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Task-based distribted processing for radio-interferometric imaging with CASA

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Task-based structuring of data processing has a long tradition in radio astronomy. Originally this architecture was driven by very high ratio of input data volume to working memory size and the tasks almost always had sequential dependencies, hence forming a pipeline. With recent rapid increase of number of baselines, bandwidths (and in some cases beams) with which interferometric data are recorded there is an increasing interest parallelising and distribution radio astronomy processing using tasks. The SKA Science Data Processor architecture, for example, is acutely dependent on such task based distribution schemes. I will explain the motivation for these approaches and some of the challenges.

In second half of the talk I will present the architecture of a task-based parallelisation system for CASA built on top of the SWIFT/T framework. This parallelisation system is now in use in Cambridge for imaging-based processing and calibration of data from the Hydrogen Epoch of Reionization Array (HERA) telescope, an official SKA precursor telescope.

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