



InfoVis in ParaView

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Topics



- Applications
- Data Structures
- Data Sources
- Data Transformations
- Algorithms
- Views

Applications



- ParaView
 - All of the capabilities mentioned here are ParaView plugins.
 - Use them in ParaView today!
- OverView
 - The OverView client provides a simplified (relative to ParaView) client intended for Infovis use.
 - The OverView UI can be "branded" and bundled with a specific set of plugins to provide a domain-specific solution.
 - The OverView UI will continue to evolve relative to the standard ParaView UI.
- Vertical Applications
 - Some problem domains will merit their own custom clients, with simplified, specialized user interfaces.

Data Structures

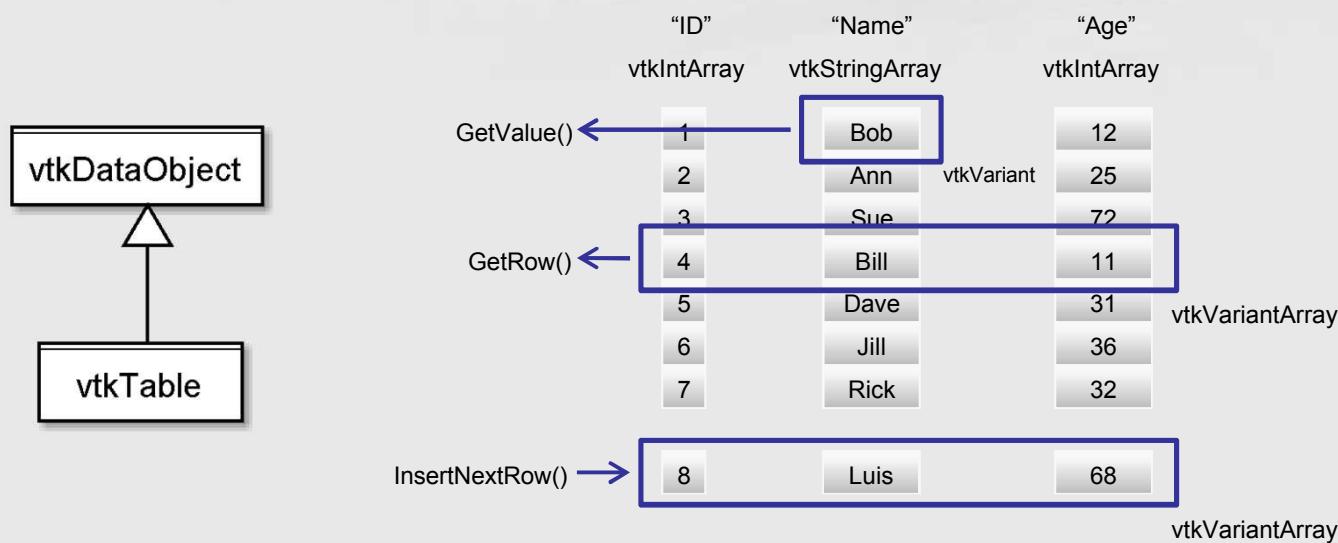


- Tables
- Graphs (Directed, Undirected, Directed Acyclic, Trees)
- N-Way Arrays

Tables



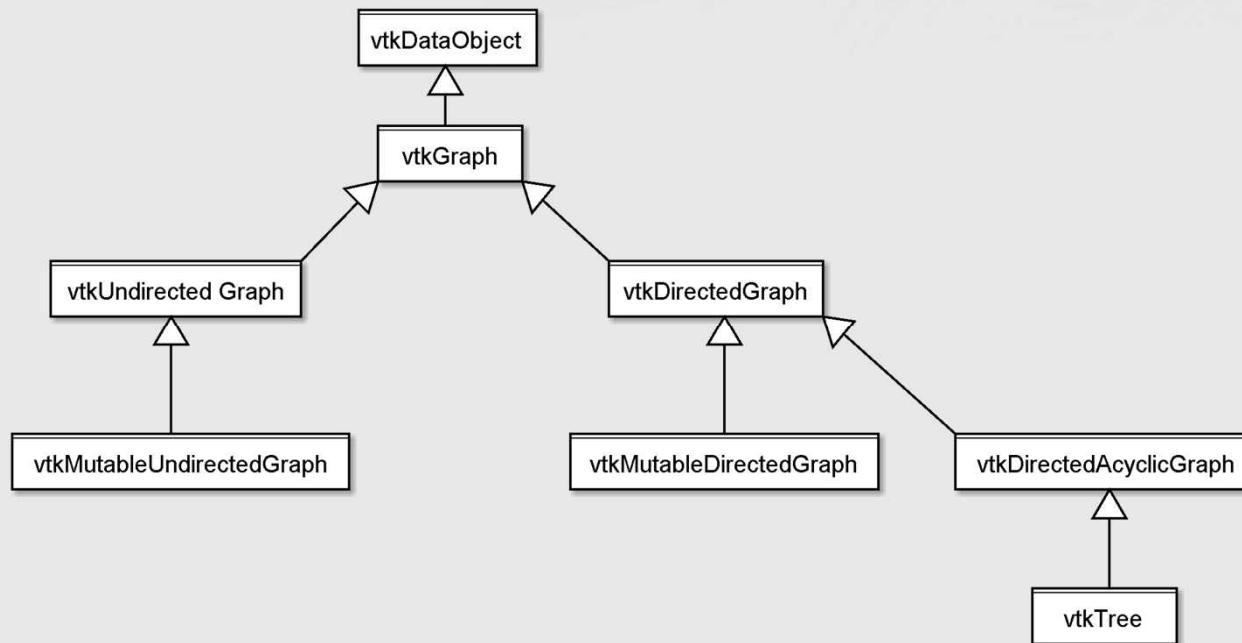
- vtkTable: manages a heterogeneous collection of VTK arrays+.
- API enforces equal lengths for every column.
- Provides API for getting / setting individual “cells” or entire rows.



