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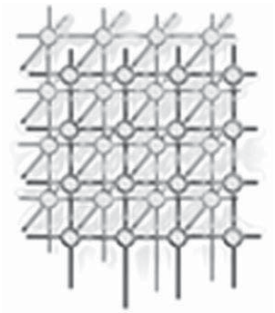
Programming environments for multidisciplinary Grid communities



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SUMMARY

As the power of computational Grids increases, there is a corresponding need for better usability for large and diverse communities. The focus in this paper is on supporting multidisciplinary communities of scientists and engineers. We discuss requirements for Grid computing environments (GCEs) in this context, and describe several core support technologies developed to meet these requirements. Our work extends the notion of a programming environment beyond the compile–schedule–execute paradigm, to include functionality such as collaborative application composition, information services, and data and simulation management. Systems designed for five different applications communities are described. These systems illustrate common needs and characteristics arising in multidisciplinary communities and motivate a high-level design framework for building GCEs that meet those needs. Copyright © 2002 John Wiley & Sons, Ltd.

KEY WORDS: Grid computing environments; problem solving environments; multidisciplinary Grid communities; compositional modeling

1. INTRODUCTION

Grid computing environments (GCEs) have increasingly gained attention in the past few years. Advances in technological infrastructure as well as a better awareness of the needs of application scientists and engineers have been the primary motivating factors. In particular, the shift in emphasis

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