



AVS/Express and Vislt Training

NERSC Users meeting June 2006 - PPPL

Cristina Siegerist NERSC/LBNL Visualization group June 13, 2006





AVS/Express and Vislt Training Overview



- **Network Editor**
- **Importing Data**
- Libraries
- **V** language
- **Module writing**

Vislt

- Introduction
- **Databases** •
 - **Plots**
- **Operators**

Conclusions and what was left out

How to contact us:

Wes Bethel (group leader), ewbethel@lbl.gov Cristina Siegerist, cesiegerist@lbl.gov http://vis.lbl.gov





What is AVS/Express?

- An object oriented visualization development tool
- Graphical development interface
- Modular, with many built in library modules
- Open and extensible, using V-language and/or C, C++, FORTRAN Api.
- Serial, not distributed.







AVS/Express in NERSC

- 250 licenses
- DaVinci (7.0, 7.1), Seaborg(6.3)
- module load avs-express
- %express
- Licenses can be checked out from the license server http://www.nersc.gov/nusers/services/licenses/





•

0 2 AVG/Express - Just/Incal/express7 D/expre EXD Project Journal UI Builder Options AVS Compat Help File Edit Object 🗀 Libraries Start 🗀 Data Import Visualization Diew Export Examples Demonstrations (rd netCDF) 🍑 Solar System ち (OutputImage) 🚮 Climate (OutputVPS) 🔁 (rd text grid) ImportWizard VizWizard (OutputVRML) 🔁 (rd text columns) FlightPath 🔁 Read Field 님 axis 2d 🔁 (OutputMovie) 🔁 (rd text sequence 👸 Image2Volume 🔁 Read UCD 님 axis 3d 🔁 (Wr netCDF Fld) 🔁 (rd bin sequence Volume Shells El clama S Read Imag Applications AVS/Express Choose initial application type **Type of application** Application type Viewer type 3D or 2D 1 3D 🔷 Single-window DataViewer Multi-window DataViewer 🔷 2D Application 🔷 3D and 2D Module Stack 🔷 None ♦ Scratch Pad Load Application 🔷 None Add Data Import Wizard to application Add Data Visualization Wizard to application Set project's default application Use Project->Save As... to create a writable project ок



Type of application

- Single-window
- Multi-window
- Application

and dimensions. Choose the default: Single-window, 3D.



