Curriculum Vitae

Wes J. Lloyd

Assistant Professor, University of Washington - Tacoma
Home Page: http://faculty.washington.edu/wlloyd   Email: wlloyd [at] acm.org

1 Research Interests

My research interests encompass distributed systems and software engineering. I have published research in the areas of cloud computing, virtualization, scientific computing, performance modeling, web/service computing, software metrics, and requirements engineering. I am particularly passionate about the development of data analytics that harness software and system level metrics to better quantify behavior and autonomously manage complex systems.

2 Education

Dec 14	Colorado State University, Fort Collins, Colorado. Ph.D., Computer Science
Dec 01	Virginia Polytechnic Institute and State University, Blacksburg, Virginia. Master of Science, Computer Science and Applications
Dec 97	University of Toledo, Toledo, Ohio. Bachelor of Science, Computer Science Engineering

3 Professional Experience

Sept 16 -	Assistant Professor	Computer Science, Institute of Technology University of Washington - Tacoma
Jul 16 -	Affiliate Faculty	Department of Civil and Environmental Engineering Colorado State University
Jan 15 - Jul 16	Research Scientist	Department of Civil and Environmental Engineering Colorado State University, in cooperation with the US Department of Agriculture, Agricultural Research Services and Natural Resources Conservation Service
Jul 07 – Dec 14	Research Associate	Department of Civil and Environmental Engineering Colorado State University, in cooperation with the US Department of Agriculture, Agricultural Research Services and Natural Resources Conservation Service
Nov 04 – Jul 07	Software Engineer	US Geological Survey and US Fish and Wildlife Service, Fort Collins Science Center, contractor
Jan 03 – Nov 04	Development Manager	Continuing Education Department, Colorado State University
Aug 01 – Dec 02	Software Engineer	Hewlett Packard Fort Collins, Colorado
Aug 00 – Aug 01	Research Assistant	Department of Computer Science, Virginia Tech
May 00 – Aug 00	Intern	IBM Research Triangle Park, North Carolina
Aug 99 – May 00	Teaching Assistant	Department of Computer Science, Virginia Tech

Jan 98 – Jan 00	Soft. Dev. Consultant	Netstar Corporation (Owens Illinois Consultant), Bloomfield Hills, MI
Nov 95 – Jan 98	Software Engineer	Matrix Technologies (Owens Illinois Consultant), Toledo, Ohio
Jun 94 – Nov 95	Instructor/Developer	National Center for Tooling and Precision Components, Toledo, Ohio
Jun 93 – Dec 96	Engineering Technician	The Mack Iron Works Company, Sandusky, Ohio

4 Publications

Publications are listed in reverse chronological order. PDF versions of all published papers and conference presentations are available for download at: http://www.cs.colostate.edu/~wlloyd/research.html

4.1 Journal Papers

[22] Lloyd, W., Pallickara, S., David, O., Arabi, M., Rojas, K., Improving VM Placements to Mitigate Resource Contention and Heterogeneity in Cloud Settings for Scientific Modeling Services. (under preparation)

[21] Dozier, A., David, O., Arabi, M., Lloyd, W., Zhang, Y., A minimally invasive model data passing interface for integrating legacy environmental system models. Submitted to Environmental Modelling & Software. Vol. 80 (6): 265-280. June 2016. Elsevier.

[20] Lloyd, W., Pallickara, S., David, O., Arabi, M., Rojas, K., Wible, T., Ditty, J., Demystifying the Clouds: Harnessing Resource Utilization Models for Cost Effective Infrastructure Alternatives. (To appear) IEEE Transactions on Cloud Computing. 2015.

[19] David, O., Ascough, J., Lloyd, W., Green, T., Rojas, K., Leavesley, G., Ajuha, L., 2013, A software engineering perspective on environmental modeling framework design: The Object Modeling System. Environmental Modelling & Software, Special Issue. vol. 39 (1): 201-213. Jan 2013. Elsevier.

[18] Lloyd, W., Pallickara, S., David, O., Lyon, J., Arabi, M., Rojas, K., 2013, Performance Implications of Multi-Tier Application Deployments on Infrastructure-as-a-Service Clouds: Towards Performance Modeling, Future Generation Computer Systems Journal, Special Issue: Model driven Provisioning of Application Services in Hybrid Computing Environments. vol. 29 (5): 1254-1264. May 2013. Elsevier.

[17] Lloyd, W., David, O., Ascough II, J.C., Rojas, K.W., Carlson, J.R., Leavesley, G.H., Krause, P., Green, T.R., Ahuja, L.R., Environmental modeling framework invasiveness: Analysis and implications. Environmental Modelling & Software 26(10): 1240-1250. 2011. Elsevier.

