Preface

Middleware systems comprise programming models, abstractions, protocols, and services to facilitate the design, the development, the integration, and the deployment of distributed applications in heterogeneous computing environments. Conceptually, the term "middleware" refers to a layer of software above the networking substrate and the operating system and below the (distributed) application. In practice these boundaries are not clear cut, with middleware functionality moving into and out of these layers. Remote communication, publish/subscribe, messaging, and (distributed) transaction constitute examples of common middleware abstractions and services.

Middleware research encompasses, builds on and extends a wide spectrum of concepts, techniques and ideas from a broad range of fields, including programming languages, distributed systems, operating systems, networking, and data management.

Following the success of the past conferences in this series in the Lake District, UK (1998), in Palisades, NY (2000), in Heidelberg, Germany (2001), and in Rio de Janeiro, Brazil (2003), the 5th International Middleware Conference in Toronto, Canada aimed to be the premier conference for middleware research and technology in 2004. The broad scope of the conference included the design, the implementation, the deployment, and the evaluation of distributed systems platforms and architectures for emerging computing environments. The conference gave an overview of research on middleware for peer-to-peer computing, middleware for mobility, middleware for replication and transactions, on publish/subscribe systems, on routing protocols and overlay networks, on application servers, resource management, and software engineering, and on Web services.

This year, the technical program of Middleware drew from 194 submitted papers, among which 13 were explicitly submitted as work-in-progress papers. At the program committee meeting on Saturday and Sunday, June 5th and 6th in Toronto, 25 research papers and 1 invited paper were selected for presentation at the conference. Two, as research papers designated submissions, were recommended for inclusion in the conference's work-in-progress paper program. The work-in-progress paper committee selected 6 papers among the 13 submitted and the 2 recommended papers for inclusion in the program. The paper selection was based on the papers' technical merit, originality, projected impact on the field, and pertinence to the scope of the conference. Each research paper was reviewed by at least three reviewers. A PC-authored paper (i.e., one or more authors on the paper was a Middleware committee member) was reviewed by at least four reviewers.

Finally, I would like to express my deepest gratitude to the authors of submitted papers, to all program committee members for their active participation in the paper review and selection process, to all external reviewers for their help in evaluating submissions, to Mark Hau and Microsoft Research for providing us

with the Conference Management System and support, and finally to the members of the organizing committee and the steering committee for their efforts towards making Middleware 2004 a successful conference.

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