Image: Start Image: Star		0 Pl and Watwee
Image: State Index Outer: State State Image: State Index Outer: State State Image: State Index Image: State Index Image: State I		File Editors Windows
init üvert inged juonit üver opena Liberaries Demostration intervis Stat intervis Stat intervis Openation intervis Open	AV/dExpan-in/fordexpan/dexpan	
Idrafis Strt Data langer Weak Case Weak Case I (Colopat/Nake) Pred field I (Colopat/Nake) Index field </th <th>He Edit Object Project Journal II Builder Options and Compat Libraries Menu</th> <th>Modules Modules = 🛛 🖄 🖾 🔽 🖬 🖌 🖌 🖌 🗶 🔍 🕮 🛄 👰 🕺 💋</th>	He Edit Object Project Journal II Builder Options and Compat Libraries Menu	Modules Modules = 🛛 🖄 🖾 🔽 🖬 🖌 🖌 🖌 🗶 🔍 🕮 🛄 👰 🕺 💋
Data langort Work Expert Examples Impertitions Impertitions Impertitions Impertitions Impertitions Imperitions Imperitions Impertitions Imperitions Imperitions Impertitions Imperitions	Libraries Start	
Image: Source System	Data Import Visualization View Export Examples Demonstrations	
Nortifierd Notifierd Indiant In	👔 🖌 🔤 (OutputImage) 🛛 🗟 (rd netCDF) 🕹 🏹 Solar System	
Imperfiltering Impering Imperfiltering Imperfiltering <th>A Climate</th> <th></th>	A Climate	
Image 2 March Image 2 Ma	ImportWizard VizWizard El community El community	
Red UC Image Widow App Image Widow App </th <th>Read Field A State Courter Courters Read Field A State State</th> <th></th>	Read Field A State Courter Courters Read Field A State	
Image: Stringer Image: Stringe	🗟 Read LICD 🗧 axis 3d 🖺 (Output Movie) 🖺 (rd text sequence 👔 Image2Volume	
In the times is a specific term of the term of the term of the term of the term of	🖥 Hound Color and Color a	
Singetwinkowkip Library modules alle Network editor canvas		
Library modules ate 20 Top Beet Object Pick objects with <eth button<="" course="" th=""><th>E SingleWindowApp</th><th></th></eth>	E SingleWindowApp	
Library modules des 30 Top Select Object Pek abjects with <tri-telt button<br="" masse="">Network-editor canvas</tri-telt>		
Library modules des 30 Top Select Object Pick objects with <irt button<="" rowse="" th=""><th></th><th></th></irt>		
Library modules dile> 30 Top Select Object Pick agets with <ith-left button<="" mose="" th=""><th></th><th></th></ith-left>		
Library modules ale 30 Top 3elect Object Pick objects with <cbr></cbr> tel-i=fit musse button		
Library modules alles 30 Top Belet Object Network editor canvas		
de 30 Top Select Object Pick objects with Network editor canvas	erection in the second s	
dile> 30 Top Select Object Pick objects with Network-editor canvas		
alles 30 Top 3elect Object Pick objects with <cbr>-ieft mouse button Network-editor canvas Allest to the set of the se</cbr>		
alles 30 Tap Select Object Pick objects with «tri+ieft mouse botton		
diles 30 Top Select Object Pick objects with <irr>Network-editor canvas</irr>		
Image: Select Object 30 Top Select Object Pick objects with -tri-left mouse builton Image: Select Object Image: Select Object		
ade> 30 10 Generalization Pick objects with <ctr> Vith -left mouse button 10 Generalization</ctr>		
Network-editor canvas		select Object
Network editor canvas		Fick objects with <ctri>+left mouse button</ctri>
	Network editor convos	
	Network cultur canvas	
	🛛	30 , , , , , , , , , , , , , , , , ,
Viewer		Viewer
Viewer		VILWU
· · · · · · · · · · · · · · · · · · ·		
e e e e e e e e e e e e e e e e e e e		econcept.
		wer instance

Selecting single window app and 3d you will see: 3D Display 3D Viewer instance Built-in Library modules







Main Library: Data IO Filters Mappers Geometries Field Mappers Viewers





94	the second se		Atvolespress - Justili	salen 🔮 🔏		onglewindowyp			EX.
<u>File E</u> dit <u>O</u> bject	Project Journal UI E	Builder Op <u>t</u> ions A <u>V</u> S	3 Compat	<u>F</u> ile <u>E</u>	ditors <u>Wi</u> ndows				
🗂 Libraries 🔡 🕴	Main 💷			Mod	lules Rd_HDF5_Field 🗖		328 3		🧕 🧾 🛃 🥖
🗇 Data IO	🗂 Filters	🗂 Mappers	Geometries] Fiel		-			
(Read Field)	E (GISMapTrans	Ter (excernar ende	E (Arrow1)	M HDF5	filename:	Ì			
E (Read UCD)	🗄 (cell data mati	🔓 external faces	E (Arrow2)	Da I	Browse				
S (Pood Imore)		🛓 (extrude cells	E (Amar 3)	n Gel Re	ad File				
		🗄 (geo glyph)							
		🗟 (glyph)							
Rd netCDF FI	(clamp cell)	E columnitate at the	(Axis2D)	Ar					
📱 SingleWindowApp									
e e e e e e		· · · · · · · · · ·	4 Monicol						
		e e e let e	r intonse i	JULIO	II				
		to d	Irag and	dron			Read I	HDF5	
			ii ag ailu '	uivh			OIII		
				e .			GUI		
				e e					
			e e e e e e	1					
		 .							
				e (
				e .					
			Óutout Ď	out-	μ.	<u> </u>			
			Output r	die>	<u>e</u>	🗧 3D Top			Select Object
				Pick object	cts with <ctrl>+left mouse button</ctrl>				
						e e e e e e e			
e e e e e e									
					· · · · · · · · · · · · · · · ·	out Port			
				e e e e					
						e e e e e e			
						🖥 Uviewe	r3D		

