PULSAR SIGNAL PROCESSORS ENABLED BY CASPER

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The Effelsberg 100m Radio Telescope carries out astronomical observations over a range of radio frequencies in the 50cm–3mm wavelengths. The telescope is used for pulsar observations for over 35% of total time available for astronomical observations. Radio pulsars themselves are used as tools to test fundamental physics and this is best addressed by high signal-to-noise ratio pulsar observations. The achievable S/N to pulsar signals is proportional to the collecting area of the telescope and their receiver bandwidths. In order to observe pulsars with newer and wider band receivers, we have developed two generations of pulsar signal processor gateware based on hardware and toolflow developed by the CASPER community. The gateware were designed to support both baseband (up to 1ns time resolution) and spectro-polarimetric data with a programmable sample width of 16μs or more. Using a distributed storage system, and high performance networking equipment, we can can now routinely support observations with a data rate of up to 2 GB/s. In this talk, I will outline these systems and some recent results.