Introduction

Overview

This introduction provides an overview of NCSA PolyView capabilities on Silicon Graphics 4D series workstations, explains the tool's relationship to HDF Vsets, describes the organization and use of this manual, and explains notational conventions.

What Is PolyView?

PolyView displays an HDF Vset file of polygons or points as a 2D or 3D, interactive image with optional annotation which may be written to a raster image file. The program also permits you to:

- change display projection
- draw data as points, lines, or polygons
- choose constant or gouraud-shaded polygons
- load and manipulate the color map
- animate a series of vdata sets
- view a fly-by of the data using a script file

NCSA PolyView is intended for researchers and engineers working with polygonal data, such as that used in finite element analysis. It assists a user in the analysis of simulation results and in the presentation of those insights to others:

Improved Analysis

- The tool's interactivity allows users a more intuitive feel for solution data.
- Rotating data in real-time lets users see what is happening in any region of the mesh.
- Fiddling with the palette can highlight subtle details of scalar results.
- Animation allows transient solutions to be viewed as varying in real-time.

Clearer Presentation

Once obtained, analytical insights can be relayed to others through raster images and the fly-by file.

- Any image may be written to an HDF raster image file and transferred to a Macintosh where NCSA Layout can use it to produce a presentation-quality, annotated slide.

- A more dynamic presentation is possible using the fly-by file to script a flight through the data to highlight features of interest.

NCSA HDF Vsets and NCSA PolyView

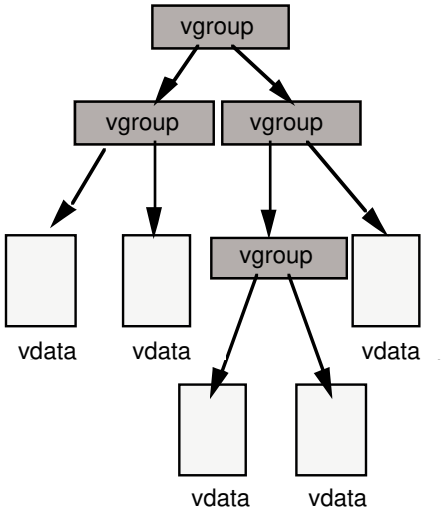
PolyView and HDF Vsets are closely related. HDF Vsets were developed to assist tools like PolyView, and PolyView was developed to exercise HDF Vsets.

NCSA extended the HDF file format when it created the HDF Vset Calling Interface. Vsets provide a more versatile storage scheme within a standard HDF file that allows definition of multi-variate data fields, hierarchical grouping of related datasets, and greater control over data access.

HDF Vsets organize data in a structure similar to a UNIX file system. Vgroups act as directories for bundling vdata, and vdata correspond to data files (Figure I.1).

Figure I.1 HDF Vset Organization

HDF Vset Organization



VGROUPS contain only references to vdatas and other vgroups.
VDATAS contain only data.

