ParaView

Explore and Visualize Massive Datasets with ParaView

January 30th 2024 - François Mazen

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CCFR
CENTRE
DE COMPÉTENCE
HPC.HPDA.IA

Who am I?

- François Mazen

- Director of Scientific Visualization at Kitware Europe, France
- Numerical Simulation Background (Ansys, Siemens PLM)

Ansys

SIEMENS

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- Open-Source Software Enthusiast
- Debian Linux Distribution Developer

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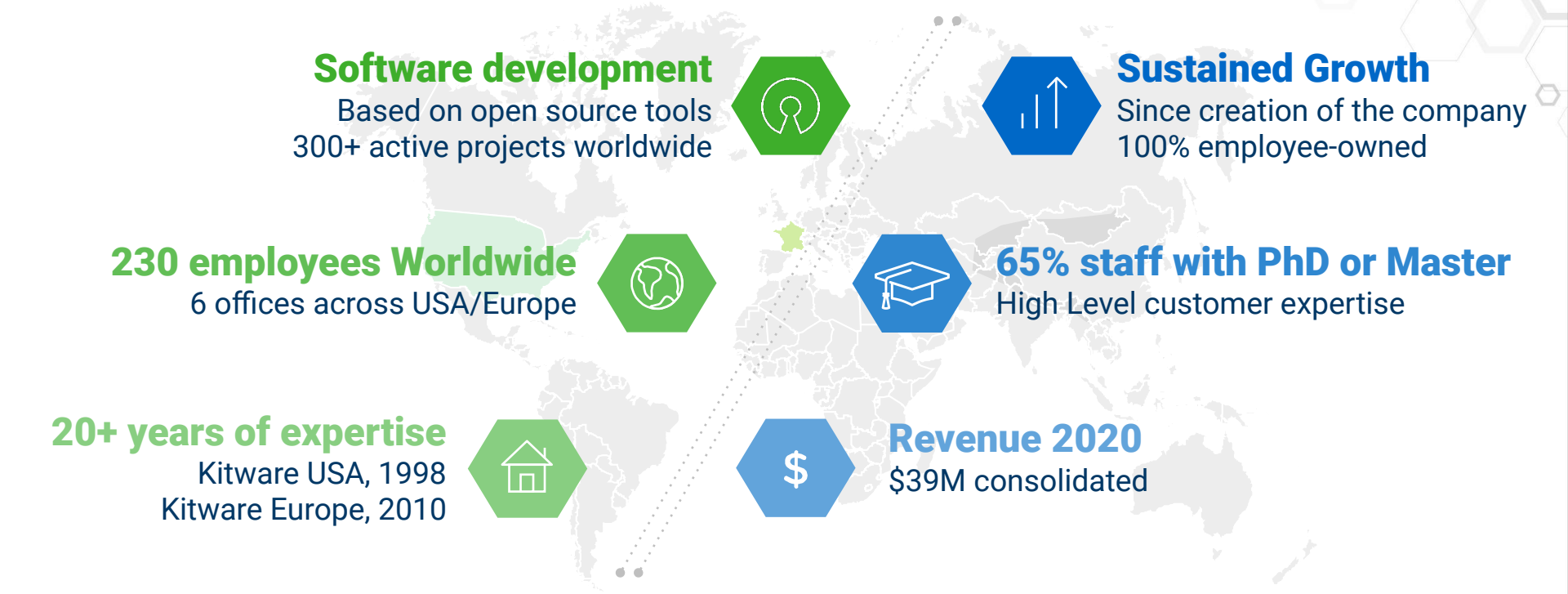
Kitware / Leader in AI & scientific open source solutions