4.2   Conference and Workshop proceedings

[16]   Lloyd, W., David, O., Arabi, M., Ascough, J.C., Green, T.R., Carlson, J., Rojas, K., The Virtual Machine (VM) Scaler: An Infrastructure Manager Supporting Environmental Modeling on Infrastructure-as-a-Service Clouds, iEMSs 2014 International Congress on Environmental Modeling and Software: Bold Visions for Environmental Modelling, 7th Biennial Meeting (iEMSs 2014), San Diego, CA, USA, June 2014, 8 p.

[15]   David, O., Lloyd, W., Rojas, K., Arabi, M., Geter, F., Carlson, J., Leavesley, G., Ascough II, J.C., Green, T.R., Model as a Service (MaaS) using the Cloud Service Innovation Platform (CSIP), iEMSs 2014 International Congress on Environmental Modeling and Software: Bold Visions for Environmental Modelling, 7th Biennial Meeting (iEMSs 2014), San Diego, CA, USA, June 2014,8p.

[14]   Carlson, J., David, O., Lloyd, W., Leavesley, G., Rojas, R., Green, T., Arabi, M., Yaege, L., Kipka, H., Data Provisioning for the Object Modeling System (OMS), iEMSs 2014 International Congress on Environmental Modeling and Software: Bold Visions for Environmental Modelling, 7th Biennial Meeting (iEMSs 2014), San Diego, CA, USA, June 2014, 8 p.

[13]   Wible, T., Lloyd, W., David, O., Arabi, M., Cyberinfrastructure for Scalable Access to Stream Flow Analysis, iEMSs 2014 International Congress on Environmental Modeling and Software: Bold Visions for Environmental Modelling, 7th Biennial Meeting (iEMSs 2014), San Diego, CA, USA, June 2014, 6 p.

[12]   Lloyd, W., Pallickara, S., David, O., Lyon, j., Arabi, M., Rojas, K., Dynamic Scaling for Service Oriented Applications: Implications of Virtual Machine Placement on IaaS Clouds, Proc. IEEE Conf. On Cloud Engineering (IC2E 2014), Mar 10-24, 2014. [20.9% acceptance rate]

[11]   Lloyd, W., Pallickara, S., David, O., Lyon, j., Arabi, M., Rojas, K., Service Isolation vs. Consolidation: Implications for IaaS Cloud Application Deployment, Proc. IEEE Conf. On Cloud Engineering (IC2E 2013), Mar 25-27, 2013. [20.5% acceptance rate]

[10]   Lloyd, W., David, O., Lyon, J., Rojas, K., Ascough II, J., Green, T., Carlson, R., The Cloud Services Innovation Platform – Enabling Service-Based Environmental Modelling Using Infrastructure-as-a-Service Cloud Computing, International Congress on Environmental Modeling and Software – Managing Resources of a Limited Planet, 6th Biennial Meeting (iEMSs 2012), Leipzig, Germany, July 2012, 8 p.

[9]   Lloyd, W., Pallickara, S., David, O., Lyon, j., Arabi, M., Rojas, K., Performance Modeling to Support Multi-Tier Application Deployment to Infrastructure-as-a-Service Clouds, Proc. 5th IEEE/ACM Int. Conf. on Utility and Cloud Computing (UCC 2012), Nov 5-8, 2012. [27% acceptance rate]

[8] Lloyd, W., Pallickara, S., David, O., Lyon, J., Arabi, M., Rojas, K., Migration of Multi-tier Applications to Infrastructure-as-a-Service Clouds: An Investigation Using Kernel-Based Virtual Machines, Proc. 12th IEEE/ACM Intl. Conf. On Grid Computing (GRID 2011), Lyon, France, Sept 21-23, 2011, pp. 137-143. [29% acceptance rate]

[7] Lloyd, W., David, O., Ascough II, J., et al., Environmental Modeling Framework Invasiveness: Analysis and Implications, In: Swayne, Yang, Voinov, Rizzoli, and Filatova (Eds.), iEMSs 2010 International Congress on Environmental Modeling and Software – Modeling for Environment's Sake, 5th Biennial Meeting, July 2010, Ottawa, Canada, 8 p.

[6] Lloyd, W., David, O., Ascough, J.C., et. al., An Exploratory Investigation on the Invasiveness of Environmental Modeling Frameworks, International Congress on Modeling and Simulation (MODSIM 09), Cairns, Australia, July 2009, 7 p.

[5] Lloyd, W., A Common Criteria Based Approach for COTS Component Selection, 6th annual Young Researcher's Workshop (YRW '04) held in conjunction with GPCE '04, Vancouver, BC, Canada, 2004.