Graphs



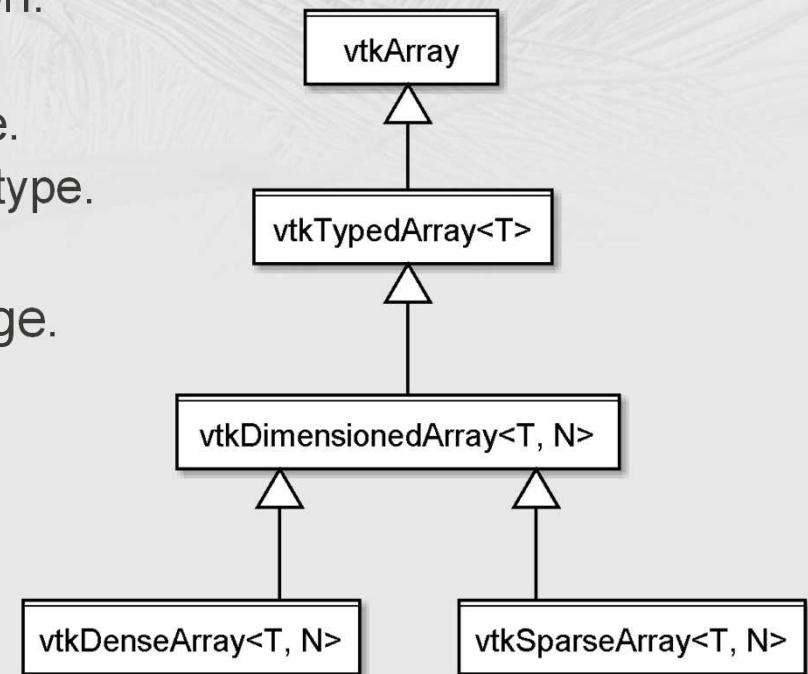
- vtkGraph provides a generic, read-only interface to an arbitrary graph.
- Derivatives provide increasingly-specialized interfaces.
- Provides per-vertex and per-edge attributes.
- Distributed graph work with Indiana University is ongoing.



N-Way Arrays



- Arbitrary-dimension sparse and dense arrays.
- Several different levels of abstraction:
 - Generic arrays without type.
 - Arbitrary-dimension arrays with type.
 - Arrays with specific dimension and type.
 - Storage-specific interfaces.
- Sparse arrays use coordinate storage.



Data Sources



- Graph Sources
 - Random Graph Source
- Array Sources
 - Diagonal Matrix Source
 - Random Sparse Array Source
- Table Readers
 - DelimitedText
 - FixedWidth
 - ISI, RIS
- Graph Readers
 - Dimacs
 - DOT
 - GXL
 - Chaco
 - XML
 - Tulip
- Databases
 - MySQL
 - Postgres
 - Oracle
 - SQLite
 - ODBC / Netezza

Data Transformations



- Data Object to Table
- Table to Graph
- Table to Tree
- Adjacency Matrix to Edge Table
- Array to Table
- Table to Sparse Array

Algorithms



- **Table Algorithms**
 - Univariate Statistics
 - Descriptive Statistics
 - Order Statistics
 - Bivariate Statistics
 - Contingency Statistics
 - Correlative Statistics
 - Merge Columns
 - Split Table Field
 - Merge Tables
 - Threshold Table
- **Graph Algorithms**
 - Brandes Centrality
 - Breadth First Search
 - Connected Components
 - Extract Selected Graph
- **Array Algorithms**
 - Cosine Similarity (Thresholded)
 - Log Weighting
 - Matricize Array
 - Matrix Column Norm
 - Normalize Matrix Vectors
 - Transpose Matrix

Views

- Table View
- Record View
- Attribute View
- Geospatial View
- Graph View
- Hierarchy View
- Landscape View

