

Interaction-Oriented Programming: Concepts, Theories, and Results on Commitment Protocols

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Abstract. Unlike traditional information systems, modern systems are *_open_*, consisting of autonomous, heterogeneous parties interacting dynamically. Yet prevalent software techniques make few accommodations for this fundamental change. Multiagent systems are conceptualized for open environments. They give prominence to flexible reasoning and arms-length interactions captured via communications. On the backdrop of multiagent systems, Interaction-Oriented Programming is the idea of programming with interactions as first-class entities instead of, e.g., objects. Protocols are to interactions as classes are to objects: because of their key nature, protocols have obtained a lot of research attention. Modeling protocols suitably for open environments meant modeling their content, not just the surface communications. In a number of important cases, such as business processes and organizations, the content is best understood using the notion of commitments of an agent to another agent in an appropriate context. Our theory of protocols supports flexible enactment of protocols, a treatment of refinement and composition of protocols, and their relationship with organizations and contracts, thus reducing the gap between agents and conventional computer science. This talk will review the key concepts, theories, and results on commitment protocols, and some important challenges that remain..

Bio

Dr. Munindar P. Singh is a professor in the department of computer science at North Carolina State University. From 1989 through 1995, he was with the Microelectronics and Computer Technology Corporation (MCC). Munindar's research interests include multiagent systems and service-oriented computing, wherein he specifically addresses the challenges of trust, service discovery, and business processes and protocols in large-scale open environments. Munindar is widely published and cited. Munindar's 1994 book *Multiagent Systems*, was published by Springer-Verlag. He coedited *Readings in Agents*, which was published by Morgan Kaufmann in 1998. Munindar edited the *Practical Handbook of Internet Computing* published by Chapman & Hall / CRC Press in October 2004 and coauthored a new text, *Service-Oriented Computing* published by Wiley in January 2005. Munindar cochaired the 2005 edition of AAMAS, the International Joint Conference of Autonomous Agents and MultiAgent Systems. He serves on the Board of Directors of the newly synthesized IFAAMAS, the International Foundation of Autonomous

Agents and MultiAgent Systems. Munindar was the editor-in-chief of IEEE Internet Computing from 1999 to 2002 and continues to serve on its editorial board. He is also a founding member of the editorial boards of the Journal of Autonomous Agents and Multiagent Systems, the Journal of Web Semantics, the International Journal of Agent-Oriented Software Engineering, and the Journal of Service-Oriented Computing and Applications. Munindar's research has been recognized with awards and sponsorship by the National Science Foundation, DARPA, IBM, Cisco Systems, and Ericsson. Munindar obtained a B.Tech. in Computer Science and Engineering from the Indian Institute of Technology, Delhi in 1986 and a Ph.D. in Computer Sciences from the University of Texas at Austin in 1993.