

Date: 1/4/2019

To: James Ahrens

cc: David Pugmire, Berk Geveci, Robert Maynard, Hank Childs

From: Kenneth Moreland, WBS 2.3.4.13 / ECP/VTK-m

Milestone Deliverable – STDA05-17

Milestone Due Date: December 31, 2018

Milestone Completion Date: <date milestone was completed>

Description of Milestone:

The STDA05-17 milestone comprises the following 3 deliverables.

VTK-m Release 2 We will provide a release of VTK-m software and associated documentation. The source code repository will be tagged at a stable state, and, at a minimum, tarball captures of the source code will be made available from the web site. A version of the VTK-m User’s Guide documenting this release will also be made available.

Productionize zfp compression The “ZFP: Compressed Floating-Point Arrays” project (WBS 1.3.4.13) is creating an implementation of ZFP compression in VTK-m. Their implementation will be focused on operating in CUDA. The VTK-m project will assist by generalizing the implementation to other devices (such as multi-core CPUs). We will also assist in productionizing the code such that it can be used by external projects and products.

Clip Clip operations intersect meshes with implicit functions. It is the foundation of spatial subsetting algorithms, such as “box,” and the foundation of data-based subsetting, such as “isovolume.” The algorithm requires considering thousands of possible cases, and is thus quite difficult to implement. This milestone will implement clipping to be sufficient for VisIt’s and ParaView’s needs.

Completion Proof of the Milestone:

The predefined objective completion criteria of this milestone for all the deliverables were the following items:

- Implementation is merged to the master branch of the central VTK-m repository.
- The VTK-m User’s Guide is updated to the new behavior.

In addition, the VTK-m release requires a dedicated revision of the User’s Guide.

The following table provides evidence for each implemented feature with links to the completed merge requests (evidence that the implementation is merged into the master branch) and a link to the excerpt from the VTK-m User’s Guide documenting the feature.

Deliverable	Merge Requests	Documentation
VTK-m Release 2	There are too many merge requests to list independently, but an overview of the major changes for VTK-m 1.3 (the release for this deliverable) is given at https://gitlab.kitware.com/vtk/vtk-m/tags/v1.3.0 .	http://m.vtk.org/images/a/a4/VTKmUsersGuide-1-3.pdf
Production zfp compression	<ul style="list-style-type: none"> ZFP productization (!1482) 	https://jiraexascaleproject.org/secur/attachment/15445/15445_ZFP+Pages+from+VTKmUsersGuide.pdf
Clip	<ul style="list-style-type: none"> Visit clipping (!1476) 	<ul style="list-style-type: none"> https://jiraexascaleproject.org/secur/attachment/15394/15394_Clip+with+Implicit+Function+Pages+from+VTKmUsersGuide.pdf https://jiraexascaleproject.org/secur/attachment/15396/15396_Clip+with+Field+Pages+from+VTKmUsersGuide-2.pdf

Tasks to Complete the Milestone:

In the case for each of the deliverables, implementation started in a private topic branch. That branch was later submitted as a merge request where the code was run through regression tests across multiple test platforms. The merge requests were also subjected to human reviewers for approval. After necessary modifications were made, the code was merged to VTK-m's master branch. Subsequently, documentation was written for the VTK-m User's Guide.

Person(s) Responsible for Completing the Milestone:

Kenneth Moreland, David Pugmire, Berk Geveci, Robert Maynard, Hank Childs

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.
SAND2018-XXXX R