Matthew P. Bohnsack

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Objective

I would like to use my knowledge of Linux, software development, networks, network security, the web, high performance computing, clusters, massively scalable systems, high performance parallel filesystems, system administration, relational databases, team leadership, and project management to create world-class systems and applications.

Education

- **University of New Mexico** — Albuquerque, NM
  Master of Science in Computer Engineering — *September 2011 (expected)*
- **Iowa State University** — Ames, IA
  Bachelor of Science in Electrical Engineering — *May 1997*
- **North Iowa Area Community College** — Mason City, IA
  Associate of Science in Pre-Engineering — *May 1994*

Work Experience

- **Sandia National Laboratories via CDS, Inc.** — Albuquerque, NM
  Sr. Systems Engineer — *July 2008 – present*
  - Conduct day-to-day monitoring, operation, troubleshooting, development, user support, etc. on Red Sky and other HPC platforms.
  - Designed and implemented a 48-node Windows HPC cluster on Sun/Oracle blade hardware.
  - Designed and implemented a 16-node Windows HPC cluster on HP blade hardware.
  - Tech lead of a team of 10 system engineers who designed and implemented the Red Sky supercomputer: #10 on the November 2009 top500 list with 433.5 TFlop/s. 43,008 cores on a 3D torus using QDR InfiniBand.
  - Designed and implemented a large suite of tools used to manage Red Sky.
- **Pay Lynxs, Inc.** — Albuquerque, NM
  Vice President, Development & Implementations — *Nov 2007 - July 2008*
  - Led team of 12 software developers.
  - Designed and implemented SCM processes and infrastructure, with a continuous integration system, automated testing, and daily build and deployment.
  - Conducted database analysis and feature development work with Java, SQL, Perl, Shell, and Ruby.
- **Sandia National Laboratories via CDS, Inc.** — Albuquerque, NM
  Sr. Systems Engineer — *Jan 2003 – Nov 2007*
  - Architecture, development, and implementation of Linux solutions with emphasis on clusters for high performance and scientific computing.
  - Led the implementation of a database-driven web application to simplify and automate various account creation and deactivation tasks.
  - Led the specification and development of a Ruby on Rails web application used to track lab-wide estimated and actual HPC system usage.
  - Lead developer on computing.sandia.gov, a website to bring all laboratory HPC platform information into one place.
  - Led the design, construction, and validation of a 280-node / 1,120 CPU DDR-InfiniBand cluster that saw 10.3 TFlop/s of Linpack performance.
  - Member of the Thunderbird implementation team: #5 on the top500 list - 8,960 compute node CPUs on SDR InfiniBand.

- Led the design and implementation of a large NIS to LDAP migration.
- Led the implementation of a Linux cluster with 16 AMD Opteron CPUs and Myrinet 2000 interconnect.
- Led a team of three developers on an award-winning large-scale dynamic web application used to track classified media. Application built with Perl, HTML::Mason, Apache, and Oracle.
- Led the implementation of a Linux cluster for the University of New Mexico with 192 PPC970 CPUs using JS20 IBM BladeCenters and Myrinet.
- Designed and led the implementation of a Linux cluster with 256 CPUs, 128 ports of GigE, 128 ports of Myrinet, 10 TB of SAN-connected disk served via GPFS, and a TPeak of 1.5 TFlop/s.
- Supervised the construction of two large data centers.
- Implementation of a 10 TB GPFS storage system with Myrinet, 2 Gb/s Fibre Channel technology, and SATA disks.
- Designed and implemented a 128-node/256-CPU Linux cluster with 2 Gb/s Myrinet interconnect.
- Represented Sandia National Laboratories by participation in the ASCI booth at SC2003.
- Implemented an 8.1 TB GPFS storage system with Myrinet, 2 Gb/s Fibre Channel technology, and Fibre Channel disks.
- Development and deployment of a Condor Pool across more than 300 Linux workstations.
- Designed and implemented a 128-node/256-CPU Linux cluster with 2 Gb/s Myrinet interconnect. Validated system performance by achieving 734.3 GFlop/s in the HPL benchmark.
- Created Sandia-internal web pages for the Infrastructure Computing Systems Department.
- Assisted engineers and scientists in porting their codes to Linux clusters.
- Collaborated in the design and implementation of a 96-port core/edge SAN based on Brocade's 2 Gb/s Fibre Channel technology.
- Designed and implemented the hardware and OS base for a multi-system implementation of SourceForge Enterprise Edition using RedHat Advanced Server 2.1.
- Developed a configurable web-based front-end to PBS and performance monitoring utilities for tracking and recording cluster performance and utilization over time.
- Created health-monitoring scripts that page system administrators when Linux cluster problems are detected.
- Designed, planned, supervised, and implemented a 256-node Linux cluster.