Software development
Based on open source tools
300+ active projects worldwide

Sustained Growth
Since creation of the company
100% employee-owned

230 employees Worldwide
6 offices across USA/Europe

65% staff with PhD or Master
High Level customer expertise

20+ years of expertise
Kitware USA, 1998
Kitware Europe, 2010

Revenue 2020
$39M consolidated

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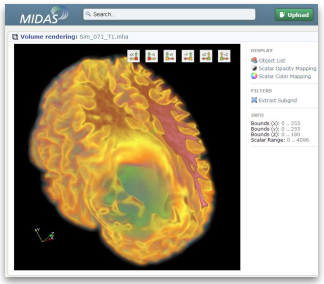
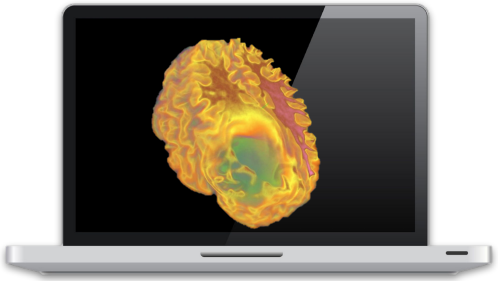
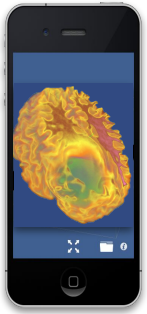
Applications / Universal Platforms



Web



Desktop



Mobile

Cloud /HPC

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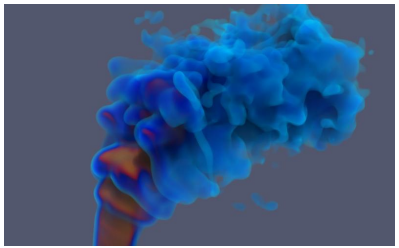
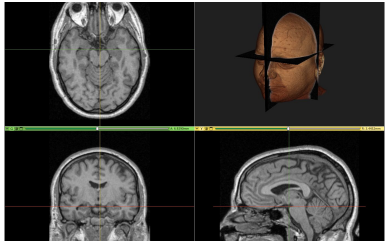
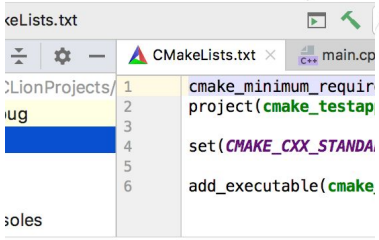
Platforms

3D Slicer
ParaView
KWIVER
mstk
VTK
Pulse Physiology Engine
CMake
Resonant
tomviz
ITK

Areas of expertise / Built on open source







Computer Vision

Data and Analytics

Scientific Computing

Medical Computing

Software Solutions

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Kitware / Services

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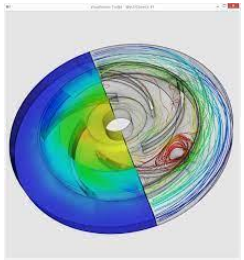
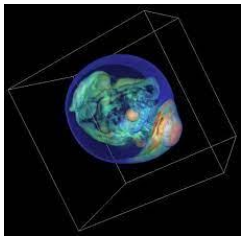
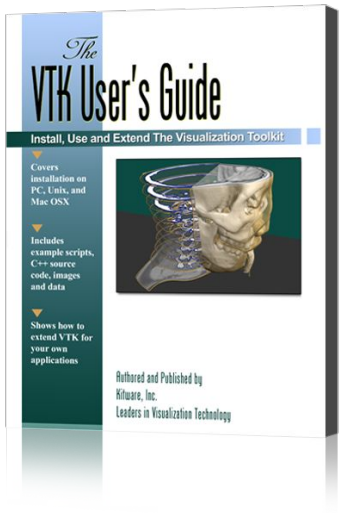
VTK / Cross-Platform Visualization Toolkit (1993)

- **Open-source (BSD-3 licence), freely available, cross-platform toolkit for post-processing and visualization of scientific data**