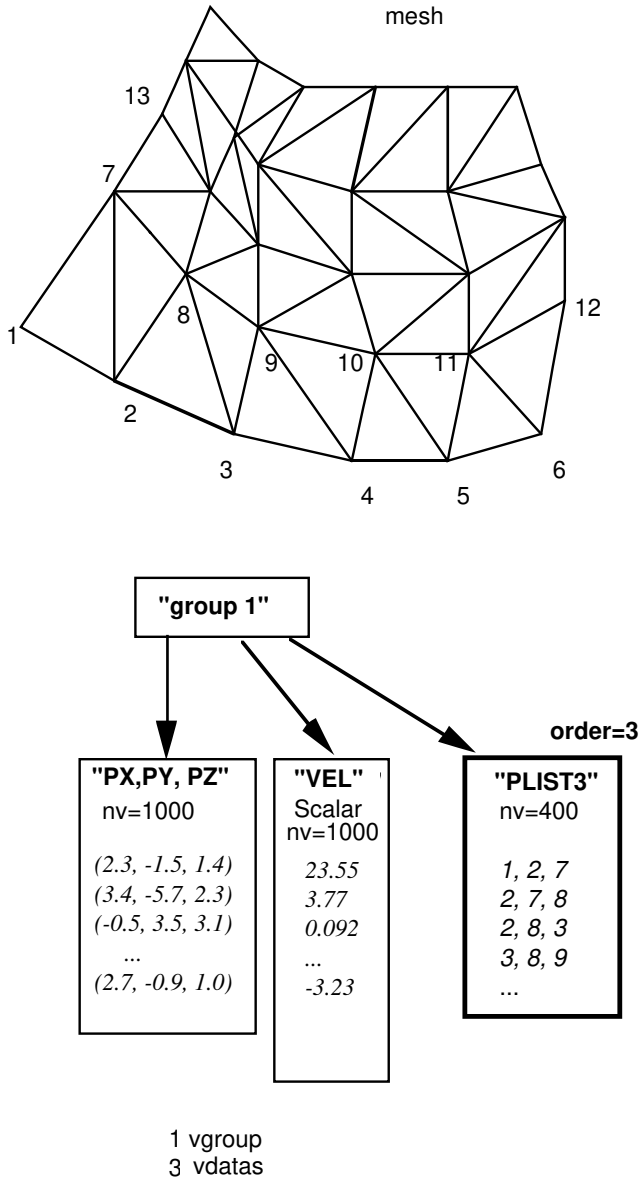
Initially created as a test bed for HDF Vset features, PolyView evolved into a released tool for the Silicon Graphics 4D series workstation. Positive response from researchers and engineers fueled NCSA's decision to make the program into a separate product. The program displays data from an HDF Vset file, and allows the user to interactively change viewing parameters.

Figure I.2 shows a sample file created for PolyView, where vertex coordinates are described by `PX`, `PY`, `PZ`, and connectivity by `PLIST3`. `VEL` contains a set of scalar values.

In this example, only one set of scalar values are provided. However, multiple scalar vdatas are permitted in the same file and may be selected via command line switches. Refer to Chapter 2, "Command Reference," for more information on command line options.

(The NCSA HDF Vset manual contains more information about Vsets. Appendix E, "Obtaining NCSA Software," describes how to download the documents via FTP, regular mail, or archive server.)

Figure I.2 Mesh and Connectivity List



Connectivity List for a mesh of 400 triangles

triangle 1: 1, 7, 2
triangle 2: 2, 7, 8
triangle 3: 2, 8, 3
triangle 4: 3, 8, 9
triangle 5: 3, 9, 4
triangle 6: 4, 9, 10

System Requirements

In order to use PolyView software, you need a Silicon Graphics 4D series workstation with at least eight bits of color, hardware Z-buffer, and double buffering. Virtual memory requirements will vary with the size of datasets being displayed.

Use of This Manual

This section describes the organization of this manual, and the conventions and nomenclature used in developing it. Before using NCSA PolyView, you should be familiar with the Silicon Graphics 4Sight user interface, and know how to use the mouse and windows. If you have not used an SGI before, you may wish to refer to your workstation's user's guide before using this package.

Manual Contents

The manual is organized into the following sections:

Chapter 1, "NCSA PolyView Tutorial," introduces you to the basic options available in NCSA PolyView.

Chapter 2, "Command References," gives descriptions and limitations of the available command line parameters and menus in NCSA PolyView.

Appendix A, "Installing NCSA PolyView," gives the procedures for installing NCSA PolyView.

Appendix B, "Example Fly File," contains an example fly file, `demo.fly`.

Appendix C, "Limitations of NCSA PolyView," lists known problems and shortcomings of the program.

Appendix D, "Obtaining NCSA Software," outlines the procedures for obtaining NCSA software.

Form of Presentation

The material in this manual is presented in text, screen displays, or command line notation.