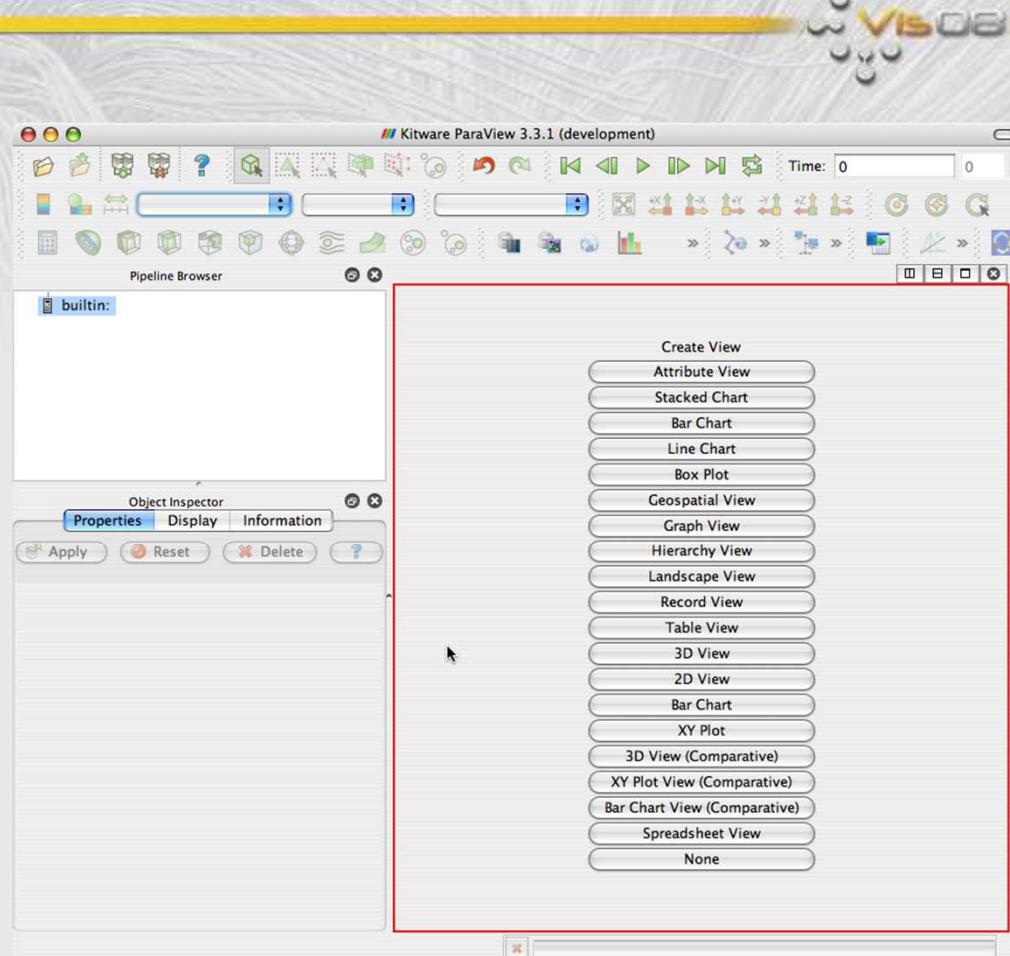


Table View



- Simple client-side spreadsheet-like display of table data.
- Needs to be merged with ParaView Spreadsheet View.

Kitware ParaView 3.3.1 (development)

