Ananth I. Sundararaj, Ph.D.

Microsoft Corporation
One Microsoft Way
Redmond, WA 98052
http://www.cs.northwestern.edu/~ais

Research Interests

My research interests lie in the broad areas of computer networks and distributed systems with a focus on distributed computing using virtual machines and Internet technologies and applications. In particular, I am interested in creating adaptive virtual execution environments capable of supporting high performance distributed applications. I am also interested in the design, analysis, theory and implementation of inter-process communication protocol standardization suites, such as congestion control in TCP/IP networks.

Education

Sep 02 – Dec 06 **Northwestern University, Evanston, IL**
Ph.D. in Computer Science
Thesis: Automatic, Run-time and Dynamic Adaptation of Distributed Applications Executing in Virtual Environments
Advisor: Dr. Peter A. Dinda

Aug 00 – May 02 **Stevens Institute of Technology, Hoboken, NJ**
M.S. in Computer Science
Thesis: Analytical Characterization of the Throughput of a Split TCP Connection
Advisor: Dr. Dan Duchamp

Aug 96 – July 00 **Manipal Institute of Technology, Manipal, India**
Bachelor of Engineering (B.E.) in Computer Science and Engineering
Thesis: One Pass Code Generation Using Recursive Descent Parser-Like Technique

Work Experience

Jan 07 – Present **Microsoft Corporation, Redmond, WA**
Program Manager, Microsoft Business Division (MBD)

Jun 06 – Dec 06 **Intel Corporation, Hillsboro, OR**
Research Scientist Intern, Corporate Technology Group
- Researched automated optimization of virtual networks interconnecting pools of virtual machines

Apr 04 – Jun 06 **Northwestern University, Evanston, IL**
Graduate Research Assistant to Prof. Peter A. Dinda
- Researched automatic, run-time and dynamic adaptation of distributed applications executing in virtual environments
- http://www.cs.northwestern.edu/~ais/virtuoso.html

Jul 01 – Dec 01 **Stevens Institute of Technology, Hoboken, NJ**
Graduate Research Assistant to Prof. Dan Duchamp
- Developed an analytical characterization for the throughput of a split TCP connection
- http://www.cs.northwestern.edu/~ais/split_tcp.html

Teaching

Apr 03 – Dec 05 **Northwestern University, Evanston, IL**
Teaching Assistant

- Database Systems (Fall 2005, Fall 2004, Fall 2003)
  - Teaching Evaluation score: **5.85/6.00**
  - Available at: http://www.cs.northwestern.edu/~ais/ctec05.pdf
- Database Management and Information Processing (Spring 2003)

Aug 00 – Jun 02 **Stevens Institute of Technology, Hoboken, NJ**
Teaching Assistant

- Compiler Design (Spring 2002)
- Data Structures and Algorithms (Spring 2001)
- Logic of Program Design (Fall 2000)

Publications

Journal Papers

1. B. Lin, **A. Sundararaj,** and P. Dinda, "*Time-sharing Parallel Applications Through Performance-targeted Feedback-controlled Real-time Scheduling*". Cluster Computing: Journal of Software, Network and Applications, Volume 11, Number 3. September 2008.
2. B. Lin, **A. Sundararaj**, and P. Dinda, *"Time-sharing Parallel Applications With Performance Isolation and Control"*, Proceedings of IEEE International Conference on Autonomic Computing (ICAC) 2007.

Peer Reviewed Conference and Workshop Publications

3. **A. Sundararaj**, M. Sanghi, J. Lange and P. Dinda, "*Hardness of Approximation and A Greedy Algorithm for Adaptive Virtual Environments*", (Short Paper and Poster) Proceedings of IEEE International Conference on Autonomic Computing (ICAC) 2006. (**3 citations)**
4. A. Gupta, M. Zangrilli, **A. Sundararaj**, A. Huang, P. Dinda, and B. Lowekamp, *"Free Network Measurement for Adaptive Virtualized Distributed Computing"*, Proceedings of IEEE International Parallel & Distributed Processing Symposium (IPDPS) 2006. (**Acceptance Rate: 22%**) **(11 citations)**
5. **A. Sundararaj**, M. Sanghi, J. Lange, P. Dinda, "*An Optimization Problem in Adaptive Virtual Environments*", **ACM SIGMETRICS** Performance Evaluation Review Journal, Volume 33, Number 2. (**Acceptance rate: 12%**) (**6 citations**)
6. A. Gupta, M. Zangrilli, **A. Sundararaj**, P. Dinda, and B. Lowekamp, *"Free Network Measurement for Adaptive Virtualized Distributed Computing"* (Poster), Proceedings of ACM/IEEE SC 2005 (Supercomputing). (**Acceptance Rate: 25%**) (**11 citations)**
7. **A. Sundararaj**, M. Sanghi, J. Lange, P. Dinda, "*An Optimization Problem in Adaptive Virtual Environments*", Proceedings of the **ACM SIGMETRICS** Seventh Workshop on Mathematical Performance Modeling and Analysis (MAMA 05), June 2005. (Extended version published in ACM SIGMETRICS Journal)
8. **A. Sundararaj**, A. Gupta, P. Dinda, "*Increasing Application Performance in Virtual Environments Through Run-time Inference and Adaptation*", Proceedings of the Fourteenth IEEE International Symposium on High Performance Distributed Computing (HPDC-14), July 2005. (**Acceptance Rate: 14%**) (**30 citations)**
9. J. Lange, **A. Sundararaj**, P. Dinda, "*Automatic Dynamic Run-time Optical Network Reservations*", Proceedings of the Fourteenth IEEE International Symposium on High Performance Distributed Computing (HPDC-14), July 2005. (**Acceptance Rate: 14%**) (**16 citations)**
10. **A. Sundararaj**, A. Gupta, P. Dinda, "*Dynamic Topology Adaptation of Virtual Networks of Virtual Machines"*, Proceedings of the Seventh Workshop on Languages, Compilers and Run-time Support for Scalable Systems (LCR 2004), October 2004. (**Acceptance Rate: 25%**) (**21 citations**)
11. **A. Sundararaj**, P. Dinda, "*Towards Virtual Networks for Virtual Machine Grid Computing*", Proceedings of the third USENIX Conference on Virtual Machine Technology (VM 04), May 2004. (**Acceptance Rate: 30%**) (**86 citations**)

