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Objective

To seek software development position in the area of Computer Networking/Operating Systems/Information Security and Information Retrieval.

Education

- **Master of Science** in Computer Science, Kansas University, Lawrence, 2000-2002.
- **Bachelor of Engineering** in Computer Science, Anna University, India, 1996-2000.

Professional Experience

Procket Networks, Sunnyvale, California (Dec 2002 – Present) – Staff Engineer

- **Quality of Service (QoS) Performance in PRO/8800 Routers**
 - Analysis of hardware architecture of PRO/8800 router in terms of quality of service performance.
 - Verification of classification, marking, input metering of the Network Processor Unit (NPU). Characterize the Token Bucket implementation of input metering in NPU.
 - Analysis of Weight Random Early Detect (WRED) in the shared memory architecture of PRO/8800 Switch fabric. Characterize the accuracy of WRED for various probability distributions, traffic patterns, congestion parameters, etc.
 - Characterize the behavior of various queue-handling functions of the outbound Line Card Unit (LCU) processor. Some of the key functions include queue scheduling, queue rate shaping, blocking etc.
- **Multicast Performance in PRO/8800 Routers**
 - Characterize the behavior of two stage shared memory replication architecture for multicast queues. Some the key issues include queue allocation, bandwidth differential between outbound ports, etc. Some key parameters monitored include jitter, throughput, etc.
 - Analyze the performance of switch fabric in handling the multicast traffic in terms of queue handling, shared memory allocation, etc.
 - Characterize various specialized multicast queue-handling functions of the outbound Line Card Unit (LCU) processor to synchronize with other output interfaces in same or other line card(s).
- **Analysis of Procket Network Processor Unit (NPU)**
 - Analysis of recirculation in process pipeline of the NPU to evaluate the performance of various key features like Access Control Lists (ACL), MPLS pop, large address handling in IPv6 and multicast traffic, GRE Termination services etc
 - Characterize the Tree based implementation of the ACLS in NPU though microcode in terms of depth, tree balance etc.
- **Development of automated tools for performance analysis.**
 - Developed an infrastructure to access the IXIA (Traffic Generator & Analyzer) services to characterize various features. Other tools were developed to automated performance results in the form of data sheets, graphs etc.

- **Analysis of Line Card Unit (LCU) Processor**
 - Characterize the performance of the fragmentation performance in the LCU for various traffic types, encapsulations, etc
 - Characterize the Unicast/Multicast queue scheduling in the LCU.
- **Deployment and maintenance of multicast in Inter-Op/Integration testbed.**
 - Testbed includes Cisco GSR, Juniper M160 and many PRO/8000 routers.
 - Various RP Discovery Mechanisms - Auto RP, Anycast RP, BSR, etc.
 - Inter-AS multicast connectivity using MSDP & MBGP.
 - Setup real time multicast multimedia applications across the testbed.

Procket Networks, Sunnyvale, California (Aug 2002 – Dec 2002) - Internship

- Involved in bring up activities of PRO/8000 Routers.
- Interface testing encapsulations including OC3/12/48/192 and GigE Interfaces.
- Verification of Counter & Statistics Manager component.
- Data Plane forwarding performance for unicast/multicast/mps over vlans, tunnels, etc.
- Verification of fragmentation in LCU Processor.

NextHop Technologies, Ann Arbor, Michigan (June 2001 – May 2002) - Internship

- BGP component level conformance testing in GateD using a BGP Packet Generator.
- BGP-OSPF synchronization testing in GateD software.
- Stress, Scalability & System level tests involving route, tunnels, etc.

Kansas University, Lawrence (Aug 2000 – May 2002) - Graduate Teaching Assistant

- Handle classes for “Discrete Structures” involving probability, algorithms, graph theory, etc
- Handle classes for “Introduction to Operating Systems” regarding NachOS scheduling, memory management modules, etc.

Projects

Computer Networking/ Operating Systems/ Information Security

- User-level implementation of Virtual Router Redundancy Protocol (VRRP) in Linux 2.4.x making use of the socket API provided by Linux kernel.
Website: <http://www.ittc.ku.edu/~kpm/vrrp/>
- Implementation of UDP encapsulation of IPsec packets for NAT traversal in Linux 2.4.x and FreeS/wan software.
Website: http://www.ittc.ku.edu/~kpm/ipsec_udp_encap/
- Implementation of Out-of-Band synchronization of Link State Database for OSPF in GNU Zebra.
Website: http://www.ittc.ku.edu/~kpm/ospf_lsdb_sync.html
- Installation, Configuration, and Securing operating systems, networks, and applications in Information Security Lab.
- A Distributed Banking Application using Raymond Tree Algorithm for mutual exclusion.
- Implemented priority based scheduling algorithm and page replacement policies in NachOS.
- Performed simulation of statistical multiplexer and Priority-based forwarding using Extend Simulator.
Report: <http://www.ittc.ku.edu/~kpm/allcad.ps>.

Information Retrieval

- Information Extraction from semi-structured documents (WWW) using various types of wrappers. The wrappers were automatically generated using known wrapper induction methods using machine learning approach.
- Designed and Implemented a Personal Search Crawler for searching dynamically changing websites at any instance. The Crawler uses a Page Rank algorithm which uses a Similarity Engine based on Vector-Space Model. The various factors used in the Similarity Engine are Meta information in links, close textual context of the link, score inheritance based on fading factor, etc.
Report: <http://www.ittc.ku.edu/~kpm/767fp.ps>
- Implemented a Search Engine for a collection of static semi-structured HTML documents based on Vector Space Model.
Report: <http://www.ittc.ku.edu/~kpm/767p2.ps>

Papers

- Router Architectures & Route Lookup Mechanisms
Website: <http://www.ittc.ku.edu/~kpm/ResearchPaper.pdf>
- Survey of Crawling Techniques
Website: <http://www.ittc.ku.edu/~kpm/crawlingtechniques.ppt>
- IP tunneling & Applications
Website: <http://www.ittc.ku.edu/~kpm/IPT.ps>

Relevant Coursework

Principles of Programming Language	Programming and Data Structures
Object Oriented Programming	Object Oriented System Analysis & Design
Theory of Computation	Principles of Compiler Design
Introduction to Algorithms	Graph Theory
Internet Routing Architecture	Distributed Computing
Impl of High Performance Networks	Operating Systems
Computer Architecture	Reconfigurable Computing
Linux System Security	Information Retrieval

Computing Skills

Languages:	C, C++, Java, Perl, Tcl/Tk,
Networking:	TCP/IP Protocol Stack, Routing Protocols (BGP 4+, OSPF v2 & v3, ISIS) Multicast Routing Protocols (PIM, IGMP, MSDP) Traffic Engineering (MPLS, RSVP-TE, LDP) Differentiated Services
Distributed Computing:	Corba, RPC
Security:	IPSec, NAT, PAM, GnuPG, Kerberos, PKI, Tripwire, SnarfSnort

Reference

Available upon request