The separation of collected data, from the geometry of instrument setup has proven to be a core strength in the Mantid Framework. Converting units, performing calibration and numerous other post-acquisition activities, are made possible though the virtual instrument concepts that Mantid supports. While the concept is very successful, the core design and implementation are showing signs of stress, and recent profiling work reveals that the current virtual instrument is far from optimal in may of the common situations in which we now use it.

The Mantid team is currently in the process ratifying a novel and fundamentally different design for the virtual instrument. We explore the requirements that have led us towards this new solution, as well as providing a detailed look at the solution itself. Replacement of the existing instrument with the new version will represent a major engineering challenge; we will present our plans for tackling this difficult upgrade task.