Left mouse to drag and drop instances of modules onto the canvas. Choose "Rd_HDF5_Field" from the Data IO library.

The viewer will show the corresponding gui. From the browser select "./tutorial1.h5"









U.S. DEPARTMENT OF ENERGY

Network Editor



Viewing controls: mouse over the icons tells you what they are





Viewing controls continued





Reading Data

- Supported Formats
- The Express Field
- Importing Data into AVS/Express
- Writing Custom Readers





Reading Data

Some Readers (Main, Data IO library)

Read_Field, Read_UCD, Rd_netCDF_Fld, Rd_HDF5_Field, Read_PLOT3D, Read_DXF, Rd_Txt_Colums, Rd_Txt_Grid, Rd_Bin_Sequence, Read_Volums, Read_Polygon, Read_Triangle...









The Express Field

Field Types:

- Structured (or irregular)
- Rectilinear
- Uniform

Connectivity is implicit, can define a header file to use Read_Field

Unstructured



Connectivity must be defined.





The Structured Field



Structured Field: nspace ndims dims coordinates node data: scalar, vector, etc.





The Read_Field Module

AVS field file This is a header file for a structured field **Header file** for a ndim = 3structured dim1 = 40dim2 = 32field dim3 = 32nspace = 3veclen = 5data = floatfield = irregular needs label = density x-momentum y-momentum z-momentum stagnation to be there variable 1 file=./blntfinq.bin filetype=binary skip=28 variable 2 file=./blntfinq.bin filetype=binary skip=163868 variable 3 file=./blntfinq.bin filetype=binary skip=327708 variable 4 file=.blntfinq.bin filetype=binary skip=491548 variable 5 file=./blntfinq.bin filetype=binary skip=655388 coord 1 file=./ blntfinx.bin filetype=binary skip=12 coord 2 file=./ blntfinx.bin filetype=binary skip=163852 coord 3 file=./blntfinx.bin filetype=binary skip=327692



Uniform

Field

The Read_Field Module

AVS field file # this is a header file for a uniform field # # ndim = 3 dim1 = 64 dim2 = 64 dim3 = 64 nspace = 3 veclen = 1 data = byte field = uniform

variable 1 file=./hydrogen.dat filetype=binary skip=3

Note: FORTRAN unformatted data can be read in by using for example: variable 1 file=for0004.dat filetype=unformatted skip=32 stride=1





The Unstructured Field

Cell types:



see the AVS/Express manual





Unstructured Field

• Can be assembled in Express by reading the connectivity array, by writing it in HDF5 format, or by using a custom reader.





Importing Data into Uniform Fields

- Rd_Text_Grid: reads in grid-oriented text, often the result of exporting a spreadsheet
- Rd_Text_Sequence: reads in a sequence of numbers from an ascii file into a uniform field.
- Rd_Bin_Sequence: Reads in a sequence of numbers from a binary file into a uniform field.



Uniform fields





Importing Data into Tables

 Rd_Text_Columns: reads an ASCII file containing any number of separated columns into a "table". It can be converted to the Uniform Field or Scattered (particles) Field types.





- I Reading an hdf5 array into a 2D uniform mesh.
- II Reading a 3D HDF5 file, making an isosurface, changing the transparency.
- III Visualizing a vector field, making streamlines.





