

## **MCAPI Programming**

### **Course Summary**

#### **Description**

This course covers concepts and approaches related to the design and implementation of multicore software using MCAPI, a standard lightweight communications API created by the Multicore Association and defined for closely distributed (multiple cores on a chip and/or chips on a board) embedded systems. MCAPI captures the basic elements of communication and synchronization that are required for such systems, simplifying the migration of applications from a single core to multicore. Ultimately, MCAPI provides a simple, efficient, and consistent multicore programming model across different types and numbers of cores, operating systems, and physical transports.

#### **Objectives**

At the end of this course, students will be able to:

- Introduce multicore standardization issues and why MCAPI benefits system developers (e.g., API for source level portability, small footprint, scalable to one or many cores, allows for more complex functionality on top).
- Learn to leverage open standards and produce programs that take advantage of multicore processors on heterogeneous and homogenous systems.
- Provide in-depth overview of MCAPI fundamentals and operations.
- Explain the functional areas of MCAPI: topology management, modes of communication (connectionless messages, connected channels, packet channels, and scalar channels), non-blocking management, and error handling.
- Analyze MCAPI case studies to better understand the MCAPI programming model.
- Examine programming methods that rely on message passing and shared memory and understand the key API features.
- Discuss strategies that make the most of MCAPI during the migration process, including load balancing, minimizing communication overhead, and shared memory communication versus computation.
- Understand and use MCAPI code templates to further simplify communication between cores on one or more chips when migrating applications.
- Provide hands-on experience with PolyCore Software MCAPI tools to learn how to remap and reconfigure without changing the application's source code.
- Conduct labs that allow students to try many configurations in a short period of time, a highlight of the PolyCore MCAPI tools.

#### **Audience**

This course is designed for system and software architects, developers, team leaders and managers seeking to understand and implement software using MCAPI. Knowledge of the C/C++ programming language and intermediate C/C++ software development experience is a pre-requisite for this course.

#### **Duration**

Two days

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