Time: 0 0

Pipeline Browser

Object Inspector

Properties Display Information

Apply Reset Delete

Field Delimiter Characters ,

Use String Delimiter 1

Have Headers 1

Merge Consecutive Delimiters 0

Max Records 0

Author Institution Conference CiteRate Category PaperID Journal Keyw NR Year Abs

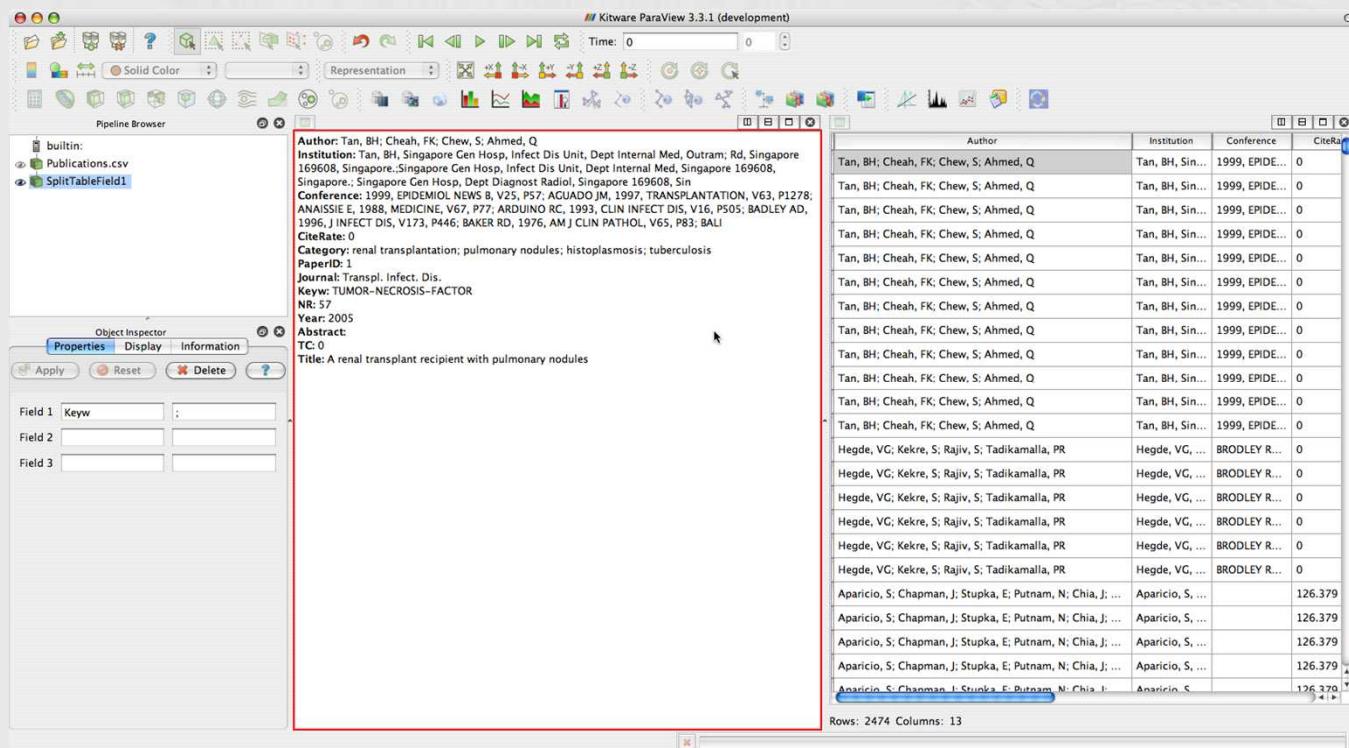
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Tan, BH; Cheah, FK; Chew, S; Ahmed, Q	Tan, BH, Sin...	1999, EPIDE...	0	renal transp...	1	Transpl. Inf...	TUMOR-NE...	57	2005	
Tan, BH; Cheah, FK; Chew, S; Ahmed, Q	Tan, BH, Sin...	1999, EPIDE...	0	renal transp...	1	Transpl. Inf...	DISSEMINA...	57	2005	
Tan, BH; Cheah, FK; Chew, S; Ahmed, Q	Tan, BH, Sin...	1999, EPIDE...	0	renal transp...	1	Transpl. Inf...	ALLOGRAFT	57	2005	
Tan, BH; Cheah, FK; Chew, S; Ahmed, Q	Tan, BH, Sin...	1999, EPIDE...	0	renal transp...	1	Transpl. Inf...	RECIPIENTS	57	2005	
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Tan, BH; Cheah, FK; Chew, S; Ahmed, Q	Tan, BH, Sin...	1999, EPIDE...	0	renal transp...	1	Transpl. Inf...	RISK-FACT...	57	2005	
Tan, BH; Cheah, FK; Chew, S; Ahmed, Q	Tan, BH, Sin...	1999, EPIDE...	0	renal transp...	1	Transpl. Inf...	MYCOACT...	57	2005	
Tan, BH; Cheah, FK; Chew, S; Ahmed, Q	Tan, BH, Sin...	1999, EPIDE...	0	renal transp...	1	Transpl. Inf...	INFECTION	57	2005	
Tan, BH; Cheah, FK; Chew, S; Ahmed, Q	Tan, BH, Sin...	1999, EPIDE...	0	renal transp...	1	Transpl. Inf...	CLINICAL P...	57	2005	
Tan, BH; Cheah, FK; Chew, S; Ahmed, Q	Tan, BH, Sin...	1999, EPIDE...	0	renal transp...	1	Transpl. Inf...	UNITED-ST...	57	2005	
Tan, BH; Cheah, FK; Chew, S; Ahmed, Q	Tan, BH, Sin...	1999, EPIDE...	0	renal transp...	1	Transpl. Inf...	TUBERCULO...	57	2005	
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Hegde, VG; Kekre, S; Rajiv, S; Tadikamalla, PR	Hegde, VG, ...	BRODLEY R...	0	customizati...	10	Prod. Oper. ...	MASS CUST...	34	2005	Manufa
Hegde, VG; Kekre, S; Rajiv, S; Tadikamalla, PR	Hegde, VG, ...	BRODLEY R...	0	customizati...	10	Prod. Oper. ...	DESIGN	34	2005	Manufa
Hegde, VG; Kekre, S; Rajiv, S; Tadikamalla, PR	Hegde, VG, ...	BRODLEY R...	0	customizati...	10	Prod. Oper. ...	DIFFERENTI...	34	2005	Manufa
Hegde, VG; Kekre, S; Rajiv, S; Tadikamalla, PR	Hegde, VG, ...	BRODLEY R...	0	customizati...	10	Prod. Oper. ...	QUALITY	34	2005	Manufa
Hegde, VG; Kekre, S; Rajiv, S; Tadikamalla, PR	Hegde, VG, ...	BRODLEY R...	0	customizati...	10	Prod. Oper. ...	VARIETY	34	2005	Manufa
Hegde, VG; Kekre, S; Rajiv, S; Tadikamalla, PR	Hegde, VG, ...	BRODLEY R...	0	customizati...	10	Prod. Oper. ...	LINKS	34	2005	Manufa
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Aparicio, S; Chapman, J; Stupka, E; Putnam, N; Chia, J; ...	Aparicio, S, ...		126.379		100	Science	PUFFERFISH	97	2002	The co
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Aparicio, S; Chapman, J; Stupka, E; Putnam, N; Chia, J; ...	Aparicio, S, ...		126.379		100	Science	SUPERFAMILY	97	2002	The co
Aparicio, S; Chapman, J; Stupka, E; Putnam, N; Chia, J; ...	Aparicio, S, ...		126.379		100	Science	DROSOPHIL...	97	2002	The co

