

Insitu-visualization in OGS-6 based on



Capabilities

- Run VTK filter pipeline at post-timestep to write out
 - Reduced / analysed data sets
 - Rendered images of visualizations
- Connect with ParaView to a running simulation over network
 - E.g. monitor long-running simulation on envinf1 / eve?
 - Modify visualization parameter

Why?

- Reduce result data (HPC)
- Get visualization automatically
- Fast feedback / monitoring

Capabilities

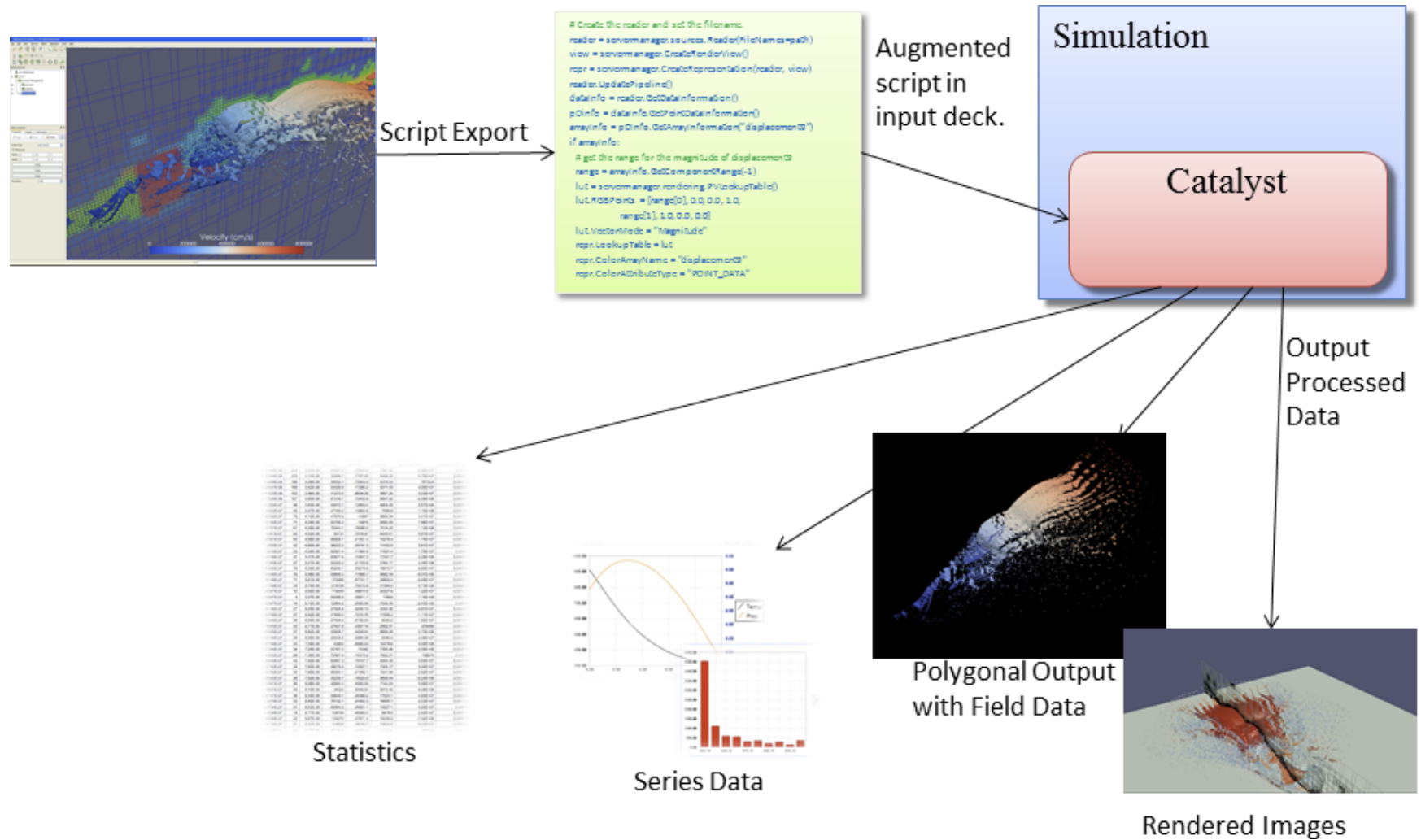


Image: <http://www.paraview.org/Wiki/images/0/0f/CatalystFullWorkflow.png>

How to use

Traditional workflow (blue) and ParaView Catalyst enhanced workflow (green):

