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Achieving Predictability in Large-scale Distributed Systems

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Abstract:

Large-scale distributed systems such as volunteer Grids, clouds, and P2P systems consist of large number of loosely coupled nodes contributing computational, storage, and network resources for deploying large-scale applications. While these systems are attractive due to their scalability and low cost of deployment, they are inherently heterogeneous and unreliable, leading to several challenges in their predictable and reliable usage. In this talk, I will present two resource management techniques designed towards making these systems more predictable for applications: reputation-based scheduling and resource bundles. Reputation-based scheduling is a scheduling technique that provides a desired reliability to applications, irrespective of the actual reliability of the underlying infrastructure. Resource bundles are an aggregation-based resource discovery mechanism designed to provide statistical guarantees on resource availability. I will present performance results for these techniques obtained through simulations as well as through experiments conducted on a live PlanetLab testbed.

Bio:

Abhishek Chandra is an Assistant Professor in the Department of Computer Science and Engineering at the University of Minnesota-Twin Cities. His research interests are in the areas of Operating Systems, Distributed Systems, and Computer Networks. He received his B.Tech. degree in Computer Science and Engineering from IIT Kanpur in 1997, and M.S. and PhD degrees in Computer Science from the University of Massachusetts Amherst in 2000 and 2005 respectively. He won the US National Science Foundation (NSF) CAREER Award in 2007. His PhD dissertation titled "Resource Allocation for Self-Managing Servers" was nominated for the ACM Dissertation Award in 2005, and he was a co-author on the Best Student Paper at IEEE ICAC'05. He is a professional member of ACM, IEEE, and USENIX.

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