Rows: 2474 Columns: 13

Record View



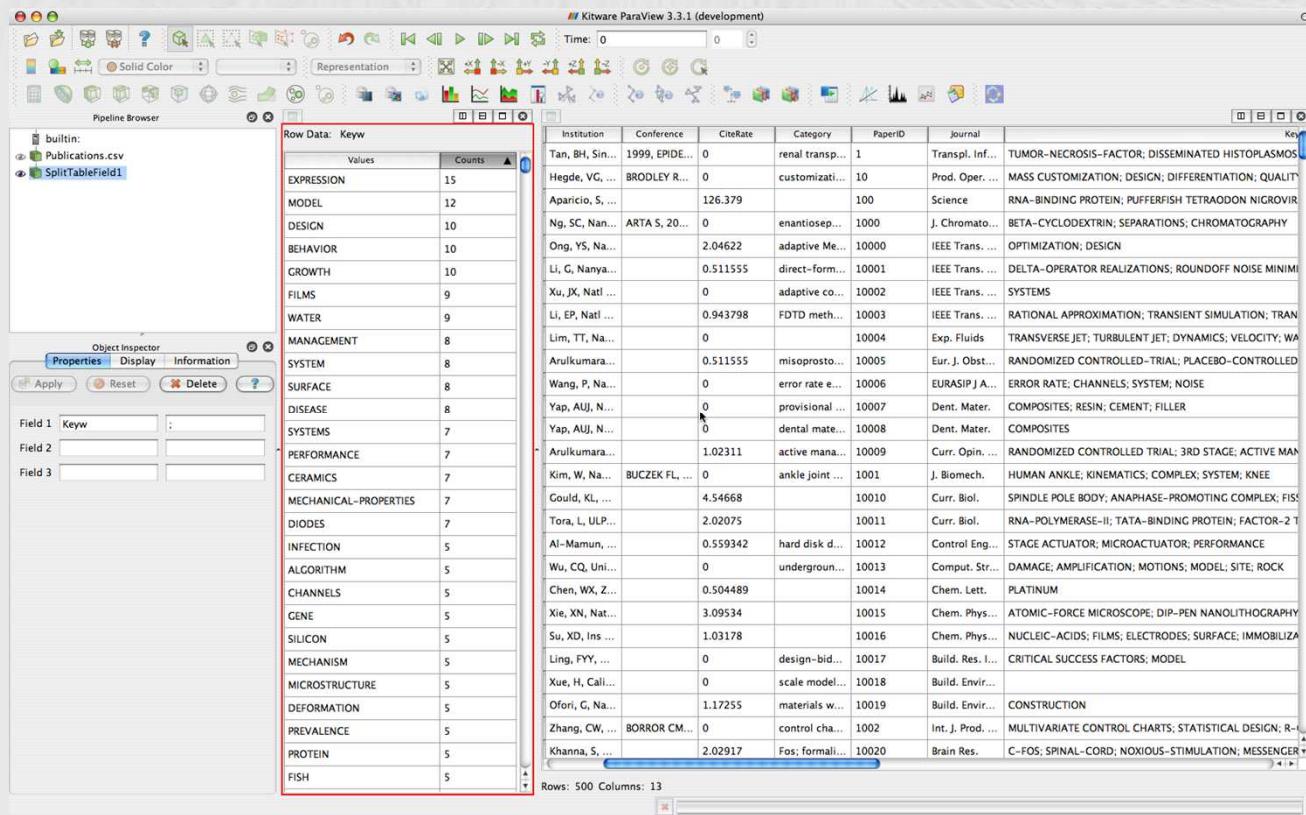
- Displays a single record (row) from a table.
- Useful when the size or number of columns make it impractical to browse using a Table View.



