

Title: Challenges for Compiler Support for Exascale Computing

Abstract: The compiler is central to the translation of the software we want users to write to the machine code we want to run. The scale of the applications and the choices of programming languages by users greatly complicate the role for the compiler and its analysis. The languages we use frequently don't support rich optimizations because of an inability of the compiler and existing forms of analysis to reason about the safety of such optimizations. Exascale does not change this, and yet many more domain specific transformations may be required to utilize future hardware. The economics of being able to quickly address Exascale specific hardware features and deliver new programming models could lead to new building blocks to support isolated computational domains using a more accessible compiler and runtime technologies for programming models. This talk will address the economics of targeting small audiences, using domain specific compiler support and language extensions and restrictions to support Exascale computing.