

# The Globus Toolkit for Grid Computing

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## Abstract

This tutorial is a practical introduction to programming for high-performance distributed computing systems, or "computational grids," and the capabilities of the Globus grid toolkit.

Emerging high-performance networks promise to enable a wide range of emerging application concepts such as remote computing, distributed supercomputing, tele-immersion, smart instruments, and data mining. However, the development and use of such applications is in practice very difficult and time consuming, because of the need to deal with complex and highly heterogeneous systems. The Globus grid programming toolkit is designed to help application developers and tool builders overcome these obstacles to the construction of "grid-enabled" scientific and engineering applications. It does this by providing a set of standard services for authentication, resource location, resource allocation, configuration, communication, file access, fault detection, and executable management. These services can be incorporated into applications and/or programming tools in a "mix-and-match" fashion to provide access to needed capabilities.

The tutorial covers three topics. First, we review basic principles of Grid computing and requirements for Grid architecture, describing the key protocols and services required. Then, we introduce the capabilities of the Globus toolkit. Finally, we show how Globus services can be applied in specific applications, examining in particular Data Grid, remote instrumentation, and distributed computing examples.

For more information on Globus, see <http://www.globus.org>.