Attribute View



- Provides a “textual histogram” of table data.
- Sort values or counts

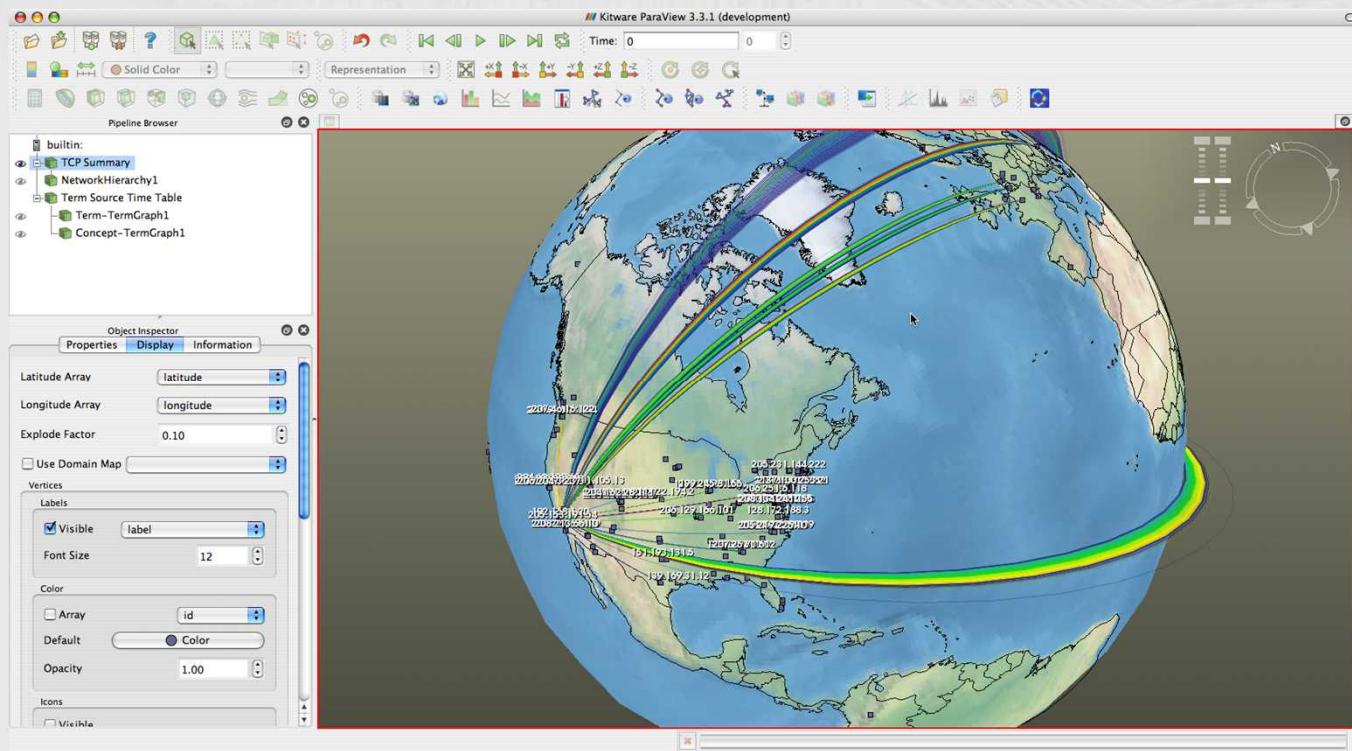


Values	Counts
EXPRESSION	15
MODEL	12
DESIGN	10
BEHAVIOR	10
GROWTH	10
FILMS	9
WATER	9
MANAGEMENT	8
SYSTEM	8
SURFACE	8
DISEASE	8
SYSTEMS	7
PERFORMANCE	7
CERAMICS	7
MECHANICAL-PROPERTIES	7
DIODES	7
INFECTION	5
ALGORITHM	5
CHANNELS	5
GENE	5
SILICON	5
MECHANISM	5
MICROSTRUCTURE	5
DEFORMATION	5
PREVALENCE	5
PROTEIN	5
FISH	5