The first operation of	AV6/Express - Just/Jocal/express	
Input ports Output ports	File Edit Object Project Sourceal UI Builder Options AVS Compat	Help
Input ports. Output ports	Libraries Templates	
Templates Templates Thouse Thouse Thouse Templates Thouse Templates Thouse Templates Thouse		
Templates Templates /HDF5 library drag and drop: H5read_array		
Input ports Output ports	1 empiates	Tomplataa
Input ports Output ports .Output ports	H [™] HSread arra	Templates
Input ports Output ports Output ports	HSread field	
ThDF5 library drag and drop: H5read_array	TT (UServed time)	UDEE library
Input ports Output ports		
Input ports ☐ Input ports ☐ Uniput ports ☐ Uniput ports		
Input ports Output ports .Output ports		drag and drag
Input ports Coutput ports Turvero	a subsentionable	
Input ports Output ports Output ports		
Output ports	Input ports.	UFroad array
Bisman arry Output ports Uutput ports		Insteau allay
isseat array ∴Output ports	and the second	
Dutput ports	· · · · · · · · · · · · · · · · · · ·	e e e e e e
Output ports	errerer 🖽 HSread array 💦 errererererererererererererererererere	e e e e e
Output ports		e e e e e
Output ports		e e e e e e
Output ports	a na na na na sa sa na	e e e e e
	Output ports	e e e e e
	· · · · · Output poiss · · · · · · · · · · · · · · · · · ·	e e e e e
	* * * * * * * * * * * * * * * * * * * *	
· · · · · · · · · · · · · · · · · · ·		e e e e e
с с с с с с с с с с с с с с с с с с с		e e e e e
n n n n n n n n n n n n n n n n n n n		e e e e e
e e e e e e e e e e e e e e e e e e e		e e e e e e
	e e e e e e e e e e e e e e e e e e e	iD e e e
	· · · · · · · · · · · · · · · · · · ·	e e e e e e
		e e e e e
		, , , , , , , , , , , , , , , , , , ,





9 🛛				AVS/Express - Jusr/loca	l/express7_0/express				SXD	
<u>File</u> <u>E</u> dit	<u>O</u> bject <u>P</u> roject <u>J</u> ou	umal <u>U</u> I Builder Op <u>t</u>	ions A <u>V</u> S Compat						<u>H</u> elp	
🗂 Libraries	Templates .	_ [
	D PAL	IР РКG		ANIM MACROS	C ANIM MODS	C NETCDF	HDF5	D RDCT	🗇 GIS	select open in
4							H5read field			each of the
Single Wir	ndowApp									
e e e e e e	 		e e e e e e e	e e e e e e e e e e e e e e e e	e e e e e e	e e e e e e e	e e e e e e e e	e e e e e e	- e - e - e - e - e - e	string objects:
~ ~ ~ ~ ~ ~ ~ ~	H5read array Parameters:		e e e e e e e	 	e e e e e e e	e e e e e e e	 	 	 	type
e e e e e e e e e	e e e "./tutoria	"./tutorial_2d.h5" *	e e e e e e e e e e e e e	 	e e e e e e e e e e e e e	e e e e e e e e e e e e e	 		 	
0 0 0 0 0 0	e e variable = ' e e = "ubin"	"ubin" c	e e e e e e e e e e e e	 	e e e e e e e e e e e e e e e e e	e e e e e e . e e e e e e .	e e	· · · · · · · ·	 	./tutorial_2D.n5
• • • • • •	e e outArr[46][101]		 c c<	 	e e e e e e e e e e e e e e e e e e e e	e e e e e e e e e e e e e	· · · · · · · · · ·	· · · · · · · ·	 	in filename and
e e e e e e	 	 	e e e e e e e e e e e e e e	 	* * * * * * * * * * * * * * *	· · · · · · · ·	 	· · · · · · ·	 	
 	 		🔁 Uviewer31	e e e e e e e e De e e e e	· · · · · · ·	 	 		 	niau
e e e e e e			e e e e e e e e e e e e	 	 	 			 	in variable
	 	 	e e e e e e e	 		 	 	• • • • • • • • • • • • • •	 	