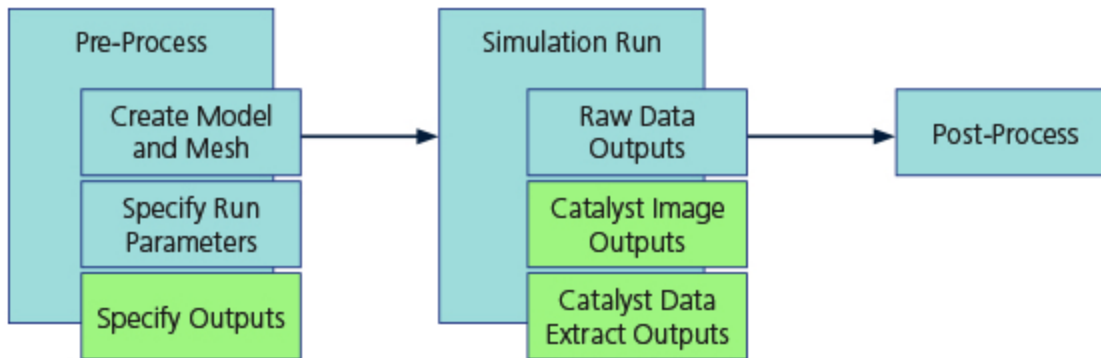


Image: Catalyst User Guide

How to use

Requirements

- ogs-binary build with `OGS_INSITU=ON`
- ParaView with CoProcessing-plugin enabled
- exemplary result data set (e.g. the first timestep output)

Usage

- Load example data set in ParaView, setup filter pipeline, add (parallel) writers
- Export current pipeline as Python script
- Add exported script to OGS simulation project file under `insitu/scripts/script`
- Run simulation

Technical requirements

- VTK dependency is substituted by a special subset of ParaView (*Catalyst edition*)
 - To reduce binary size
 - Contains just a subset of filter (e.g. threshold, contour, clip, cut, glyph, transform, warp)
 - Some additions to the official editions
(`scripts/catalyst/Editions/ogs`)
- Full VTK / ParaView functionality can be used if required

Technical implementation

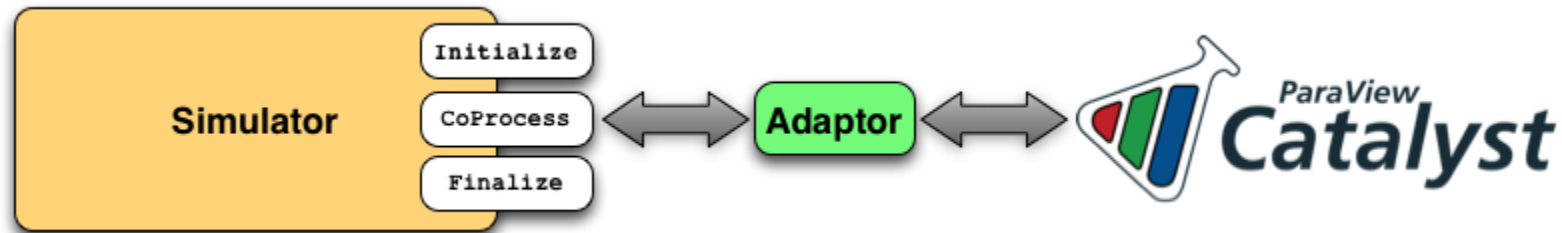


Image: <http://www.paraview.org/in-situ/>

- Defined in `Applications/InSituLib`
- `CoProcess()` is called in `ProcessLib::Output::doOutputAlways()`
- Adapter is `MeshLib::VtkMappedMeshSource` ; providing zero-copy / -overhead access from VTK to OGS mesh data structures
- VTK 7.1 now required; even for `OGS_INSITU=OFF`

Links

- www.paraview.org/in-situ/
- www.paraview.org/files/catalyst/docs/ParaViewCatalystUsersGuide_v2.pdf

Next steps

- Implement a test
- Try with a real-world HPC simulation example (TBMOD)
- Create an eve / envinf1 `module` to use prebuilt ogs-binary
- Get OGS on <http://www.paraview.org/catalyst-adaptors/>