Geospatial View



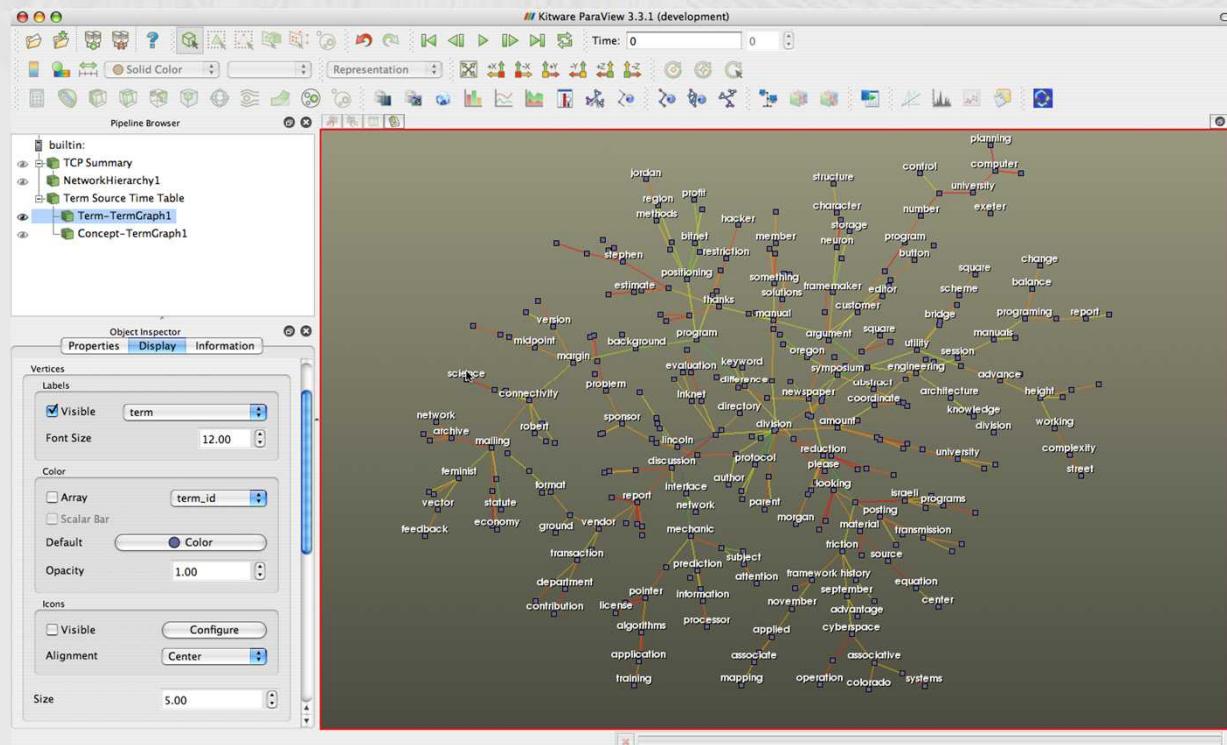
- Displays geo-referenced data on an interactive globe.
- Variable-resolution background texture maps.
- Polyline-based political boundaries.



Graph View



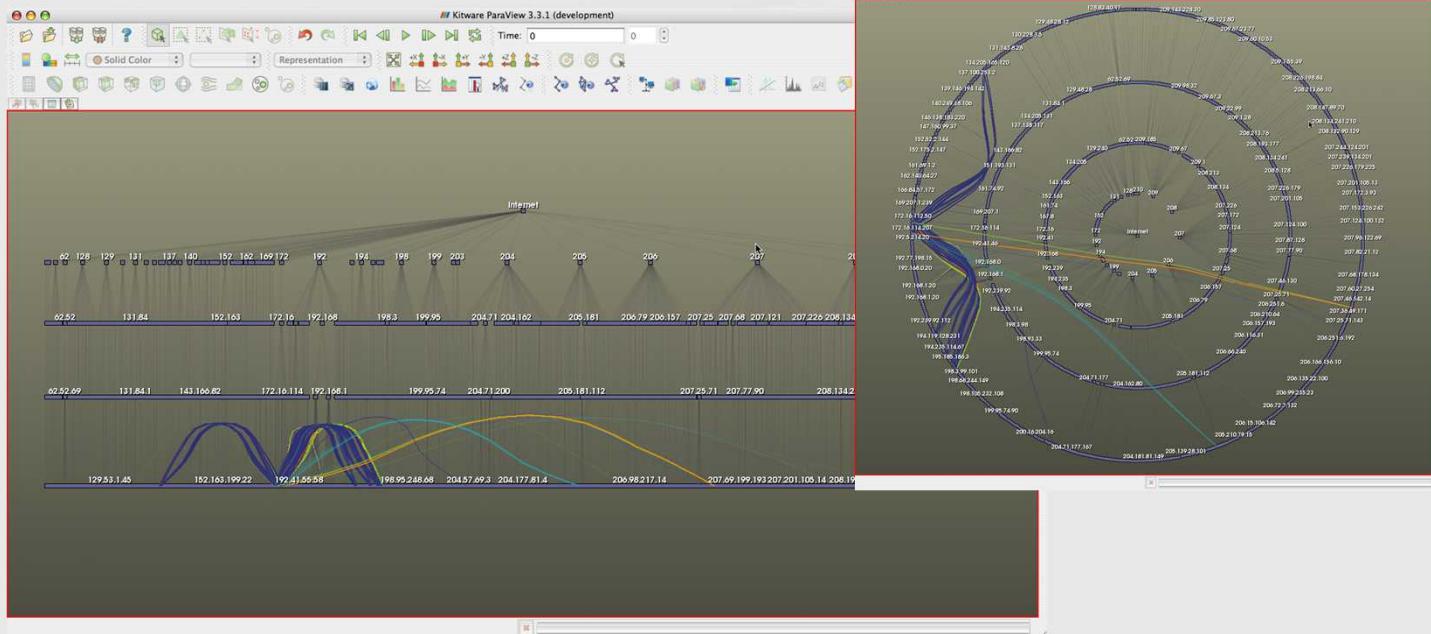
- Arbitrary layout algorithms.
- Attribute-based rendering: vertex / edge labels, vertex / edge color, vertex icons.