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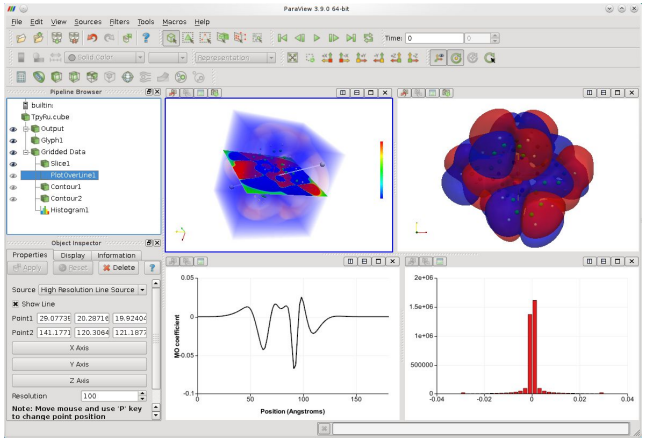
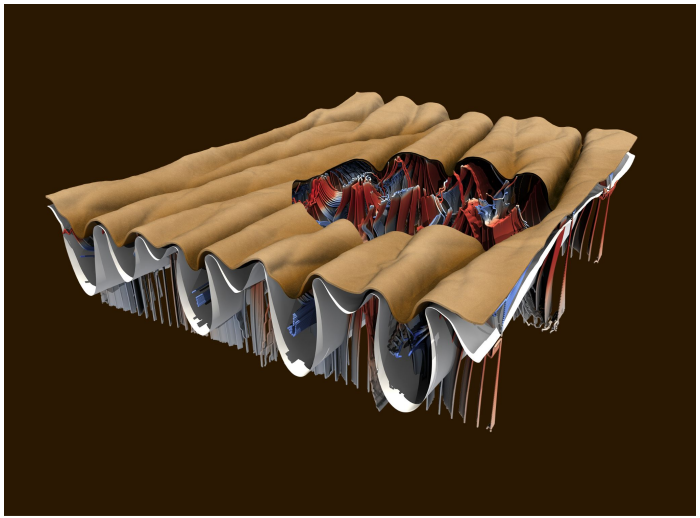
ParaView / High-Performance Post-Processing (2002)

- **Open-source, multi-platform, data analysis and visualization application**
- **Analysis of extremely large datasets using distributed memory computing resources**





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ParaView Community

- **Open Source Software (BSD license)**
- **Run on most of Top500 HPC**
- **300000+ download yearly from Kitware servers**
  - More users via other unknown download channel (Linux packaging, Enterprise distribution…)
- **157k commits made by 339 contributors since 2000**
- **1.6M lines of code**

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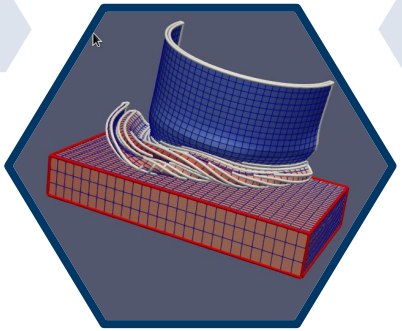
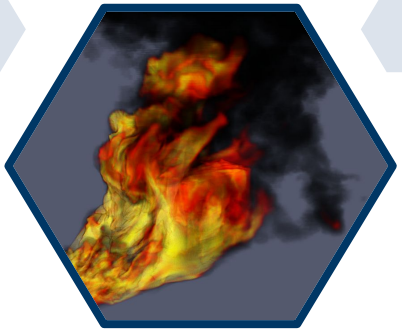
Features / Application Domains

