Theophilus Benson

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Research Interests

Quantifying and mitigating the complexity of networked systems and improving the performance, reliability, and management of data centers and clouds.

Education

2008-2012 Ph.D. in Computer Science
University of Wisconsin, Madison
Thesis Title: "New Approaches for Managing Enterprise Networks"
Advisor: Aditya Akella

2006-2008 M.S. in Computer Science
University of Wisconsin, Madison

2000-2004 B.S. in Computer Science
Tufts University
Medford, MA, USA

Awards and Distinctions

2010 Best Paper Award, ACM IMC 2010
2009-2010 IBM Research PhD Fellowship
2009 IBM Research PhD Assistantship
2009 IBM Bravo Award
2009 Top ranked paper at ACM SIGCOMM WREN Workshop
2006, 2011 University of Wisconsin AOF Fellowship

Impact

2011 Cloud Networking Services for Enterprises
Developed a service model for extending IaaS cloud applications with virtual network services, and a system implementation based on Software Defined Networking technologies. These concepts have been adopted and licensed by 2 cloud providers.

2010 Models and Traces for Data Center Traffic
Developed models to analyze data center traces and determine how well popular design assumptions hold under realistic data center workloads. The results from my models have been used by members of the community as guiding principles in the design of data center frameworks. The underlying data center traces have been released to the community for use.

2009 TrafficJam
A packet level traffic generator that I developed to help researchers evaluate data center architectures and techniques. The generator is currently being used by several different research groups.

2008 ConfCap: Configuration Complexity Metrics
A tool that I developed to help network operators visualize routing configuration and policies within their networks. The tool is currently being used by 10 networks. Of the 10 networks, 5 are large universities with over 25,000 users, 3 are private enterprise, and the last 2 are medium sized universities with over 8000 users.

Publications

Conference

2011 "MicroTE: The Case for Fine-Grained Traffic Engineering in Data Centers"
Theophilus Benson, Ashok Anand, Aditya Akella and Ming Zhang.
In Proc. of ACM CoNEXT.

2011 "The Evolution of Network Configuration: A Tale of Two Campuses"
Hyojoon Kim, Theophilus Benson, Aditya Akella and Nick Feamster.
In Proc. of ACM IMC.

2011 "CloudNaaS: A Cloud Networking Platform for Enterprise Applications"
Theophilus Benson, Aditya Akella, Anees Shaikh and Sambit Sahu.
In Proc. of ACM SOCC.

2011 "Demystifying Configuration Challenges and Trade-Offs in Network-based ISP Services"
Theophilus Benson, Aditya Akella and Aman Shaikh.
In Proc. of ACM SIGCOMM.

2010 "Network Traffic Characteristics of Data Centers in the Wild"
Theophilus Benson, Aditya Akella and David Maltz.
In Proc. of ACM IMC.

2010 "A First Look at Problems in the Cloud"
Theophilus Benson, Sambit Sahu, Aditya Akella and Anees Shaikh.
In Proc. of USENIX HotCloud.

2010 "The Case for Fine-Grained Traffic Engineering in Data Centers"
Theophilus Benson, Ashok Anand, Aditya Akella and Ming Zhang.
In Proc. of USENIX INM/WREN.

2009 "Understanding Data Center Traffic Characteristics"
Theophilus Benson, Ashok Anand, Aditya Akella and Ming Zhang.
In Proc. of WREN.

2009 "Mining Policies from Enterprise Network Configuration"
Theophilus Benson, Aditya Akella and David Maltz.
In Proc. of ACM IMC.

2009 "Unraveling the Complexity of Network Management"
Theophilus Benson, Aditya Akella and David Maltz.
In Proc. of USENIX NSDI.

Invited Talks

2011 "Network Traffic Characteristics of Data Centers in the Wild", Cisco.
2010 "Peeking into the Cloud", Clouds10 Workshop, Sydney, Australia.
2010 "Unraveling the Complexity of Network Management", HP Labs.
2009 "Unraveling the Complexity of Network Management", AT&T Research.
2009 "Unraveling the Complexity of Network Management", IBM Research.

Professional Experience

2007-2012 Research Assistant
University of Wisconsin, Madison, Wisconsin USA
2011 Visiting Researcher
AT&T Research, Florham Park, New Jersey USA
2009 Research Intern
IBM Research, Hawthorne, New York USA
2008-2010 Research Intern and Consultant
Microsoft Research, Redmond, Washington USA
2007 Research Intern
IBM Research, Hawthorne, New York USA
2004-2006 Software/Release Engineer
Openratings, Waltham, Massachusetts USA

Teaching Experience

2009 Teaching Assistant, CS838: Rethinking the Internet Architecture
Developed and graded course assignments and projects. Wrote and taught all lectures covering data centers, clouds, and emerging platforms for testing Internet architectures (OpenFlow and NetFPGA).

2009-2010 Teaching Assistant, CS740: Advanced Computer Networks
Supervised 2 groups of 4 students on semester long research projects. Reviewed and graded course research projects. Wrote and taught all lectures covering data centers and clouds.

Patents

2009 "Method and Apparatus for Supporting Near Zero-Touch Application Management in a Cloud with Failures"
Theophilus Benson, Sambit Sahu, Anees Shaikh and Chitra Dorai.
(Pending)

2009 "Method and Apparatus for Managing Peak Workload in a Cloud with Artificial Delays"
Theophilus Benson, Sambit Sahu, Anees Shaikh and Chitra Dorai.
(Pending)

2008 "Method and Apparatus for Enabling Proactive Failure prediction in Network Devices Through Functional Representation of Network Configuration"
Theophilus Benson, Sambit Sahu and Anees Shaikh.
(Pending)

Professional Activities

2007-2011 External Reviewer
ACM CCR, INFOCOM, TON, COMNET

2008 Program Committee
NSF FIND 2008 Student Initiative

2007 Graduate Student Admission Committee
University of Wisconsin, Madison

Current Member of USENIX and ACM

References

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