- **International Business Machines (IBM)** Ames, IA (and all over the world)
  Linux Cluster Architect *Feb 2001 – Jan 2003*
  - Architecture, development, and implementation of Linux solutions with emphasis on clusters for high performance/scientific computing and high availability.
  - Created xcat.org as a support site for xCAT users.
  - Contributed code and documentation for xCAT.
  - Did problem determination, developed a fix, and conducted regression tests on a 62-node Linux cluster for Los Alamos National Lab in Los Alamos, New Mexico.
  - Implemented a 32-node cluster with 64 2.4 GHz Pentium Xeon CPUs and Gigabit Ethernet interconnect for Pioneer Hi-Bred in Des Moines, Iowa.
  - Provided Linux cluster consulting to Freddie Mac.
  - Upgrade and customization of 4 clusters with a total of 184 compute nodes for Sandia National Laboratories in Albuquerque, New Mexico.
  - Implemented a 32-node Linux cluster with Myrinet and 600 GB of GPFS storage for the Naval Oceanographic Office at the Stennis Space Center in Mississippi.
  - Designed and implemented a 64-node Linux cluster with Myrinet and 3 TB of storage for Los Alamos National Lab in Los Alamos, New Mexico.
  - Designed and implemented a 32-node Linux cluster with 64 1.4 GHz PIII compute node CPUs, 4 storage nodes with 8 1.4 GHz PIII CPUs, 4 separate networks including Gigabit Ethernet, and 2 TB of Fibre Channel GPFS storage for the University of Notre Dame in South Bend, Indiana.
  - Designed, build, configured, integrated, and tested 8, 16, 32, and 128-node Linux clusters for Sandia National Laboratories in Albuquerque, New Mexico.
  - Developed an internal website for Lucent to track a Linux on S/390 project.

- Contributed to the development of responses to several large cluster RFPs, including RFPs from a number of National Laboratories.
- Implemented Apache SSL Proxy customizations for Adventist Health System.
- Did job scheduler customizations to eliminate user starvation on a cluster for Pioneer Hi-Bred in Des Moines, Iowa.
- Implemented a 5-node test cluster and upgraded a 32-node cluster to the latest xCAT release for Pearson Technology in Old Tappan, New Jersey.
- Implemented a 64-node cluster for The University of Georgia in Athens, Georgia.
- Did customization work on three clusters at Sandia National Laboratories in Albuquerque, New Mexico.
- Implemented a 32-node cluster for Pioneer Hi-Bred in Des Moines, Iowa.
- Provided consulting and administration services for NCSA on their Platinum and Titan clusters in Champaign, Illinois.
- Taught xCAT classes for cluster administrators and cluster users at Sandia National Laboratories in Albuquerque, New Mexico.
- Upgraded an existing 16-node cluster to 32 Myrinet-connected nodes and an existing 32-node cluster to 48 Myrinet connected nodes for Sandia National Laboratories in Albuquerque, New Mexico.
- Implemented a 216-node cluster for Amgen in Thousand Oaks, California.
- Implemented a 160-node cluster with Myrinet for POSDATA in Seoul, South Korea and achieved 184.4 GFlop/s in the HPL benchmark, ranking it #184 on the November 2001 top500 list.
- Implemented five 16-node clusters and one 32-node cluster for Sandia National Laboratories in Albuquerque, New Mexico.
- Created Linux Cluster Architect training documentation and led the training and certification of IBM architects/engineers in this area.
- Implemented a 19-node cluster for the DOD/airforce in Rochester, Minnesota.
- Trained personnel from WesternGeco on setup and administration of IBM Linux clusters in Houston, Texas.
- Implemented an HA cluster for CreditMinders in Austin, Texas.
- Implemented a 32-node cluster for Pearson Technology in Old Tappan, New Jersey.
- Implemented a 62-node cluster for Structural Bioinformatics in San Diego California.
- Assisted in the implementation of an 80-node cluster the Lawrence Berkeley National Lab in Oakland, California. This was ranked #286 on the June 2001 top500 list.

