

Co-design for the SKA project

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Radio-telescopes cover wide frequency bands and make extensive use of interferometry. This leads to the production of large volumes of data and calls for considerable processing. As a consequence of the limited material possibility to store the raw data, the SKA project has decided to incorporate the processing facilities to the telescopes. Two supercomputers, one for each telescope, are hence envisaged to ingest an expected representative flow of 0.77 TB/s and carry out preliminary data reduction tasks both to reduce the volume of data and yield science products. Preconstruction work has led to a concept based on a homogeneous set of nodes processing data on-the-fly or on-demand within a few days. This distinction stems from the need to provide operational feedback and average the computing load which peaks at an estimated 125 PFlops but averages out to 10 PFlops. Generic COTS systems have hitherto been considered to maximise versatility and refrain from specialising software development. However significant risks have been identified concerning cost for procurement and operations. I will present the co-design exercise which is on-going to mitigate this. In this frame, with the advent of high level synthesis, FPGAs with their higher resource utilisation and lower operating frequencies could become an option, notably for on-the-fly tasks, in-networking processing or as accelerators for selected calculation, should the risk/benefit ratio prove favourable.

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