PLY_(file_format)#References)
* [6 External links](https://en.wikipedia.org/wiki/PLY_(file_format)#External_links)

**The file format**

Files are organised as a header, that specifies the elements of a mesh and their types, followed by the list of elements itself. The elements are usually vertices and faces, but may include other entities such as edges, samples of range maps, and triangle strips.

The header of both ASCII and binary files is ASCII text. Only the numerical data that follows the header is different between the two versions. The header always starts with a "[magic number](https://en.wikipedia.org/wiki/Magic_number_(programming)#Magic_numbers_in_files)", a line containing

ply

which identifies the file as a PLY file. The second line indicates which variation of the PLY format this is. It should be one of:

format ascii 1.0

format binary\_little\_endian 1.0

format binary\_big\_endian 1.0

Future versions of the standard will change the revision number at the end - but 1.0 is the only version currently in use.

Comments may be placed in the header by using the word comment at the start of the line. Everything from there until the end of the line should then be ignored. e.g.:

comment This is a comment!

The 'element' keyword introduces a description of how some particular data element is stored and how many of them there are. Hence, in a file where there are 12 vertices, each represented as a floating point (X,Y,Z) triple, one would expect to see:

element vertex 12

property float x

property float y

property float z

Other 'property' lines might indicate that colours or other data items are stored at each vertex and indicate the data type of that information. Regarding the data type there are two variants, depending on the source of the ply file. The type can be specified with one of *char uchar short ushort int uint float double*, or one of *int8 uint8 int16 uint16 int32 uint32 float32 float64*. For an object with ten polygonal faces, one might see:

element face 10

property list uchar int vertex\_index

The word 'list' indicates that the data is a list of values, the first of which is the number of entries in the list (represented as a 'uchar' in this case). In this example each list entry is represented as an 'int'. At the end of the header, there must always be the line:

end\_header

**ASCII or binary format**

In the ASCII version of the format, the vertices and faces are each described one to a line with the numbers separated by white space. In the binary version, the data is simply packed closely together at the 'endianness' specified in the header and with the data types given in the 'property' records. For the common "property list..." representation for polygons, the first number for that element is the number of vertices that the polygon has and the remaining numbers are the indices of those vertices in the preceding vertex list.

**History**

The PLY format was developed in the mid-90s by [Greg Turk](https://en.wikipedia.org/wiki/Greg_Turk) and others in the Stanford graphics lab under the direction of Marc Levoy. Its design was inspired by the [Wavefront .obj format](https://en.wikipedia.org/wiki/Wavefront_.obj_file), but the Obj format lacked extensibility for arbitrary properties and groupings, so the "property" and "element" keywords were devised to generalize the notions of vertices, faces, associated data, and other groupings.

**See also**

* [STL (file format)](https://en.wikipedia.org/wiki/STL_(file_format))
* [Additive Manufacturing File Format](https://en.wikipedia.org/wiki/Additive_Manufacturing_File_Format)
* [Wavefront .obj file](https://en.wikipedia.org/wiki/Wavefront_.obj_file), a 3D geometry definition file format with *.obj* file extension
* [MeshLab](https://en.wikipedia.org/wiki/MeshLab): an open source Windows, Mac OS X and Linux application for visualizing, processing and converting three-dimensional meshes to or from the PLY file format.
* [CloudCompare](https://en.wikipedia.org/wiki/CloudCompare), another open source application for handling PLY files.
* [Mathematica](https://en.wikipedia.org/wiki/Mathematica) A technical computing system that can work with PLY files.

**References**

* 1. *Greg Turk.* [*"The PLY Polygon File Format"*](https://web.archive.org/web/20161204152348/http:/www.dcs.ed.ac.uk/teaching/cs4/www/graphics/Web/ply.html)*. Archived from* [*the original*](http://www.dcs.ed.ac.uk/teaching/cs4/www/graphics/Web/ply.html) *on 2016-12-04.*

**External links**

* [PLY - Polygon File Format](http://paulbourke.net/dataformats/ply/)
* [Some tools for working with PLY files (C source code)](http://www.cc.gatech.edu/projects/large_models/ply.html)
* [rply - An Ansi C software library for reading and writing PLY files (MIT license)](http://w3.impa.br/~diego/software/rply/)
* [libply - A C++ software library for reading and writing PLY files (GNU license)](https://web.archive.org/web/20151202190005/http:/people.cs.kuleuven.be/~ares.lagae/libply/)
* [Another C++ software library for reading and writing PLY files (GPL 3.0 license)](http://www-sop.inria.fr/members/Thijs.Van-Lankveld/prog/ply/doc/index.html)
* [A repository of 3D models stored in the PLY format](http://graphics.stanford.edu/data/3Dscanrep/)

**Format de fichier de polygones**

[](https://commons.wikimedia.org/wiki/File:David_von_Michelangelo.jpg?uselang=fr)

The [Le Digital Michelangelo Project](http://graphics.stanford.edu/projects/mich/) [[archive](http://archive.wikiwix.com/cache/?url=http%3A%2F%2Fgraphics.stanford.edu%2Fprojects%2Fmich%2F)] à l'[Université Stanford](https://fr.wikipedia.org/wiki/Universit%C3%A9_Stanford) utilisa le format PLY pour un scanner 3D de très haute résolution de "[David](https://fr.wikipedia.org/wiki/David_(Michel-Ange))", sculpture de [Michelangelo](https://fr.wikipedia.org/wiki/Michelangelo).

