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From Cluster to Grid Computing: An Introduction

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PC clusters have provided a cheaper solution for the continuing demand for greater computational speed in areas including numerical modeling and simulation of scientific and engineering problems. Recent advances in high-speed network connectivity also enable the sharing of geographically distributed computational resources using an infrastructure called computational grids, which in turn increases further the computational power available to researchers. To harness this potential, a different programming strategy becomes necessary. Writing programs in these platforms is known as parallel programming, where the overall problem is split into several parts each of which is performed by a separate computational node and in parallel. In this lecture, I will introduce parallel programming using the message-passing interface (MPI) on a PC cluster platform. The approach will then be extended on a grid-computing platform.