[4] Lloyd, W., M. Rosson, and Arthur, J., Effectiveness of Distributed Requirements Engineering, Proceedings of the IEEE Joint International Requirements Engineering Conference (RE 2002), Essen, Germany September 2002. [17% acceptance rate]

[3] Schoenhoff, P., Henry, S., and Lloyd, W., Software Development Teams Evaluation, Proceedings of the International Conference on Advances in Infrastructure for Electronic Business, Science, and Education on the Internet (SSGRR), L'Aquila, Italy, August 2001.

4.3 PhD Dissertation and Masters Thesis

[2] Autonomous Management of Cost, Performance, and Resource Uncertainty for Migration of Applications to Infrastructure-as-a-Service (IaaS) Clouds. Ph.D. Dissertation, December 2014 Colorado State University. Advisor: Shrideep Pallickara.

[1] Tools and Techniques for Effective Distributed Requirements Engineering: An Empirical Study. Masters Thesis, August 2001 Virginia Tech. Co-Advisor(s): Mary Beth Rosson, Stephen Edwards. Available at: http://scholar.lib.vt.edu/theses/available/etd-07262001-110924/

5 Projects

5.1 The Cloud Services Innovation Platform

The Cloud Services Innovation Platform (CSIP) is a REST/JSON-based Java application framework used to support development of distributed and scalable scientific modeling services. CSIP aims to provide modeling-as-a-service to support both interactive (synchronous) and batch (asynchronous) model runs. CSIP enables cloud-based computing resources to be harnessed for both new and existing environmental models supporting the disaggregation of work into subtasks which execute in parallel using a scalable number of virtual machines. CSIP has been harnessed to deploy both research and operational environmental scientific models for the US Department of Agriculture. Example models include: the Wind Erosion Prediction System (WEPS), the RUSLE2 soil erosion model, the Comprehensive Flow Analysis toolkit, and SWAT-Deg, a stream channel degradation prediction system. CSIP services have been tested and deployed to both public and private Infrastructure-as-a-Service clouds.

5.2 The Virtual Machine Scaler

The VM-Scaler is a REST/JSON-based web services application which supports cloud infrastructure provisioning and management. VM-Scaler harnesses the Amazon Elastic Compute Cloud (EC2) application programming interface to support model-service scalability, cloud management, and infrastructure configuration for supporting service oriented application hosting. VM-Scaler provides "cloud control" while abstracting the underlying IaaS cloud from the end user. VM-Scaler is extensible to support any EC2 compatible cloud and currently supports the Amazon public cloud and Eucalyptus private clouds versions 3.x. VM-Scaler provides a platform to improve scientific model deployment by supporting experimentation with: hot spot detection schemes, VM management and placement approaches, workload profiling techniques, and model job scheduling/proxy services. VM-Scaler has been exercised to scale model services and execute large workloads in the cloud for several research and operational environmental science models used by the US Department of Agriculture.

6 Teaching

I have taught and developed a variety of credit and continuing education courses at Colorado State University, Front Range Community College, and Virginia Tech. Courses where I developed original lecture content are indicated using the § symbol.

6.1 Courses Taught at University of Washington, Tacoma, Washington

Term	Course	Enrollment	Audience
§ Fall 2016	TCSS 422: Operating Systems	35	Undergraduate Course

6.2   Courses Taught at Colorado State University, Fort Collins, Colorado

Term	Course	Enrollment	Audience
§ Fall 2012	CS 555: Distributed Systems, Guest Lecturer	13	Graduate Course
Summer 2004	CS 150: Interactive Java Programming	15	Undergraduate Course
§ Spring 2004	NCT 0793: Intermediate Visual Basic .NET	5	Continuing Education
§ Fall 2003	NCT 0792: Introduction to Visual Basic .NET	5	Continuing Education
§ Summer 2003	NCT 0792: Introduction to Visual Basic .NET	8	Continuing Education
§ Fall 2002	CS 253: Problem Solving in C++	50	Undergraduate course

6.3   Courses Taught at Front Range Community College, Fort Collins, Colorado

Term	Course	Enrollment	Audience
§ Spring 2003	CSC 230: C Programming	20	Undergraduate Course

6.4   Courses Taught at Virginia Tech, Blacksburg, Virginia

Term	Course	Enrollment	Audience
§ Summer 2001	CS 2984: Java Programming	30	Undergraduate Course
§ Fall 2000	CS 4704: Software Engineering Lab	30	Undergraduate Course
§ Spring 2000	CS 4704: Software Engineering Lab	30	Undergraduate Course
Fall 1999	CS 1004: Computer Literacy, Teaching Asst.	50	Undergraduate Course

