

Green computing toward SKA era with RICK

Tuesday 15 October 2024 15:20 (20 minutes)

Square Kilometer Array is expected to generate hundreds of petabytes of data per year, two orders of magnitude more than current radio interferometers. Data processing at this scale necessitates advanced High Performance Computing (HPC) resources. However, modern HPC platforms consume up to tens of MW , i.e. megawatts, and energy-to-solution in algorithms will become of utmost importance in the next future. In this work we study the trade-off between energy-to-solution and time-to-solution of our `RICK` (Radio Imaging Code Kernels), which is a novel approach to implement the w -stacking algorithm designed to run on state-of-the-art HPC systems. The code can run on heterogeneous systems exploiting the accelerators. We did both single-node tests and multi-node tests with both CPU and GPU solutions, in order to study which one is the greenest and which one is the fastest. We then defined the `green productivity`, i.e. a quantity which relates energy-to-solution and time-to-solution in different code configurations compared to a reference one. Configurations with the highest green productivities are the most efficient ones. The tests have been run on the Setonix machine available at the Pawsey Supercomputing Research Centre (PSC) in Perth (WA), ranked as 28th in Top500^{footnote}[list](https://top500.org/lists/top500/list/2024/06/), updated at June 2024.

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Session Classification: Session 6