Contribution ID: **171**   Type: **Talk**

Reducing Data Movement Through Derived Quantity Generation

Tuesday, 3 December 2024 15:30 (20 minutes)

Learning from scientific simulations often relies not on the raw quantities calculated, but instead from derived values. For example, air pressures in a weather simulation in isolation are not as interesting as the air pressure gradient. If the gradients are roughly parallel, you have straight-line winds. If the gradient is rotating around a point, it is a cyclone storm. Other uses, such as reducing from a complex multi-quantity 3D model into a 2D representation for the actual value required for analysis can radically reduce data movement from the large computational system to the local analysis system. We have built tools that enable automatically calculating these derived quantities as part of normal simulation output to enable extracting the derived quantities for movement to a different machine and other purposes.

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Session Classification: HPC Technology

Track Classification: Storage and IO