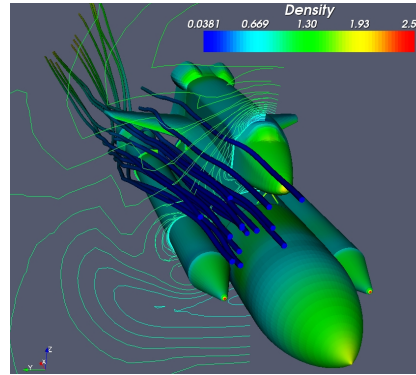
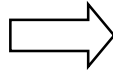


1.2 Basics of Visualization

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0255640 132304 133732 032051 037334 024721 015013 052226 001662
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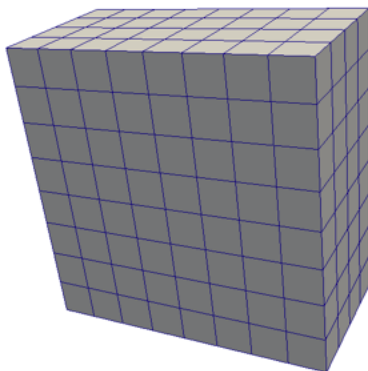
```



Put simply, the process of visualization is taking raw data and converting it to a form that is viewable and understandable to humans. This allows us to get a better cognitive understanding of our data. Scientific visualization is specifically concerned with the type of data that has a well defined representation in 2D or 3D space. Data that comes from simulation meshes and scanner data is well suited for this type of analysis.

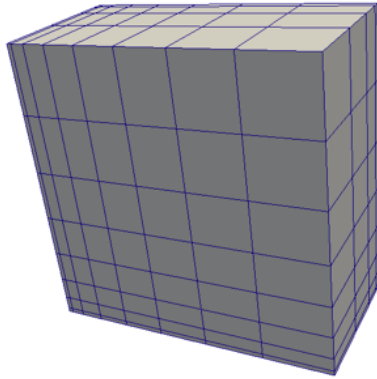
There are three basic steps to visualizing your data: reading, filtering, and rendering. First, your data must be read into ParaView. Next, you may apply any number of **filters** that process the data to generate, extract, or derive features from the data. Finally, a viewable image is rendered from the data.

ParaView was designed primarily to handle data with spatial representation. Thus the primary **data types** used in ParaView are meshes.



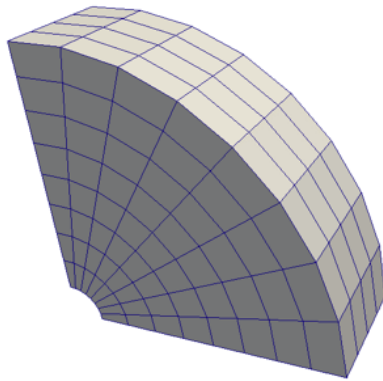
Uniform Rectilinear (Image Data)

A uniform rectilinear grid is a one- two- or three- dimensional array of data. The points are orthonormal to each other and are spaced regularly along each direction.



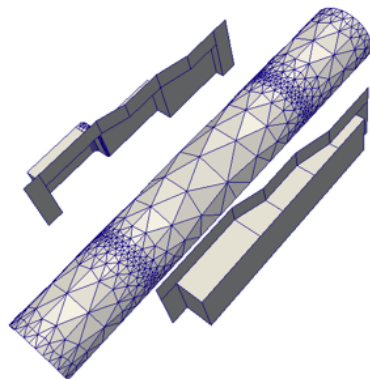
Non-uniform Rectilinear (Rectilinear Grid)

Similar to the uniform rectilinear grid except that the spacing between points may vary along each axis.



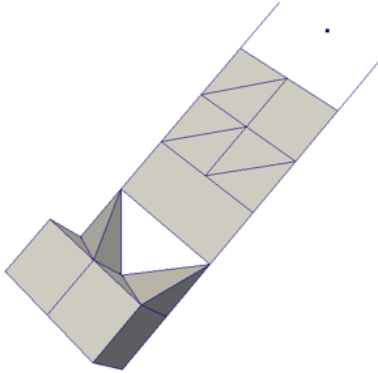
Curvilinear (Structured Grid)

Curvilinear grids have the same topology as rectilinear grids. However, each point in a curvilinear grid can be placed at an arbitrary coordinate (provided that it does not result in cells that overlap or self intersect). Curvilinear grids provide the more compact memory footprint and implicit topology of the rectilinear grids, but also allow for much more variation in the shape of the mesh.



Polygonal (Poly Data)

Polygonal data sets are composed of points, lines, and 2D polygons. Connections between cells can be arbitrary or non-existent. Polygonal data represents the basic rendering primitives. Any data must be converted to polygonal data before being rendered (unless volume rendering is employed), although ParaView will automatically make this conversion.




Unstructured Grid

Unstructured data sets are composed of points, lines, 2D polygons, 3D tetrahedra, and nonlinear cells. They are similar to polygonal data except that they can also represent 3D tetrahedra and nonlinear cells, which cannot be directly rendered.

In addition to these basic data types, ParaView also supports **multi-block** data. A basic multi-block data set is created whenever data sets are grouped together or whenever a file containing multiple blocks is read. ParaView also has some special data types for representing **Hierarchical Adaptive Mesh Refinement (AMR)**, **Hierarchical Uniform AMR**, **Octree**, **Tabular**, and **Graph** type data sets.

1.3 More Information

There are many places to find more information about ParaView. The manual, titled *The ParaView Guide*, is available for purchase as a hard copy or can be downloaded for free from <http://www.paraview.org/paraview-guide>. ParaView also has an online help that can be accessed by simply clicking the  button in the application.

The ParaView web page, www.paraview.org, is also an excellent place to find more information about ParaView. From there you can find helpful links to mailing lists, Wiki pages, and frequently asked questions as well as information about professional support services.