**PLY** est un [format de fichier](https://fr.wikipedia.org/wiki/Format_de_fichier) informatique connu sous le nom de ***Polygon File Format*** (« Format de Fichier de Polygones ») ou le ***Stanford Triangle Format***.

Le format fut principalement conçu pour stocker des données tri-dimensionnelles provenant de [scanners 3D](https://fr.wikipedia.org/wiki/Scanner_tridimensionnel). Il consiste en une description relativement simple d'un objet unique comme une liste de polygones nominalement plats. Une grande variété de propriétés peuvent être stockées, telles que couleur et transparence, normales aux surfaces, coordonnées de texture. Le format permet d'avoir des propriétés différentes pour le devant ou l'arrière d'un polygone

Il existe deux versions de ce format de fichier, un en [ASCII](https://fr.wikipedia.org/wiki/ASCII), l'autre en [binaire](https://fr.wikipedia.org/wiki/Binaire).

**Le format de fichier**

Au début de chaque fichier ply, il y a un [header](https://fr.wikipedia.org/wiki/Header) indiquant le contenu du fichier

header // Debut du header

ply // Type du fichier

format ascii 1.0 // Fichier codé en ASCII

comment VCGLIB generated

.

. // Corps du header

.

end\_header // Fin du header

Exemples d'éléments que peut contenir ce header:

element vertex 100 // Cette ligne signifie qu'il y a 100 points

property float x // l'abscisse du point sur l'axe des x

property float y // l'ordonnée du point sur l'axe des y

property float z // la cote sur l'axe des z

property float nx // la normale a x

property float ny

property float nz

property uchar red // le rouge du code RGB

property uchar green // le vert

property uchar blue // le bleu

property uchar alpha // la transparence

element face 1000 // Cette ligne signifie qu'il y a 1000 faces

property list uchar int vertex\_indices // liste des nombres de points qui vont se trouver dans chaque facette

property uchar red

property uchar green

property uchar blue

property uchar alpha

**Voir aussi**

* [MeshLab](https://fr.wikipedia.org/wiki/MeshLab) : Application open source Windows, Mac OS X et Linux, pour visualiser, traiter et convertir des [maillages](https://fr.wikipedia.org/wiki/Maillage_(structure_de_donn%C3%A9es)) tri-dimensionnels depuis ou vers le format PLY.
* [CloudCompare](https://fr.wikipedia.org/wiki/CloudCompare) : Application open source Windows et Linux, pour visualiser, traiter et convertir des [maillages](https://fr.wikipedia.org/wiki/Maillage_(structure_de_donn%C3%A9es)) ou nuages de points tri-dimensionnels depuis ou vers le format PLY.
* [Mathematica](https://fr.wikipedia.org/wiki/Mathematica) Une méthode de calcul fonctionnant avec les fichiers PLY.

**Références**

* [PLY - Polygon File Format](http://local.wasp.uwa.edu.au/~pbourke/dataformats/ply/) [[archive](http://archive.wikiwix.com/cache/?url=http%3A%2F%2Flocal.wasp.uwa.edu.au%2F~pbourke%2Fdataformats%2Fply%2F)]
* [Quelques outils pour travailler avec les PLY](http://www.cc.gatech.edu/projects/large_models/ply.html) [[archive](http://archive.wikiwix.com/cache/?url=http%3A%2F%2Fwww.cc.gatech.edu%2Fprojects%2Flarge_models%2Fply.html)]
* [Une bibliothèque pour lire et écrire les PLY](https://web.archive.org/web/20081203195143/http:/www.cs.princeton.edu/~diego/professional/rply/) [[archive](http://archive.wikiwix.com/cache/?url=https%3A%2F%2Fweb.archive.org%2Fweb%2F20081203195143%2Fhttp%3A%2F%2Fwww.cs.princeton.edu%2F~diego%2Fprofessional%2Frply%2F)]
* [Une banque de modèles 3D au format PLY](http://graphics.stanford.edu/data/3Dscanrep/) [[archive](http://archive.wikiwix.com/cache/?url=http%3A%2F%2Fgraphics.stanford.edu%2Fdata%2F3Dscanrep%2F)]
* [https://upload.wikimedia.org/wikipedia/commons/thumb/a/ad/Utah_teapot.png/30px-Utah_teapot.pngPortail de l’imagerie numérique](https://fr.wikipedia.org/wiki/Portail:Imagerie_num%C3%A9rique)

[Catégories](https://fr.wikipedia.org/wiki/Cat%C3%A9gorie:Accueil) :

* [3D](https://fr.wikipedia.org/wiki/Cat%C3%A9gorie:3D)
* [Format de fichier graphique](https://fr.wikipedia.org/wiki/Cat%C3%A9gorie:Format_de_fichier_graphique)
* [Imagerie numérique](https://fr.wikipedia.org/wiki/Cat%C3%A9gorie:Imagerie_num%C3%A9rique)

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