

Formal Model of Governance: Policies, Accountability, Data, Traceability

Munindar P. Singh

Gap Analysis and Challenge

Major business and regulatory trends speak to the importance of governance for data and processes. Major IT trends, especially increasing availability and use of data for automated processes, speak both to the opportunity to support governance and increased risks of doing so inadequately. Yet, current governance models are limited, rigid, require excessive human intervention, and do not lend themselves to proper formalization and automation, such as in decision making and in compliance checking.

The AnormA Approach: Interaction, Autonomy, Data-Centrism, Norms

I am developing AnormA, a novel approach that fundamentally goes beyond traditional thinking. First, AnormA offers high-level abstractions for governance centered on a formal mathematical model based on norms. Second, these abstractions characterize compliance and accountability while recognizing the autonomous decision-making of the concerned parties. Third, AnormA provides a query language that computes governance status based on enterprise data. I have applied precursors of AnormA on foreign exchange transactions and scientific collaboration.

Research Proposal

The proposed project will identify and formalize significant governance scenarios arising in industry as a basis for extending AnormA. Specific directions include (1) defining key performance indicators (KPIs) as metrics derived from norms and (2) defining analytics for determining who is accountable based on observed events. Results from this project would inform standards and architectures for governance.

Biographical Sketch

Munindar P. Singh is a professor in the Department of Computer Science at North Carolina State University. He has authored several papers and a book *Service-Oriented Computing*; his advisees have earned 20 PhD and 27 MS degrees. Munindar is a Fellow of the IEEE and received the 2015 NCSU Outstanding Research Achievement Award. His research has been recognized with awards and sponsorship by (alphabetically) Army Research Lab, Army Research Office, Cisco Systems, Consortium for Ocean Leadership, DARPA, Ericsson, IBM, Intel, National Science Foundation, National Security Agency, and Xerox. Munindar is the editor-in-chief of *ACM Transactions on Internet Technology*; previously, he was the editor-in-chief of *IEEE Internet Computing*. He has chaired various research events and been associate editor for several journals.