EXD

<u>F</u> ile <u>E</u> dit	<u>Object Project Journal UI</u> I	Builder Options AVS	3 Compat			Help	
🗂 Libraries	Main 🖃	MAIN		\sim	Field N	Iappers	From Main/Field
🗂 Data IO	E inters	🗅 Mappers	Geometries	Field Mappers	C Viewers		
🔁 (Read F	Field)	E (excavate brid	🗄 (Arrow1)	Mesh Mappers	🚡 (Uviewer3D)		Mannara drag and
🚡 (Read L	UCD) 🗧 (cell data mati	E outernal faces	🗟 (Arrow2)	🗖 Data Mappers _	🗟 (Uviewer2D)		mappers using and
🔁 (Read h	Image) 🗄 (cell to node)	E (oxtrudo colle)	E (Arrow3)	Field Mappers	🗄 (Uviewer)		
B Rd HDF	5 Field 🛛 🔁 (clamp)	S (geo glyph)	🔁 (Arrow4)	uniform scal	(ImageView)		drop
🛛 🔁 (Rd net	tCDF Fi 🔽 🔁 (clamp cell) 🛛		🖹 (Axis2D)	🗎 (uniforn vec	E (OutputVPS)		arop
🚡 SingleWind	dowApp						uniform scalar
e e e e							unnunn_scalai
							_
	H5read array						
	Parameters:						Lett mouse button
	🔲 🔚 filename = "./tutorial_	2d.h5"					
	e e = "./tutorial_2d.h5"ĭ						
	variable = "ubin"						on an output port
	= "ubin"						
	outArr[46][101]						and connect to the
			e e e e e e				and connect to the
					uniform_	scalar_field	
				· · · · · ·			aarraananding
				scalar field			corresponding
							input port of
			e e e e e e	e e e e e e			πραιροπ οι
						· · · · · · · · · · · · · · · · · · ·	
						Uviewer3D	another module
				e e e e e e			





	AVS/Express - /usr/local/express7.0/express	98	SingleWindow App	EXD
File Edit Object Project Journal UI Builder Options AVS Compat		File Editors Windows		
🗂 Libraries Main 🖃		Modules Modules 🖃		🗖 🛃 🤣
Data IO Filters Data C Geometries	Field Mappers Viewers			
E (Read Field)	🔺 🗀 Mesh Mappers 🗛 🔁 (Uviewer3D) 🗛			
E (Read UCD) E (cell data mat	🗂 Data Mappers 🔄 🖹 (Uviewer2D)			
[(Read Image) [(cell to node) [Cell to node) [Cell to node] [Cell to nod	🗂 Field Mappers 🛛 🗟 (Uviewer)			
E Rd HDF5 Field E (clamp)	🕀 uniform scal 🕀 (ImageView)			
E (Rd netCDF FI , E (clamp cell) E (geo glyph) E (Axis2D)	🗸 🗄 (uniform ver 🚽 🖺 (OutputVPS) 🚽			
SingleWindowApp		=		
	· · · · · · · · · · · · · · · · · · ·			
🕀 H5read array				
e e e e e e e e e e e e e e e e e e e				
filename = "./tutorial_2d.h5"	* - • • • • • • • • • • • • • • • • • •			
= "./tutorial_2d.h5"				
e e e e e e e e e e e e e e e e e e e	general contractor			
e e e "ubin"i e e e e e e e 🗎 uniform so	ar field receed			
Parametels				
[] in dims[2]				
	<u></u>	<idle></idle>	3D Top Sel	ect Object
		Pick objects with <ctrl>+left mouse button</ctrl>		
	X	e e e e e e e e e e e e e e e	e e e e e	
сесесессессессе с с с с с с с с с с с с	n]			
e e e e e e e e e e e e e e e e e e e		· · · · · · · · · · · · · · · · · · ·		
🕂 👿 obj	Uviewer3D			
		• • • • • • • • • • • • • • • • •		







Delete the application: left click on SingleWinApp choose **Delete Application** from the main File menu.







