Vislt Tutorial

Brandt Westing



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Background

- <u>https://wci.llnl.gov/codes/visit/</u>
- Open Source, Multiplatform, interactive parallel visualization and graphical analysis tool
- Developed by the Department of Energy (DOE) Advanced Simulation and Computing Initiative (ASCI)
- Although Vislt was developed for visualizing terascale data, it is also well suited typical desktop simulations



Data Types

- Supports a wide variety of data types
 - Structured grids
 - uniform rectilinear, non-uniform rectilinear, and curvilinear
 - Unstructured grids
 - Polygonal data
 - Images
 - Multi-block
 - AMR
- Time series support



Visualization Algorithms

- VisIt's visualization capabilities are grouped into two categories:
 - Plots are used to visualize data and include boundary, contour, label, mesh, pseudocolor, scatter, streamline, and others
 - Operators consist of operations that can be performed on the data prior to visualization. (Examples include slice, isosurface, threshold among others)



Special Features

- Supports derived fields
 - New fields to be calculated using existing fields.
- Supports multiple mesh types (rectilinear, curvilinear, and unstructured meshes)
- Employs parallel and distributed architecture to handle extremely large data sets interactively



Data Formats

- Supports over 5 dozen different file formats
 Silo
 - https://wci.llnl.gov/codes/visit/1.5.4/GettingDataIntoVisIt 1.5.4.pdf
 - VTK (<u>http://www.vtk.org/VTK/img/file-formats.pdf</u>)
 - And many more! <u>https://wci.llnl.gov/codes/visit/FAQ.html#12</u>
- Conversion to the VTK format is straightforward



Vislt Test-Drive



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Getting Started

- Download example data file 'noise.silo'
 - <u>http://portal.longhorn.tacc.utexas.edu/training/</u>
 - Right-click, Save link as...

Open Vislt



Today we will:

- Create contours for a scalar variable
- Create isosurfaces for a scalar variable
- Clip and slice the isosurfaces
- Use glyphs to display a vector field
- Use streamlines to show flow through a vector field
- Edit annotations and background
- Add slices to show variable values over a plane
- Create volume rendering





Open the file (and display information)

- Click File -> Open file
- Select noise.silo
- Click OK
- Note name of file under –
 > Active source
- Click File information
- Close Window





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- Click Add -> Contour -> hardyglobal
- Click Draw
- Double click on Contour (or Right-click ->Edit plot description)
- Under select by choose ->N Levels enter 5
- Change the opacity levels
- Click Apply
- Click Dismiss
- Click Delete





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- Click Add -> Pseudocolor -> hardyglobal
- Click Draw
- Click Operator -> Slicing -> Isosurface
- Click Draw
- Click Arrow to expand
- Double-Click Isosurface
- Under select by choose >Percent(s) enter 50
- Click Apply





- Click Add -> Pseudocolor -> hardyglobal
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- Click Arrow to expand
- **Double-Click** Isosurface
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- Click Apply & Dismiss





- Double-Click -> Pseudocolor
- Change Opacity
- Click Apply
- Click Add -> Pseudocolor
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- Click Operator -> Slicing
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- Click Arrow to expand
- **Double-Click** Isosurface
- Under select by choose >Percent(s) enter 80
- Click Apply -> Dismiss -> Draw





- Double-Click -> Pseudocolor
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- Click Apply & Dismiss
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Clip Isosurfaces

- Click -> apply operators and selection to all plots
- Click Operators -> Selection -> Clip
- Click Draw
- Double-Click -> Clip
- Click Plane 2
- Click Apply & Dismiss
- Click x (to delete)
- Click Draw





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- Click Operators -> Slicing -> Slice
- Click Draw
- Double-Click -> Slice
- Click Z-Axis & Project to 2D
- Click Apply
- Click Dismiss





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- Double-Click -> Slice
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- **Click** Dismiss





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- Unselect Apply operators/ selection to all plots
- Click Add -> Vector
 -> airVfGradient
- Click Draw
- Double click on Vector
- Under N vectors enter 1000
- Click Apply
- **Click** Dismiss
- **Click** Hide/Show





- Unselect Apply operators/ selection to all plots
- Click Add -> Vector
 -> airVfGradient
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- Click Add -> Streamline
 -> grad
- Double click on Streamline
- Under Source Type Select Plane
- Enter:
 - Point Density 8
 - Radius 10
 - Streamline Direction Both
- Click Apply
- Click Dismiss
- Click Draw
- Double click on Streamline





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- Click on Appearance
- Under draw as select Tubes
- Click Apply
- Under Data Value select Variable
- Under Variable select hardyglobal
- Click Apply
- Under Color -> Color table, click Default Choose orangehot
- Click Apply &



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- Click on Controls -> Annotation
- Click on Colors
- Select Black for Background and White for Foreground
- Click Apply
- Click on General
- Click no annotations
- Click legend
- Click Apply & Dismiss
- Hide Pseudocolor Plots





- Click on Controls -> Annotation
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- Hide Pseudocolor Plots





- Click on Controls -> Annotation
- Click on Colors
- Select Black for Background and White for Foreground
- Click Apply
- Click on General
- Click no annotations
- Click legend
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Create Slice

- Click Add -> Pseudocolor -> grad_magnitude
- Click Draw
- Click Operator -> Slicing -> Slice
- Double click on Slice
- Select Z Axis
- Unselect project to 2D
- Click Apply & Dismiss
- Click Draw
- Click Hide/Show





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- Click Add -> Volume
 -> grad_magnitude
- Click Draw
- Double click on Volume
- Change Transfer Function
- Click Apply
- Click Dismiss





- Click Add -> Volume
 -> grad_magnitude
- Click Draw
- Double click on Volume
- Change Transfer Function
- Click Apply
- Click Dismiss





- Click Add -> Volume
 -> grad magnitude
- Click Draw
- Double click on Volume
- Change Transfer Function
- Click Apply
- **Click** Dismiss





- Click Add -> Volume
 -> grad magnitude
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- Change Transfer Function
- Click Apply
- Click Dismiss





- Click Add -> Volume
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Questions?

- More tutorials available:
 - <u>https://wci.llnl.gov/codes/visit/manuals.html</u>