Non-overlapping Technical Reports

12. **A. Sundararaj**, M. Sanghi, J. Lange, P. Dinda, *Hardness of Approximation and Greedy Algorithms for the Adaptation Problem In Virtual Environments*, Technical Report NWU-EECS-06-06, Department of Electrical Engineering and Computer Science, Northwestern University, July, 2006,
13. **A. Sundararaj**, P. Dinda, "*Exploring Inference-based Monitoring of Virtual Machine Resources*", Technical Report NWU-CS-04-31, Department of Computer Science, Northwestern University, February 2004. (**1 citation)**
14. **A. Sundararaj**, D. Duchamp, "*Analytical Characterization of the Throughput of a Split TCP Connection*", Technical Report 2003-04, Department of Computer Science, Stevens Institute of Technology, 2003. (**12 citations**)

Thesis

15. **A. Sundararaj**, "*Automatic, Run-time and Dynamic Adaptation of Distributed Applications Executing in Virtual Environments"*, Ph.D. Dissertation, Department of Electrical Engineering and Computer Science, Northwestern University, December, 2006
16. **A. Sundararaj**, "*Analytical Characterization of the Throughput of a Split TCP Connection"*, M.S. Thesis, Department of Computer Science, Stevens Institute of Technology, May 2002.
17. **A. Sundararaj**, "*Development of Algorithms for Retargetable One Pass Code Generation"*, Bachelor of Engineering (B.E.) Thesis, Department of Computer Science, Manipal Institute of Technology, Manipal, India, July 2000.

Presentations

1. **A. Sundararaj**, "*Automatic Run-time Adaptation in Virtual Execution Environments*", ACM SIGMETRICS Ph.D. Student Forum, Banff, Canada, June 2005.
2. **A. Sundararaj**, A. Gupta, P. Dinda, "*Increasing Application Performance in Virtual Environments Through Run-time Inference and Adaptation*", Proceedings of the Fourteenth IEEE International Symposium on High Performance Distributed Computing (HPDC-14), Research Triangle, NC, July 2005.
3. **A. Sundararaj**, M. Sanghi, J. Lange, P. Dinda, "*An Optimization Problem in Adaptive Virtual Environments*", Proceedings of the ACM SIGMETRICS Seventh Workshop on Mathematical Performance Modeling and Analysis (MAMA 05), Banff, Canada, June 2005.
4. **A. Sundararaj**, A. Gupta, P. Dinda, "*Dynamic Topology Adaptation of Virtual Networks of Virtual Machines"*, Proceedings of the Seventh Workshop on Languages, Compilers and Run-time Support for Scalable Systems (LCR 2004), Houston, TX, October 2004.
5. **A. Sundararaj** P. Dinda, "*Towards Virtual Networks for Virtual Machine Grid Computing*", Proceedings of the third USENIX Conference on Virtual Machine Technology (VM 04), San Jose, CA, May 2004.

Achievements

Sep 05 — **Northwestern Dissertation Year Fellowship**, Nominated
Northwestern University, School of Engineering, Evanston IL
1 among 20 nominated students out of 148 eligible Ph.D. students

Sep 02 — **Walter P. Murphy Fellowship**
Northwestern University, School of Engineering, Evanston IL
Academic Scholarship awarded to 38 out of a class of 145 incoming Ph.D. students

Aug 02 — **Case Prime Fellowship**
Case Western Reserve University, Cleveland, OH
Academic Scholarship awarded to outstanding incoming Ph.D. students, Offered but declined

Jul 00 — **First class with distinction,** Certificate for academic distinction
Manipal Institute of Technology, Manipal, India

Professional Activities and Affiliation

- **Reviewed research papers** for
  - IEEE Transactions on Parallel and Distributed Systems (TPDS), 2006
  - IEEE International Conference on Parallel and Distributed Systems (ICPADS), 2006
  - IEEE International Conference on Autonomic Computing (ICAC), 2006
  - IEEE International Conference on Distributed Computing Systems (ICDCS), 2006
  - IEEE International Symposium on High Performance Distributed Computing (HPDC) 2003, 2005, 2006
  - IEEE International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS) 2005
- Member of ACM (Association of Computing Machinery)