From MAIN/Data IO drag and drop Rd_HDF5_Field

Read tutorial_3d.h5 from the GUI







Unstructured data: mesh made with prisms and several node data variables, both scalar and vector.





		SingleWindowApp
<u>File Edit Object Project Journal UI Builder Options AVS Compat</u>	File Editors Windows	
🗂 Libraries Main 🖃	Modules Rd HDF5 Field 🖃	
🗅 Data 10 🛑 Filters 💭 Mappers 💭 Geometri		
E (Read Field)	HDF5 filename:	
E (Read UCD)	L/NUG2006/tutorial 3d.h5. Browse	
E (Read Image) E (cell to node) E isosurface	Bead File	
E Rd HDF5 Field E (clamp)		
E (Rd netCDF FI E (clamp cell)		
	Time Step	
SingleWindowApp	Select node data components:	
	☐ B , magnitude of magnetic field	
	⊐ p, pressure	
	⊒ C, -J_phi/R	
Ri HDF5 Field	_ cb, current source	
	_ U, -	
	⊥ uei-uayger 0, -	
	V_phi, -	
	⊒ tl, toroidal field	
	☐ B, magnetic field vector	
e e e e e e e e e e e e e e e e e		
· · · · · · · · · · · · · · · · · · ·	<idle></idle>	3D Top Select Object
	Pick objects with <ctrl>+left mouse button</ctrl>	
· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • •	
· · · · · · · · · · · · · · · · · · ·	Uviewer3D	
		· · · · · · · · · · · · · · · · · · ·

Find isosurface (Main/Mappers). Left mouse button on an output port and connect to the corresponding input port of another module. Delete a connection: right click on the connection and select delete.



	AVS/Express - Jusr/local/express7.0/express	
File Edit Object Proje	ect Journal UI Builder Options AVS Compat	<u>H</u> elp
Libraries Rename		
Data IO Find in All Libra	anes	
B (Read Properties	and E (adjust slice sH E (Array(1) H C Mesh Manners E (Ilviewer3D	JA
Object Editor.		
B (Read Add File Impor		4
E cost up Local Objects.		
Save Objects.		
🗄 SingleWindowApp	Distant Exclusion in a	
	Libraries	
	Find Object 🛛 By Name 🗖	
e e e e e e e	· · · · · · · · · · · · · · · · · · ·	
	Search Pattern	
	surf[
	Objects	
e e e e e e e	Examples. Visualization. VolumeRendSurface	
	Graphics_Display.Full_Library.VIEW. Components. SurfConvPopup	
	Main. Mappers. isosurface	
	Main. Mappers, isosurface nest	
e e e e e e e	Main Manners isosurface trace	
	Main Marpers rei te surface	
	Main. Mappers. 101_00_surface	
	Main. Mappers. surf_optimize	
	Selection	
	Main Manage issaurfassi	
Search all libraries for object	Maru, Mappers, 1505011 ace	<u> </u>
a containing aries for object		
	Find Show Close	
		i

Tip: under the Object menu button there is a "Find in All Libraries..." option. Search for *surf* and all the modules surf related will appear. Show will show the module in the library.







Example Application: Change the isosurface value from the isosurface module GUI.





