Engineering Data Visualization Efforts for Engineered Resilient Systems

Sebastien Jourdain – R&D Engineer

sebastien.jourdain@kitware.com
New Visualization?

- Technology evolves
- Need to embrace today’s communication media
Great history of Open Source and Visualization

Kitware

ParaView

vtk
• Trade-offs analytic platform
  • Look at millions of variations
  • Need to handle big data
  • Provides various analytic tools

• Web as communication media
  • Ease of access
  • Ease of delivery
  • Ease of use
Visualization on the Web?
ParaViewWeb is ParaView but shaped to be driven and used within a Web environment.
Large Data Visualization

Experimental Simulation Design

Extract meaningful parameters to ease comparison

Aggregation

Weight, cost, speed...

Big data

Data extraction and filtering

ParaViewWeb visualization

ERS Toolset

Extract handful set of entry

Tonic Data Exportation

Tonic Data Visualization
ERS Toolset

1. Experimental Simulation Design
   - Big data
     - Extract meaningful parameters to ease comparison
     - Aggregation
     - Weight, cost, speed...

2. Tonic Data Exportation

3. Tonic Data Visualization

4. ParaViewWeb visualization

5. Data extraction and filtering
   - ERS Toolset
     - Extract handful set of entry
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ParaViewWeb visualization

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Large Data Visualization
Large Data Visualization
Data filtering and extraction

- A way to express your interest
- Parameter annotation
- Score generation
Data filtering and extraction

- Score distribution

Live update with +25M
Region tagging
Data extraction

- Reached manageable data size
  - Other tools and visualizations
- Fine grained data analysis
  - Further drill down

- Other tools
Reach a set of solutions

Interested to look back?

Looking at the original data
Tonic Data Visualization

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Tonic Data Visualization
Tonic & Arctica Viewer

- Tool for reducing original data size to produce interactive 3D visualization

- Extract rendering information for deferred Web rendering (composition, coloring, alpha blending…)

- Visualization designed for the web
Tonic & arcticViewer

Data + Exploration Script + Browser = Tonic Data

Browser Logos: Chrome, Firefox, Safari
ArcticViewer - Demo
Conclusion

• ERS – Large Data Visualization and Analysis system
• Enabling Big Data (+ 25M) for driving data analysis and visualization

• ParaViewWeb a good fit for big data
  • Framework for data processing and visualization

• Tonic & ArcticViewer
  • Another approach for interactive web visualization
Questions?
sebastien.jourdain@kitware.com