Adventures with Automatic Code Transformations

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The end of Moore’s Law performance scaling for individual threads has led to a massive increase in the amount of parallelism employed to achieve performance increases. For example, the Met Office’s new Cray XC40 systems will eventually have almost half a million cores in total. A (semi) automatic approach to code transformations is outlined for legacy (UM) and new (Gung Ho) code, undertaken to obtain some of the possible performance available. Moreover, diverse architectures such as CPU, Xeon Phi and GPU can be targeted from single source base. Some preliminary results will be presented.