	98	čingleWindowApp 🗧 🕅 🕅	
File Edit Object Project Journal UI Builder Options AVS Compat	File Editors Windows		
🗂 Libraries 🛛 Main 🖃	Modules Rd HDF5 Field 💷		Find the
Data IO Filters Mappers Geometr			
S (Read Field)	HDF5 filename:		
E (external edge	L/NUG2006/tutorial 3d.h5. Browse		Main
(Arrow)			
Image: Second			
C (Rd netCDF Fi Z Clamp cell) Z G (geo gryph) Z C (Axis2D	Time Step		ovtornal tacod
Sindollandow Ann	╡║┍━━━━━━┓║║		CALCINAL TACCO
	Select node data components:		_
	🗏 [B], magnitude of magnetic field		
	_ p, pressure		module
<u></u>	□ C, -J_phi/R		moddio
a a 🔁 Rd HDF5 Field a concorrence a concorr	☐ cb, current source		
	dei-uagger U, -		
	psi, V nhi -		
	⊥ t. toroidal field		
	☐ B, magnetic field vector		
<u></u>			
isosurface	cidles	3D Ton Select Object	
	Pick objects with activateft mouse button		
<mark> </mark>			1
<mark> </mark>			
external faces			
	uviewer3D		





Office of

U.S. DEPARTMENT OF ENERGY

Example Application II



Changing the transparency: ctrl-left click on the surface to select the object. external faces will replace Top. Select **Editors/Object** from the main menu.



	SingleWindowApp	
File Editors Windows		
Object General Field Conversion Visible Modes ckable All Properties Dynamic		
Cache Size (MB) 32		
Alternate Object		
🗖 Enable 🗖 Visible		
Reinter Space Match Camera 💷		
Transform Mode Parent		
WWW label		
<idle></idle>	3D external_faces Select Object	
Pick objects with <ctrl>+left mouse button</ctrl>		











	Single	WindowApp		
<u>File Editors Windows</u>				
Object Properties 🖃	<u>×</u>		X I I I I	
Object 💷 🗖 Inherit Reset				
Type Surface 🖃				
0.30				
0.70 0.70 0.70 0.70 0.70 0.70 0.70 0.70				
0.40				
12.00				
0.30				
0.00				
Nono -				
<idle></idle>	3D	external_faces		Select Object
ick objects with <ctrl>+left mouse button</ctrl>				







ctrl-left click on the background to select the Top object. Select Editors/Modules from the main menu.





	02	SingleWindowApp	EX)
<u>File Edit Object Project Journal UI Builder</u>	File Editors Windows		
🗅 Libraries Main 💷	Modules Rd_HDF5_Field =		2 🛃
Data 10 Filters (GasMapTran Gead UCD) (Gead UCD) (Read Image) (Read Image) (Read IDF Field SingleWindowApp	HDF5 filename: L/NUG2006/tutorial 3d.h5 Browse Read File 0 Select node data components: [B], magnitude of magnetic field p, pressure C, -J_phi/R cb, current source U, - del-dagger U, - psi, - V_phi, - tricumit Cold F, magnetic field vector density, -		
Rd HDF5 Field		30 Ton Select (biect
	Pick objects with <ctd></ctd>		
			'
			e e e
			e e e
	<u></u>		
	Uviewer3D		
	<mark></mark>		
			e e e
			e e e
			с с с
			с с с

We will visualize a Vector Field:

From the Rd_HDF5_Field GUI read the

B, magnetic field vector





U.S. DEPARTMENT OF ENERG

Example Application III



Select Accesories/Utilities/Viz_Macros/Vector (double left click to open)















Office of Science

U.S. DEPARTMENT OF ENERGY

Example Application III



Delete the vectors from the viewer and connect the streamlines.

Select plane as the start point



V language

AVS/Express applications can be saved as .v files and loaded later.



To save an application: select your SingleWindowApp (left click) and save from the File menu as a .v file

You can load it later with "File/Load Application"

9 🔼	
<u>File</u> <u>E</u> dit <u>O</u> bjec	t <u>P</u> roject
New Application	Start
Load Application	
Save Application	
Delete Application	
Exit	
ImportWizard	
🔁 Read Field	
🔁 Read UCD	
Applications	





AVS/Express Module Writing

It's a long tutorial by itself. If people are interested I can prepare material and post it in our web site.





