

Addressing Multicore Communication Challenges Using NoC Technology

Drew Wingard
Sonics, Inc.

Abstract

The need for application performance at acceptable power densities and energies has led to increasing use of multicore processor architectures across a wide range of end markets. While some designs focus on a single tightly-coupled cluster of a few homogeneous CPU's, many multicore implementations in the embedded markets use heterogeneous processing architectures to optimize cost, performance, and energy.

Appropriate use of networking technology appears to be an attractive approach to address the functional and scaling issues in loosely-coupled heterogeneous multicore designs. This paper discusses work in the area of NoC technology, with a specific focus on promising techniques and production designs. We show that the toughest task in NoC design appears to be choosing which techniques to borrow from data and communications networks for the applications.

Biography

Drew Wingard is a founder and the Chief Technical Officer of Sonics, Inc., which has been providing SMART interconnects since 1999. He has been the original architect of Sonics' SiliconBackplane and the original creator of the Open Core Protocol specification. He currently represents Sonics on the Governing Steering Committee of OCP-IP, where he chairs the Specification working group. Prior to founding Sonics, Wingard led the development of advanced circuit and CAD methodology for MicroUnity Systems Engineering, Inc. Previously he had co-founded Pomegranate Technology, where he designed an advanced SIMD multimedia processor. He received a B.S. from the University of Texas, Austin and an M.S. and Ph.D. from Stanford University, all in electrical engineering. While at Stanford, Dr. Wingard's research explored the optimization of design processes between architectural, logical, circuit, and physical design with an emphasis on tools and automation.