Case Study:
Australian SKA RFI Site Testing

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An international consortium representing more than 15 countries including the European Union, the USA, Australia, Canada, China, India and South Africa has been established to research the viability of a very large telescope array that will enable astronomers to see the formation of the early universe, including the emergence of the first stars. With 100 times the sensitivity of existing telescopes, the proposed Square Kilometre Array (SKA) will revolutionize many areas of astronomy and also make unique contributions to basic physics, including some extreme predictions of general relativity.

The Australia National Telescope Facility of the Commonwealth Science Industrial Research Organisation required a custom system to acquire, analyse and present data from the RF spectrum at the candidate site in WA as well as store 1.3Tb to secure storage.

The Solution

The ATNF requested a system to satisfy the international high sensitivity SKA measurement protocol and be suitably robust to run reliably in unattended operation for weeks at a time in some of the most remote areas of Australia. Neo Vista System Integrators Pty Ltd (NVSI) created a custom system based primarily on a Rohde and Schwarz frequency spectrum analyser (FSA), and a gigabit Ethernet link to a client notebook PC running Microsoft Windows XP. The FSA was controlled by the custom software suite created using the National Instruments' LabVIEW professional development system. The user was able to perform calibrations and define frequency scans. A typical frequency scan had a user-definable start and stop frequency, as well as resolution bandwidth. The scan could be completed by defining either a number of sweeps to perform or a static stop time. Acquiring approximately 6Mb for each discrete sweep point, tests of up to 40Gb were committed to a local SQL database residing on a portable USB2.0 drive attached to the client laptop PC using stored SQL procedures and calls written by NVSI. Average amplitude, minimum, maximum, mean and median values at each selected frequency step can be calculated for system confidence checks in the field.

Once connected to the corporate network, the data was then uploaded through the software to a network storage device for further offline statistical analysis.

NVSI was able to assist the ATNF to exploit the power of the SQL database environment, while benefiting from the rapid development capabilities of National Instruments' LabVIEW.

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