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Prototying an in-situ visualisation mini-app for the LFRic project

Friday, 28 September 2018 09:00 (30 minutes)

This talk will provide an overview of work done as part of a collaboration between the Met Office and NIWA to create a prototype LFRic mini-app that uses Paraview with the Catalyst library for in-situ visualisation. The Met Office LFRic project is developing a software infrastructure to support the replacement for the Met Office Unified Model (UM). This new model will deliver the Met Office's operational weather forecasting and climate capabilities on the HPC platforms of the next decade. Key requirements are scalability and ability to efficiently deploy to different hardware architectures in preparation for exascale regimes. When considering future massively parallel, high resolution outputs, I/O is a serious potential bottleneck. In-situ analytics and visualisation as part of a modelling workflow therefore makes sense as we can do much of the post-processing work while the data is still 'hot'. Our Catalyst mini-app enables visualisation of LFRic fields with 'on-the-fly' conversion of mesh and data from LFRic's internal data structures to Paraview/VTK data structures while the model simulation is running. Parallel image rendering on compute nodes (using the MPI decomposition defined by the LFRic infrastructure) is also supported. Workflows on user desktops as well as HPC are possible with a range of end-user interactions. For example, a full Python pipeline enabling customisation of visualisation scripts without writing significant code and also 'live' operation where end users can interact with a running simulation via Paraview.

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