William Fisher 3052 Emerson Street, Palo Alto, CA 94306; **Cell: (650)224-6456; email: fisher@meer.net**

Objective

Technical Project Leader position in either kernel, networking protocols or file system software development.

Work Experience Summary

25+ years of software development experience covering::

- All stages of product development cycle including product definition, architecture/design development, coding, testing, qualification and field support.
- Experience in both startups and large corporate software development environments.
- Definition, design, implementation and testing of custom protocols under Linux 2.4/2.6.
- Detailed performance work on complete forwarding path for large core router.
- Detaled kernel performance work on NAS filer supporting NFS, CIFS and iSCSI.
- Design and implementation of BSD kernel changes supporting large MPLS switch and RSVP.
- Network Architect and lead developer for TCP/IP V4 and V6 protocols on SGI's large SMP NUMA Servers.
- NFS V2/V3 development under IRIX and RISC/OS on both SGI and MIPS Computer Systems
- Detailed performance work on large SMP systems for both NFS and TCP/IP.
- Real time operating system development for DEC PDP-11 and CDC 7700 Computer Systems.

Operating System and Languages Experience

- **Languages:** C, C++, Fortran, Intel and MIPS Assembly, Mesa, HTTP
- **Scripting:** Shell Scripts, Perl
- **Networking Protocols:** TCP/IP, XNS, RIP, OSPF, IGMP, DVMRP, MPLS, RSVP, BGP4, XTP, etc.
- **Device Drivers:** Ethernet, FDDI, ATM, SONET, Fibre Channel
- **Operating Systems:** Linux 2.4/2.6, IRIX 6.X, RISC/OS, FreeBSD 4.6.X, BSDI 2.0, Xerox Pilot, EPOS and CDC Scope

Work Summary Detail

Agami Systems, Inc. Sunnyvale, CA 94043; Principal Engineer; 2006-July 2008

A $70M VC funded startup building a NAS filer supporting NFS, CIFS, iSCSI and NDMP with a WEB based SMS front-end. The filers featured AMD Opteron 4-way X86 processors with support for both SAS and SATA disk drives. The networking system supported 12 Gigabit Ethernet controllers. The product used a heavily modified Linux 2.6.X kernel with extensions in the RAID system, the XFS journaling filesytem and a custom DVFS layer supporting specialized file system operations utilizing NVRAM. The streaming write performance over NFS was 1 Gbyte/second using 11 Gigabit Ethernet interfaces. My contributions included:

- Kernel extensions to support Oprofile co-existance with the NVRAM based system wathdog functions, added support for more AMD performance counters, etc. Other changes included adapting SGI kernel lock metering changes for several version of Linux and adding semaphore hold time moditoring and logging functions.
- Performed Linux kernel profiling of major code paths for NFS and TCP as well as obtaining detailed locking overheads in filesystem, RAID subsystem and both disk and network device drivers. The benchmarks included SpecNFS, standard networking benchmarks as well as internal ones.

- Kernel modifications to the Linux bonding driver to support a wider range of transmit interface selection algorithms and NetDev event monitoring.
- NFS implementation extensions to support NFS Copy Write Avoidance in Linux kernel.
- Custom x86 assembly language IP checksum procedure including detailed measurements of a number of cache pre-fetching approaches.
- Working on porting efforts covering large numbers of internal patches from Linux 2.6.7 to 2.6.20, covering locking changes, file system changes, device drivers, etc.
- Wrote several specialized Ethernet test programs used in bringup and manufacturing tests.
- Detailed analysis of tcp packet traces for a variety of customer identified problems covering various NFS and iSCSI system bugs.
- Detailed analysis of interrupt overheads in the Broadcom and Intel EEPro Ethernet device drivers and interrupt coalescing tuneables.

Fabric7 Systems, Inc. Mountain View, CA 94043; Principal Engineer; 2003-2006

A $57M VC funded startup building an AMD Opteron 8-way X86 server with hardware support for virtualization of networking and Fibre Channel storage. The hardware supported virtualization can be applied to dynamically configure the processor complex into either 2-way, 4-way or 8-way x86 configurations. Dynamic creation and assignment of virtual NIC's to various processor configurations. The processors run either RedHat/Suse Linux or Microsoft Windows. My contributions included:

- Design, implementation and testing of the major control protocol underlying the fabric architecture of the Virtual I/O Controller (VIOC) in the Fabric7 Q160 AMD Opteron x86 server. This is a custom control protocol with the server side implemented in hardware and the client side kernel resident in the system control processor. The control protocol is used for configuring and provisioning local and remote VNIC's and generic CAM initialization and access. Development included a set of Linux 2.4 kernel protocol modules along with extensive unit test code.
- Custom ARP protocol support in both user and kernel land for the fabric hardware.
- Extensive kernel debugger procedure development for protocol development and debugging.
- Developed kernel /proc fs procedures for debugging and trouble shooting.
- Co-Architect, design and development of a light-weight custom transport protocol(MP), similar to XTP, with the eventual goal of having FPGA silicon off load support. The prototype protocol mod\ules developed under Linux 2.6 kernel to provide proof of concept in addition to aiding FPGA hardware design.
- Created the MP protocol project plan, development task list and schedules for the major portions of the project.
- Kernel storage discovery and provisioning modifications to the scsi device discovery software and the iscsi protocol support code for a Fibre Channel Module gateway controller. A complete set of NetLink modules were developed to configure and display targets, nexus information and other gateway parameters. This gateway used modified GPL iscsi Linux 2.6 kernel software as well as in-house developments for the GUI, network management, etc.