Hierarchy View



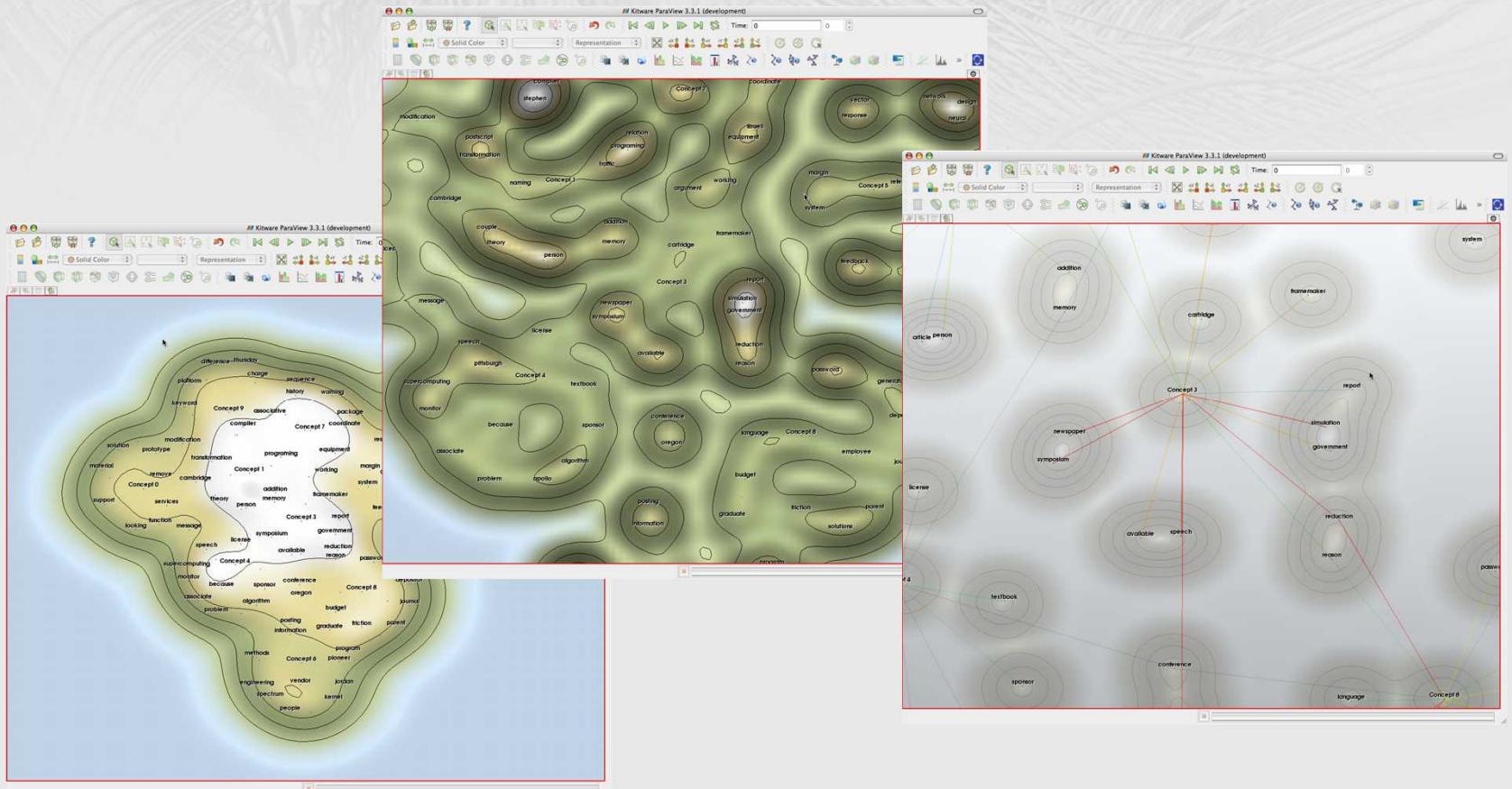
- Displays a graph, embedded within a hierarchy (tree).
- All of the rendering functionality of a Graph View.
- For data that incorporates hierarchies, provides a fast layout that's more meaningful than force-directed.



Landscape View



- Renders a graph using a heightfield to accentuate vertex clusters.



Infovis Demo