Fluid Dynamic



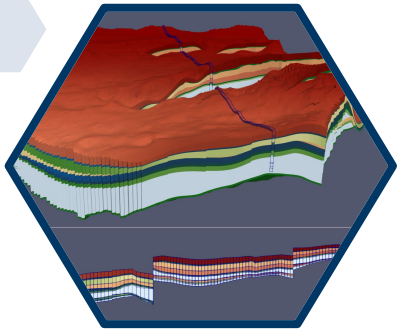
Structural Analysis

Medical



Particles

Astrophysic



Geoscience

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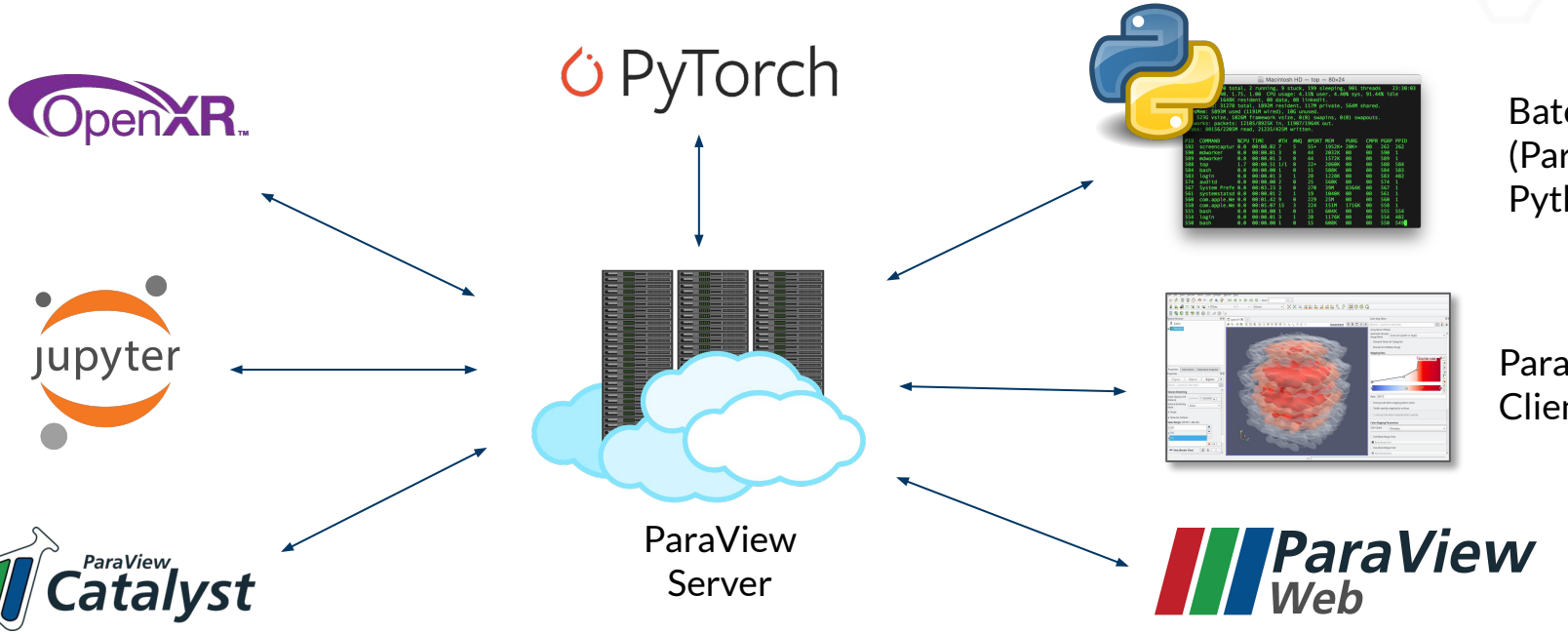
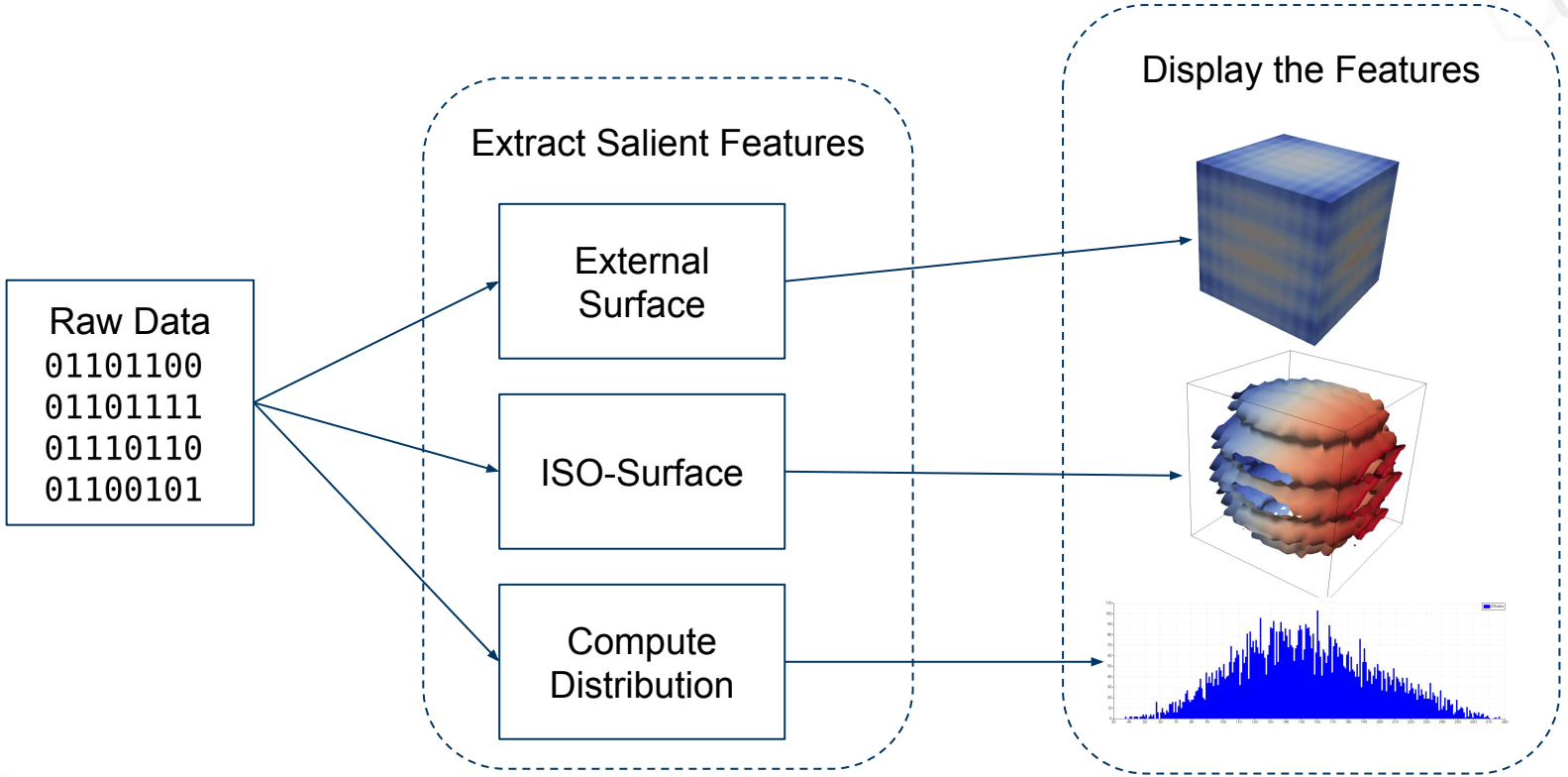
ParaView Ecosystem