Text

In explaining various features and commands, this manual often presents a word within a paragraph in *italics* to indicate that the word is defined within the paragraph, or that it is a significant term that should be noted and/or is being mentioned for the first time. Also, we have italicized menu names and their options so they correspond to their italicized appearance in the PolyView program.

So that they are more easily identifiable within this manuscript, parameters, variables, integer arguments, call routines, etc. have been presented in `10 point courier` style.

Portions of this manual refer to other sections of the manual where related topics are explained. These cross references usually mention the title of sections or chapters enclosed in quotation marks, such as, See Chapter 1, "NCSA PolyView Basics."

Command Line Format Notation

Throughout this manual, many explanations instruct you to make entries by typing on the keyboard. These entry instructions are printed in

co**urier bold type** and appear within a paragraph or on a separate line. The command lines in this manual are normally shown in lowercase, except in rare instances where uppercase is required.

When it is necessary for you to press a key that is labeled with more than one character (such as the RETURN key), this manual identifies the key with all capital (uppercase) letters. Keys to be entered are printed in bold type. Keys that are pressed simultaneously or in succession are linked with a hyphen. For example, press CONTROL-A.

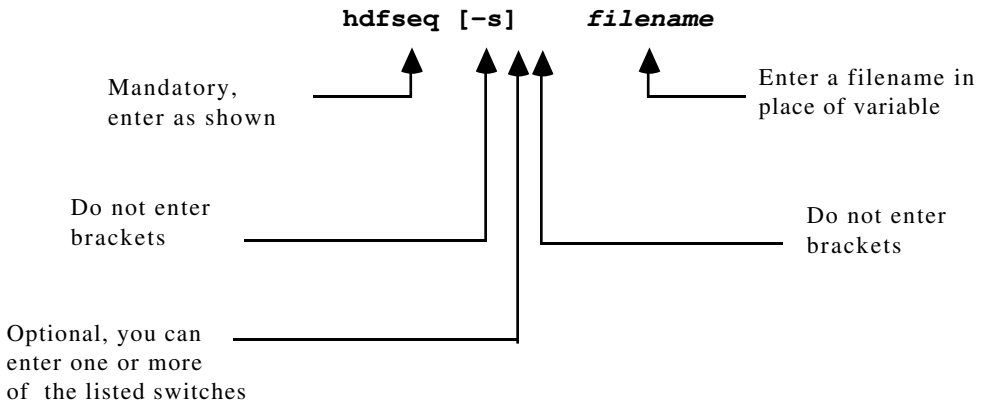
The meaning of each special notation applied to format lines is listed in Table I.1.

Table I.1 Meaning of Entry Format Notations

Appearance	Example	Entry Method
On separate line; lowercase, courier bold type	**dothis**	Enter the keys for each character.
Within a text line; uppercase	RETURN	Press the single key indicated.
Within a text line; uppercase; hyphens between key names	CONTROL-A	While holding down the first one or two key(s) indicated, press the last key indicated.
On separate line or within a text line; italic, lowercase, courier bold type	***filename***	This notation is a variable, which represents a certain kind of entry, but may consist of different characters every time you make the entry.
Square brackets; bold type	**[ ]**	Do not enter the square brackets. Material presented between brackets is optional and should be entered only in certain cases.
Ellipses; bold type	**...**	Do not enter ellipses. Ellipses indicate you may enter more material similar to the material preceding the ellipses.

Figure I.3 shows you how to read and enter a command line.

Figure I.3 Reading and Entering a Command Line



Further Reading

More detailed information about the basic HDF structure and how it works can be found in *NCSA HDF Specifications*, *NCSA HDF Calling Interfaces and Utilities v.3.1*, and *NCSA HDF Vset v.1.0* which you may download via FTP, archive server, or by regular mail. Refer to Appendix D, “Obtaining NCSA Software.,” for more information.