**Deep integration with Python – The new Mantid Python API**

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Python was chosen for the scripting interface within Mantid due to its ease of use, solid reliability and wealth of pre-defined packages, such as numpy, to provide users with additionally functionality that would not need to be written from scratch.

Mantid version 1.x contained a Python API that provided users with the ability to automate their reduction tasks but the API was not the most intuitive to use. While Mantid was gaining ground in usage across ISIS & ORNL a consultation was started with existing users with the aim of improving the long-term usability of the interface. Mantid version 2.0 saw the introduction of a new Python interface that retains the abilities to let users write complex processing scripts that mix the Mantid API with any available Python package. The new API is now far simpler and intuitive so that it can be used in an interactive manner without having to remember a complex set of commands.

In addition to providing a much improved interface, v2 contains deeper connections between Mantid's C++ layer and Python. Examples of such bindings are:

* Wrapping of Mantid arrays with numpy at the C++ level to avoid excessive copying when accessing data;
* Converting C++ types to Python types using the Python C API, i.e. vector → list;
* Integrating IPython within MantidPlot to provide a powerful script interpreter.

This poster will focus on providing descriptions of some of the more complex bindings along with reasons why it is felt that the effort is worthwhile.

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