- **Engineering Animation, Inc. (EAI)** Ames, IA
  Internet Products Manager and Senior Software Engineer *March 1999 – Feb 2001*
  - Technical lead for e-Vis.com, a secure solution for Internet-enabled visual collaboration across the extended enterprise.
  - Ported e-Vis from Linux to HP-UX and Sun platforms.
  - Performed e-Vis internationalization.
  - Instrumental in achieving partnership with Covisint.
  - Managed team of 10 developers.
  - Collaborated with the executive, sales, business development, marketing, and QA departments.
  - Worked on next generation e-Vis architecture for syndication utilizing XML and XML-RPC, while maintaining and furthering development on the existing architecture.
  - Implemented internal version of Bugzilla to track software defects and enhancement requests.
  - Developed a Perl library to programatically access e-Vis functionality. Managed development of tools using this library for monitoring, load testing, and QA on the site.
  - Designed and executed and automated process to deploy and kept current a fleet of Linux demo laptops running the complete e-Vis system.
  - Planned and managed the execution of site maintenance and upgrades.
  - Developed site architecture and managed the implementation of e-Vis datacenter.
  - Developed an automated build system.
  - Setup and administration of CVS system for software revision control.

  - Initial design and development of e-Vis.com.
  - Conducted research on web search engine technologies.
  - Used SWIG on a C++ CORBA library to build a Perl module to extract data from PDM systems.

- **Engineering Animation, Inc. (EAI)** Ames, IA
  Network Engineer, Web Developer, Software Engineer *May 1997 – March 1999*
  - Built a web-based C++/Perl middleware that allowed EAIs visualization software to query and retrieve data from different PDM systems with a consistent interface.
  - Design and implementation with emphasis on integration with customers existing data architecture, usability, speed, and security.
  - Responsible for enterprise LAN/WAN design, implementation, and monitoring including routers, remote access equipment, leased lines, etc.
  - Administration of DNS, NIS, and NNTP services.
  - Implemented security measures with firewalls, router filtering, password checking, etc.
  - Mentored junior web developers.
  - Developed web-based network monitoring tools.
  - Build Perl analysis tools for radius log files.
  - Developed database-driven dynamic Intranet applications.

Skills

Languages and Programming: C/C++, Java, Perl, Python, PHP, Ruby, Scheme, LaTeX, Shell, SQL, Groovy, HTML, Javascript, MATLAB, git, CVS, SVN, Eclipse, Netbeans.

Operating Systems: Linux (Ubuntu, RedHat, Gentoo), OpenBSD, Solaris, Windows Server 2008 R2

Clustering/HPC: MPI programming, PBS/torque, Maui, slurm, moab, Myrinet, InfiniBand, Windows HPC Server Suite

Database: MySQL, Oracle, PostgreSQL, SQLite

Web: Apache, Apache C/Perl API, HTML::Mason, mod perl, PHP, Ruby on Rails, Struts, Spring, Tomcat, JBoss.

Miscellaneous: Excellent troubleshooting and debugging skills, self-motivated, and highly organized.

Publications

- M. Epperson, J. Naegle, J. Schutt, M. Bohnsack, S. Monk, M. Rajan and D. Doerfler. HPC Top 10 InfiniBand Machine…A 3D Torus IB Interconnect on Red Sky *OpenFabrics Alliance 2010 International Sonoma Workshop*. March 14–17, 2010, Sonoma, CA.
- M. Bohnsack. Red Sky – Pushing Towards Petascale with Commodity Systems *LCI Conference on High Performance Clustered Computing*. March 9–11, 2010, Pittsburgh, PA.

Other

- Active DOE "Q"-level security clearance.
- ITIL Foundation certification.
- Amateur Extra Class amateur radio license.