Scientific Visualization Basics



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ParaView - Graphical User Interface

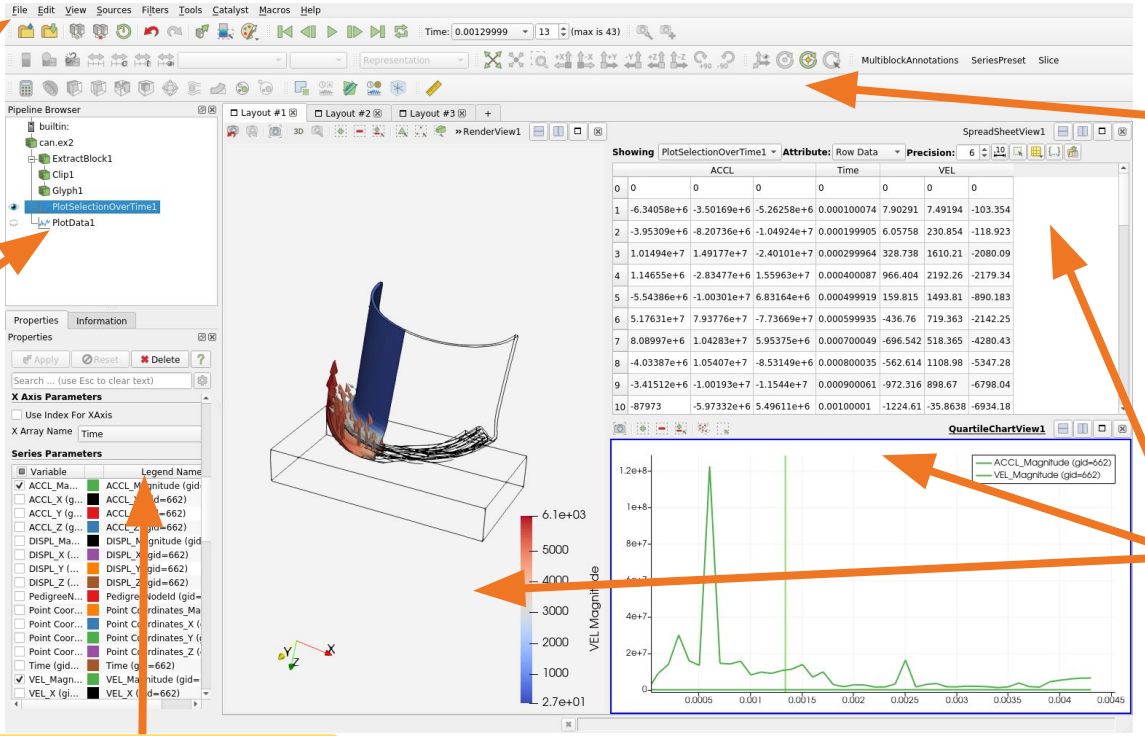
Menu bar

Pipeline Browser

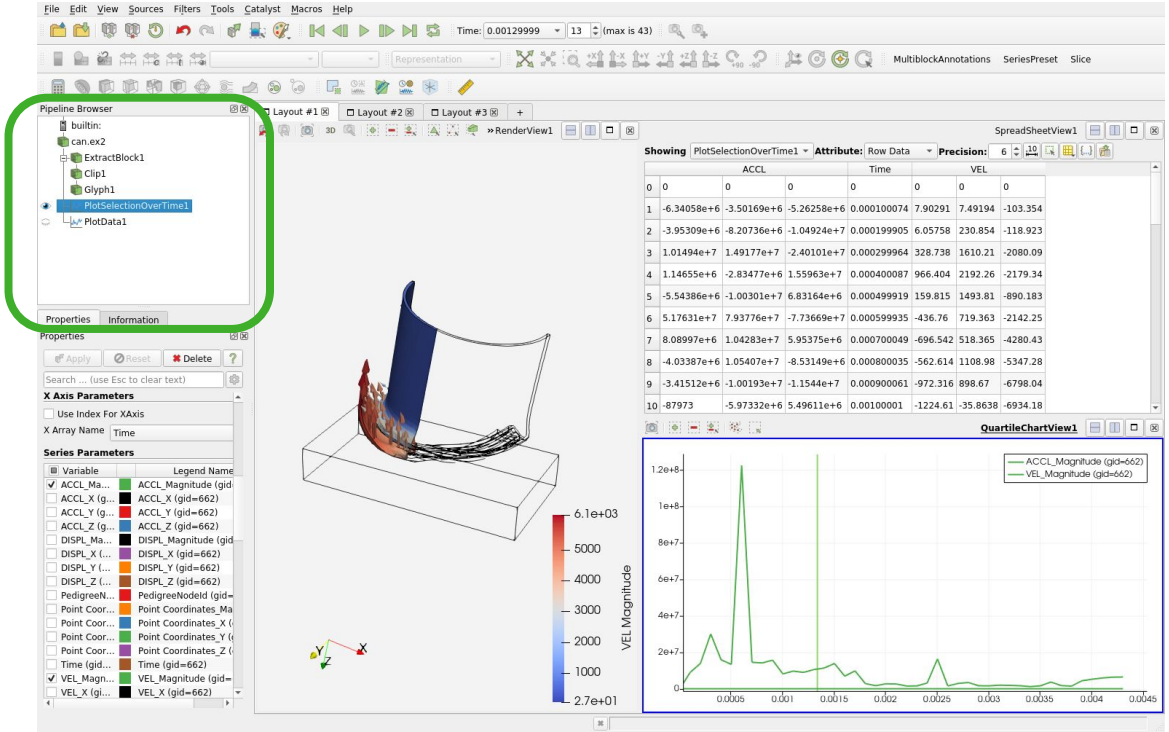
Object Inspector

Toolbars

View(s)



