

Assessment of the Trustworthiness and Dependability of Cloud Services

Dr. Bret Michael

Abstract

Users of cloud services need have some ability to specify, monitor, and gauge the level of trustworthiness and dependability afforded by those services. However, enabling the individual user or an enterprise's professional information technology staff to do so is frustrated by impediments such as: inter-service interference and interference among cloud services, on-premises services, and legacy non-cloud systems; poor visibility on the user's part of the management and control of cloud services; lack of standardization of cloud-service interfaces; difficulties in measuring at the right level of granularity the frequency and context of usage of cloud services in a environment in which the services themselves affect the evolution of an enterprise's business-process workflows; the interaction of dynamic provisioning and access to those cloud services via mobile apps; and many unknowns about how to specify service-level agreements such that they can be understood by both the user and provider of the service as well as enforced. In short, cloud services can exacerbate problems with assessment of information systems and can also introduce cloud-specific problems for assessment. The speaker will discuss tactics, as part of an overall cloud-adoption strategy, for addressing these challenges, with the aim of providing the user with ability to incrementally build a systematic, formal process and means for conducting verification, validation, certification, and accreditation of systems composed of cloud. Examples will be given for reliability, security, and safety.

Speaker Bio

Dr. Michael is a Professor of Computer Science and Electrical Engineering at the Naval Postgraduate School. His research addresses the development and assessment of trustworthy large-scale distributed systems, such as: frameworks for applying lightweight formal methods in computer-assisted verification and validation of systems, methods for conducting safety analyses of systems of systems, and specification and refinement of security and reliability policy for cloud computing. His other area of research is in cyber conflict, with an emphasis on investigating avenues for achieving deterrence, operational arms control, and collective defense in cyberspace. Prior to joining the Naval Postgraduate School he was an Assistant Research Engineer at the University of California at Berkeley and Visiting Scholar at the Institut National de Recherche sur les Transports et leur Sécurité (Lyon, France), conducting research on advanced vehicle control and safety systems. He began his career as a Formal Methods Engineer at Argonne National Laboratory and as a Member of the Research Staff at the Institute for Defense Analyses, conducting applied research in software engineering. In addition to his leadership roles within the IEEE Reliability and Computer societies, Professor Michael serves on several U.S. government and international steering committees and working groups, including a member of Government Steering Committee of the DoD Information Assurance Technology Analysis Center, the Lead Technical Advisor to the Group of Experts for the Tallinn Manual on the Law of Armed Conflict in Cyberspace, and the EastWest Institute's working group supporting the Russia-U.S. Bilateral on Critical Infrastructure Protection. He has also

been active in software engineering education, most recently helping lead the development of a reference curriculum for graduate degree programs in software engineering (<http://www.gswe2009.org/>). He is an Associate Editor of the IEEE Systems Journal and formerly an Associate Editor-in-Chief of IEEE Security & Privacy magazine and Associate Editor of the Journal of Information & Management. He received his Ph.D. degree from George Mason University in 1993 and completed post-doctoral studies in National Security Law at the University of Virginia's Center for National Security Law in 2003. He is a Senior Member of the IEEE and was awarded the IEEE Reliability Society's Engineer of the Year Award.