Panasas, Inc. Fremont, CA; Contractor; 2002

A $100M VC funded startup building a large scalable blade NAS box supporting NFS, CIFS and DAFL protocols.

- TCP/IP protocol stack performance on FreeBSD 4.6 and Linux 2.4
- Characterization and performance measurement of TCP performance under varying packet loss conditions over Gigabit Ethernet.
- Developed an improved fast packet retransmit algorithm.
- FreeBSD 4.6.2 kernel TCP/IP protocol stack improvements via code streamlining and reduced footprint. Intel's VTune product used for PC sampling and obtaining Pentium performance counters.

Caspian Networks, Inc. San Jose, CA; Technical Project Leader; 2001-2002

A $262M VC funded startup building a large scalable multi-terabit internet core router. Featured full custom forwarding ASIC's, scalable switching fabric using a Linux 2.2 on PowerPC. Software supported a distributed hardware architecture utilizing CORBA messaging between various processor cards with the application software supporting RSVP, ISIS, OSPF, BGP, Frame Relay-CCC and various MIB's. A Juniper CLI was provided along with normal provisioning and router management software.

- Technical project leader of IP Forwarding software development team
- IP Forwarding software profiling and performance enhancements
- Routing Information Base (RIB) and Forwarding Information Base (FIB) performance test software development
- Multicast Forwarding investigation for PIM - Sparse Mode support
- Core design team member for next generation Logical Router

Bravara, Inc; Palo Alto, CA, Senior Protocols Engineer; 2000-2001

A $34M VC funded startup building a large scalable multi-terabit internet core MPLS Switch. The switch featured a scalable hyper-cube fabric, several custom ASIC's capable of switching line-rate MPLS packets from any of 256 OC-192C ports. Typical applications included core MPLS switching, Voice-Over-IP using MPLS tunnels, MPLS VPN's etc. System software supported RSVP for MPLS, IS-IS and OSPF routing protocols along with SNMP and several MIB's.

- Technical project leader of MPLS software development team.
- BSDi TCP/IP Protocol Stack performance and scalability enhancements.
- One of the first employees from initial funding and heavily involved in recruiting, initial product definition and development.

Silicon Graphics Computer Systems; Senior Staff Engineer; 1992-2000

Mountain View, CA 94043
Senior Staff Engineer; 2000, Project Leader; 1997-1999, Senior Engineer; 1992-1997

- Co-Architect of Multi-Processor IRIX UNIX TCP/IP Protocol Stack
- IRIX 6.X IPv6 protocol stack development, kernel and user space
- SPEC-WEB Performance analysis and protocol stack development
- SPEC-NFS Performance analysis and NFS v2/v3 and XFS file system development
- NFS v2/v3 and UNIX file system development
- UNIX System V Release 4(SVR4) kernel, Networking and SMP STREAMS development

MIPS Computer Systems; Project Leader; 1988-1992

Sunnyvale, CA 94086

- NFS v2, TCP/IP and UNIX file system development

- BSD 4.3 kernel and TCP/IP networking protocol development
- UNIX System V, Release 4 kernel, Networking and STREAMS development
- Early employee through IPO and acquistion by Silicon Graphics, Inc.

FileNet Corporation; Principal Engineer; 1983-1988

Costa Mesa, CA 92626

- Network software architect for a large digital paper imaging system
- XNS and TCP/IP protocol software development
- Unix SVR3 Ethernet device driver development
- EPROM development on Motorola 68K
- Early employee from initial funding through the IPO

Xerox Corporation; Office Products Division; Senior Engineer; 1978-1983

El Segundo, CA 90266

- Distributed file system software protocol and server software development
- Digital image processing (DSP) algorithm development

Information Sciences Institute; Research Associate; 1977-1978

University of Southern California, Marina del Ray, CA 90291

- DARPA research funded Digital speech compression algorithm development
- DSP Programming on variety of signal processing computers
- Network speech conferencing protocols development
- Real time Operating System (EPOS)and file system development on PDP 11's

TRW, Defense and Space Systems Group; Member Technical Staff; 1973-1977

Redondo Beach, CA 90278

- Classified digital image processing algorithm development
- Satellite ground station data handling and processing systems
- Real time OS development on CDC 7700

PUBLICATIONS

- "FileNet: A Distributed System supporting WorkFlo; A Flexible Office Procedures Language", William Fisher and John Gilbert, 1988 ACM Conference on Office Automation, National Bureau of Standards, Gaithersberg, Maryland, September 1988
- Optical Storage Technology: Addressing Office Applications International Society for Optical Engineering, William Fisher, Optical Engineering Reports, August 1987

Education

- University of California, Los Angeles (UCLA) Los Angeles, California, 1974-1978, Completed course work towards a PhD in Computer Science
- State University of New York at Stony Brook (SUNY), Masters of Science in Computer Science, 1973 Stony Brook, New York
- Michigan State University (MSU), Bachelors of Science in Computer Science, 1972 East Lansing, Michigan

Contact Information

William Fisher
3052 Emerson Street, Palo Alto, California 94306
(650)224-6456 Cell, (650)424-9265 Home
e-mail: fisher@meer.net