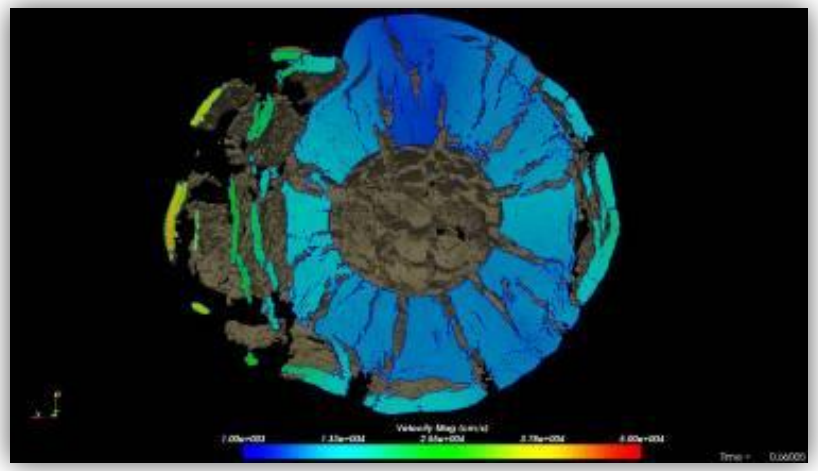
Pipeline Browser



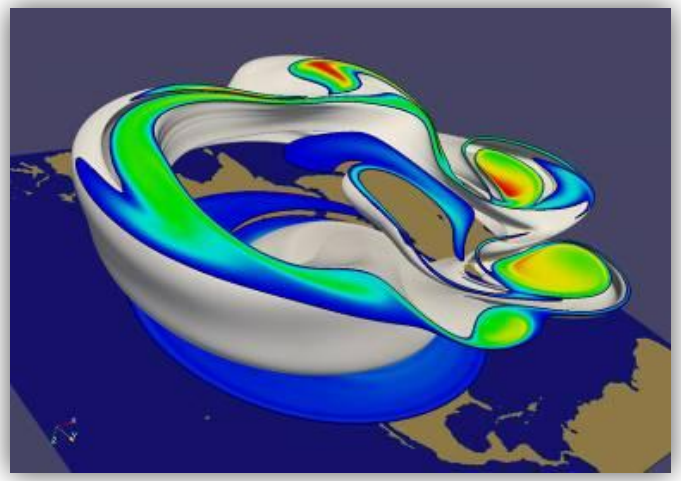
Extremely Large Data

Sandia National Laboratories

1 billion cell asteroid detonation simulation



½ billion cell weather simulation



Source: Sandia National Lab

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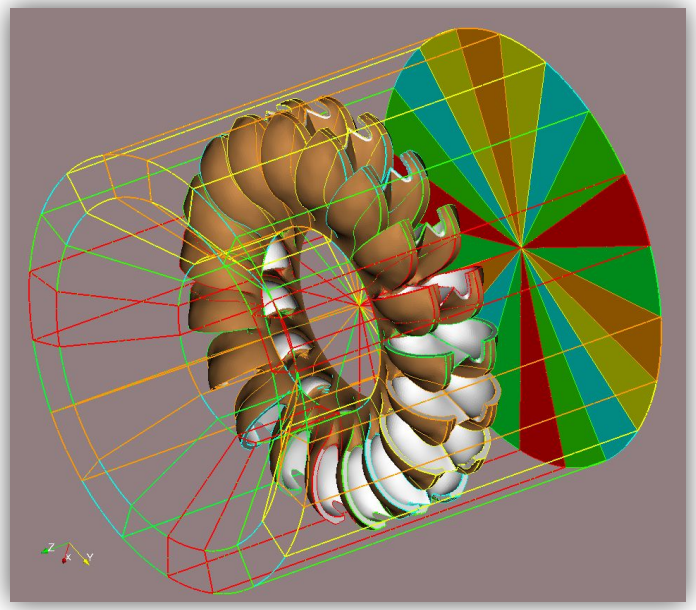
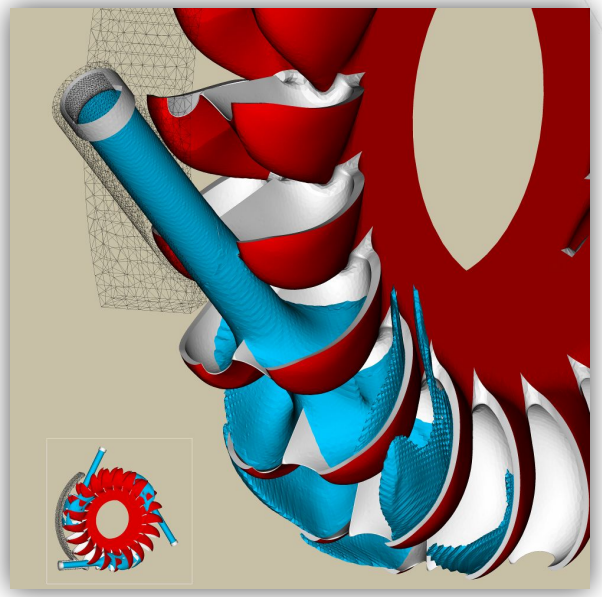
Fast Large Data Interaction