6.5   Courses Taught at the National Center for Tooling and Precision Components, Toledo, Ohio

Term	Course	Enrollment	Audience
§ Summer 1995	Microsoft Office, 8 sections	10x8	Continuing Education

7 Honors and Awards

2013 IEEE International Conference on Cloud Engineering (IC2E) Travel Grant Award, $400.

2012 Computerworld Honors Laureate project - Winner Economic Development category: "Cloud Services Innovation Platform" (5% award rate, selected from 200 laureate projects)

2007 Special Service Award for Software Development, US Fish and Wildlife Service

Upsilon Pi Epsilon, Computer Science Honor Society, Virginia Tech

Eta Kappa Nu Electrical Engineering and Computer Science Honorary, University of Toledo

Golden Key National Honor Society, University of Toledo

National Dean's List 1997-1998

Top 10% of senior class in engineering, University of Toledo 1997

8 Research Funding

Machine Learning to Improve the Runtime and Availability of the Wind Erosion Prediction System, Wes J. Lloyd (author), with Olaf David. Amazon Web Services Research Grant. $5000. 04/2016-04/2017.

Towards the Next Generation Water Supply Forecasting (EWSF) System harnessing IaaS Clouds, Wes J. Lloyd (author), with Olaf David. Amazon Web Services Research Grant, $5000. 04/2016-04/2017.

Autonomous Scaling of Multitier Soil Erosion Models in IaaS Clouds, Wes J. Lloyd (CO-PI), with Shrideep Pallickara (PI). Amazon Web Services Research Grant. $5000. 3/2014-3/2015

9 Professional and Academic Activity

Conferences

[C5]   Technical Program Committee: 2nd ACM International Workshop of Software-Defined Ecosystems (Big System 2015), Portland, OR. 2015.

[C4]   Reviewer: IEEE/ACM International Conference on Utility and Cloud Computing (UCC 2014). London, UK. 2014.

[C3]   Track Chair, Reviewer: Stream A: Cyberinfrastructure and Cloud Computing for Environmental Modeling, Track A3: Session A3: Innovative Architectures and Approaches of Cloud and Mobile Technology for Environmental Modeling, 7th International Congress on Environmental Modeling and Software (iEMSs 2014). San Diego, CA. 2014.

[C2]   Volunteer: ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA '04). Vancouver, British Columbia, Canada. 2004.

[C1]   Volunteer: ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA '00). Minneapolis, Minnesota. 2000.

Research Presentations

[P8]   University of California, Santa Barbara Computer Science, Research Seminar, Autonomic Management of Cost, Performance, and Resource Uncertainty for Migration of Applications to Infrastructure-as-a-Service (IaaS) Clouds, Pasadena, CA, November 2014.

[P7]   NASA Visit, Jet Propulsion Lab (NASA/JPL) Site Visit, Autonomic Management of Cost, Performance, and Resource Uncertainty for Migration of Applications to Infrastructure-as-a-Service (IaaS) Clouds, Pasadena, CA, November 2014.

[P6]   The Federation for Earth Science Information Partners (ESIP) Summer Meeting, The Virtual Machine Scaler: Supporting Environmental Modeling for the Cloud Services Innovation Platform, Frisco, CO, July 2014.

[P5]   Department of Homeland Security Grant Site Visit, Autonomic Resource Management for Service Oriented Application Migration to Infrastructure-as-a-Service (IaaS) Clouds, Fort Collins, CO, March 2014.

[P4]   IEEE International Conference on Cloud Engineer (IC2E 2014), PhD Symposium, Autonomic Resource Management for Service Oriented Application Migration to Infrastructure-as-a-Service (IaaS) Clouds, Boston, MA, March 2014.

[P3]   EucaDay NYC 2012, Cloud Services Innovation Platform: Enabling Scalable Delivery of Scientific Modeling, New York, NY, Apr 2012.

[P2]   Gov/Cloud 2012, Federal Government Case Studies, Cloud Services Innovation Platform, Washington DC, Feb 2012.

[P1]   Euca Social 2011, held in conjunction with Cloud Expo 2011, Cloud Services Innovation Platform, Santa Clara, CA, Nov 2011.

Review Activities

Reviewer for: the IEEE Transactions on Services Computing Journal, IEEE Transactions on Big Data, the Elsevier Environmental Modeling and Software Journal, the IEEE/ACM Utility and Cloud Computing conference, and the International Congress for Environmental Modeling and Software.

Membership

Association for Computing Machinery (ACM)
Institute of Electrical and Electronics Engineers (IEEE)
Denver Eucalyptus Meetup

Other Service:

Faculty advisor, Colorado State University Outdoor Club, 2007-2016.
Licensed Amateur Radio Operator, KF8BN, since 1988