- Vislt is a point-and-click 3D scientific visualization application that supports most of the common visualization techniques (isocontouring, volume rendering) on structured and unstructured grids.
- For detailed information on Vislt, please refer to http://www.llnl.gov/visi





- Main Features:
 - it's free and open source and most importantly, it offers a distributed mode. You can connect a client from your desktop and run a backend in the computer where you produced the data.
 - Visit employs a parallel architecture in order to handle extremely large data sets interactively.







 On DaVinci, use the modules facility % module load visit % visit

IMPORTANT NOTES

- 1- To run the parallel backend the path to visit has to be in your environment. Add this line to your .cshrc setenv PATH /usr/common/graphics/visit/visit-1.5.2/bin/:\$PATH
- 2 Sometimes when the Vislt GUI starts, the opening of windows stalls. If this is the case use:
- %visit -nowindowmetrics
- 3 If you are running in client remote server mode, the version number of the client and the server must to be the same.
- 4- Make sure the backend can connect to your client (check with the systems' admin).





File Controls Options Windows Help File Ctrl+F Advanced file options Help Advanced file options File information Ctrl+F File information Ctrl+R File information Ctrl+R Simulations Ctrl+S Save window Ctrl+S Set Save options Ctrl+S	Select "Select file" from the File menu.
Save movie Export database Print window Set Print options Ctrl+P Restore session Save session Draw Exit	Load "tutorial_3d.vtk"
Plots Operators PlotAtts OpAtts Variables Apply operators and selection to all plots	Note: this is the same data that we just used for Express but I extracted only the B, magnitude and the B, vector variables
	to VTK format





9 2 -		Vis	ilt 1.5.2		
<u>F</u> ile	<u>C</u> ontrols	<u>O</u> ptions	<u>W</u> indows		<u>H</u> elp
Sele	cted files				
	itorial_3d.v	rtk		1	
\mathcal{I}	Open	<u> Г</u>	leplace		Overlay
		<			
Activ	e window	Maint	ain limits		Replace plots
1	Ā	🗌 vie	w∐ data		Auto update
Active	e plots	Hide/Shov	v Dele	te	Draw
J	,				
Plot	s Operato	rs PlotA	tts OpAtts		Variables
A A	oply operat	ors and s	election to a	ill plots	3

Open the file.

The Plots menu will be enabled.

Once you select a plot, the operators over that plot will be enabled.







U.S. DEPARTMENT OF ENERGY



U.S. DEPARTMENT OF ENERGY

Vislt tutorial



Select PlotAtts Pseudocolor.

Change the opacity and apply.



Vector plot attributes

Z X D

Plots Operators	PlotAtts OpAtts selection to all plots 	Select Plot Vector B	Maintain limits R view data A e/Show Delete or - ExternalSurface(B) ternalSurface(B)	Line style Y Line width Y Vector color Magnitude Default Limits Use Original Data Y Min 0
 Curve Filled Bounda Histogram Label Mesh Pseudocolor Scatter Scatter Streamline Streamline Subset Surface Tensor Truecolor Vector Vector Volume Science 	▶ TY ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶	Draw the plot From the PlotAtts menu select Vector and change the parameters	PlotAtts OpAtts Image: Solution of the second se	Imax 1



cience

U.S. DEPARTMENT OF ENERGY

Vislt tutorial



Making Streamlines:

Make sure you deselect the toggle button "Apply operators and selection to all plots"

Select Plots, Streamline, B

From PlotAtts, Streamline change the source type to plane and the step length.



Conclusions

- AVS/Express: commercial, serial, very flexible, not so easy to use, good API for custom development.
 – left out: module development
- Vislt: open source, parallel, easy to use, python interface for batch operation, plugin development is possible.
 - left out: vtk data format, parallel operation, plugin development.