CFD simulation of 20-30 million cells
with load balancing





Source: Swiss supercomputing center

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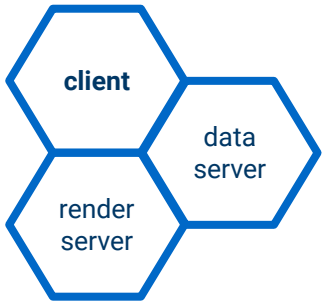
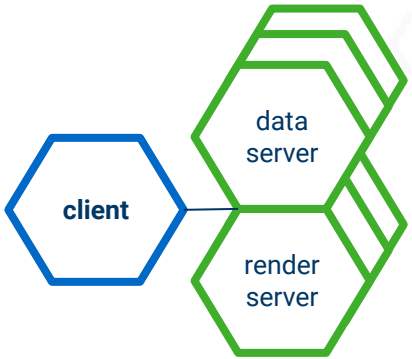
Client Server Architecture

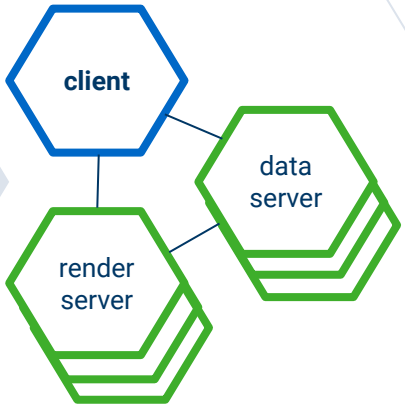
Built-in
paraview



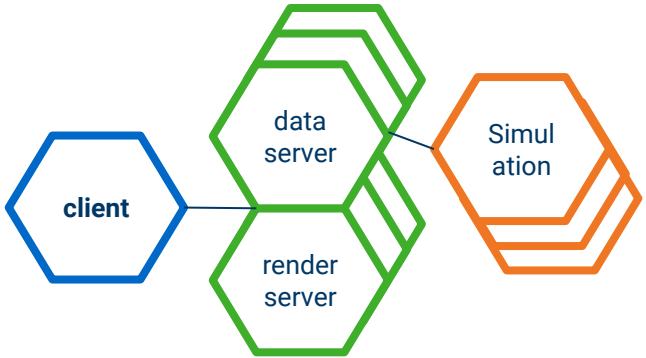
Distributed
pvserver



Graphic Nodes
data/render server



In Situ
catalyst



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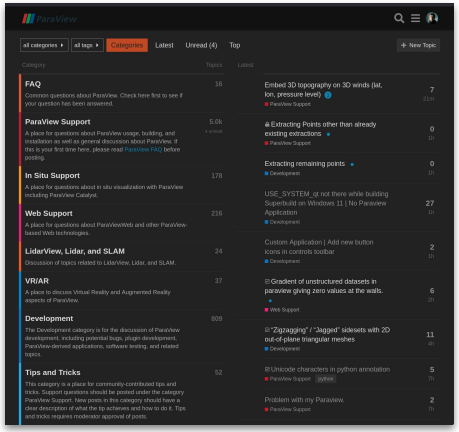
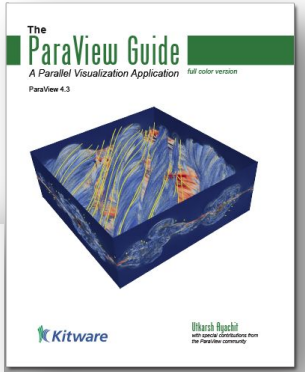
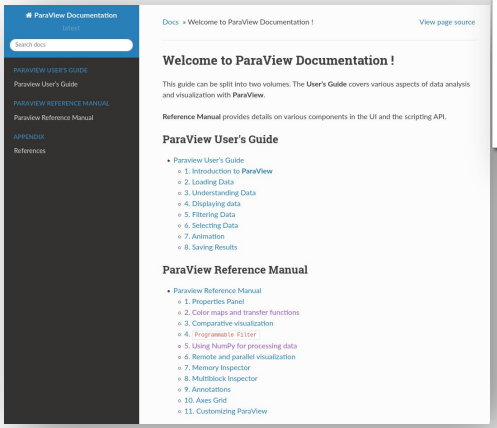
Going Further ...

- **ParaView User Doc (Guide) – Official user's manual and reference guide**
  - Accessible in the binary version of ParaView
  - Freely available as a website: https://docs.paraview.org
  - Printed version on Amazon
- **Wiki and Forum**
  - Plenty of user and developer resources
  - https://discourse.paraview.org/
- **Kitware**
  - https://www.kitware.eu/contact/







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