Lee Kilpatrick

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Objective: A challenging software engineering job in experimental research or commercial development, in such areas as network protocols or applications, wireless networking or mobility, distributed computing, or embedded systems.

Skills: 10 years of experience in networks with an emphasis on realtime communications. Technical lead on projects. Have worked in experimental, commercial, and operational environments. Working familiarity with large, complex, software systems (400,000 lines of code).

Protocols: TCP/IP family -- TCP, IP, ICMP, OSPF, BGP, EGP, SPF, RIP, some IPSec, IGMP, IP multicast. Lower-level protocols include ATM, PPP, Frame Relay, Ethernet, HAP/WPS. Realtime experience includes RSVP, ST-II, some IntServ.

Development environments: Languages include extensive work with C and Java; also HTML, Perl, sh and csh shell scripts, Expect, Tcl, awk, ASN.1. Tools include gcc, gdb, CVS, RCS, BBNTools, Visual Cafe. Development done in Unix and Windows environments for embedded environments pSOS & FEPOS, as well as Unix and Java run-time target environments. High level of familiarity with Unix (Solaris, SunOS, Linux, and Mac OS X) as well as Windows and Mac OS.

Technical Experience

Genuity Inc./GTE Internetworking March 1997-August 2000

VPN Advantage -- *Software Designer*

Designed and implemented Java GUI tool for configuration of VPN Advantage commercial VPN service. The service went through two releases, with a third in the planning stages. Responsibilities outside of the GUI included collaboration on the design of the configuration database and the development of the configuration and provisioning process. Through troubleshooting operational problems, gained familiarity with the entire system, including the Timestep and Nortel VPN boxes.

VISION Realtime Group -- *System Engineer*

Engineered solutions for distance learning projects as a potential commercial service offering. This enabled students at Georgia Tech to participate in classes taught at Stanford, and vice versa. The service used RSVP for QoS bandwidth reservation, and had a browser-based Java applet for connection management. Also designed an on-site video-on-demand network architecture for an apartment complex, and an application to encapsulate ATM data in IP packets.

BBN Systems & Technologies

MMAD Project -- *Technical Lead* January 1996-February 1997

Designed and implemented an FSM-based IP-telephony application in C for the Multi-Media Access Device (MMAD). The MMAD Voice Application interfaced to a PBX, and the application managed the connection setup and data forwarding from the PBX to another PBX-connected-MMAD to complete telephone calls. The application consisted of a driver-level component for packet forwarding as well as an FSM to control call setup. The product was primarily developed for a partner in Japan, where over 40,000 of these devices have been sold to date.

BGP4 implementation -- *Software Engineer*

Wrote the low-level data structures and access routines for a BGP4 implementation. Integrated access of the BGP routing tables into the BBN SPF and EGP code.

ST-II T/20 Development Group -- *Software Engineer* August 1992-December 1995

Member of the development group for BBN's ST-II T/20 router. This was a commercial TCP/IP router product which also supported ST-II, an experimental IETF QoS protocol, for realtime video and audio conferencing. The projects listed below were implemented on BBN's ST-II T/20 embedded router and its 400,000 lines of C source code.

Multi-way videoconferencing

Modified the HCP (Host Control Protocol) interface for the Packet Video Processor (PVP) application. PVP was an application that allowed real-time videoconferencing over a packet-switched IP/ST-II network. HCP provided the

interface between the lower-level setup process and a GUI front end. The modifications allowed participants in a multi-way videoconference to select which of the participants they were viewing at any one time.

ST-II bandwidth enforcement
Designed and implemented virtual clock-based bandwidth enforcement on the T/20's ST-II QoS protocol implementation. This prevented the network from being overwhelmed by ill-behaved users performing WAN bridging or videoconferencing. It was designed to be configurable, for backwards compatibility with non-bandwidth-enforcing nodes and networks if required.

HAP dynamic multicast groups for ST-II
Designed and implemented support for dynamic multicast groups in the T/20's implementation of the Host Access Protocol (HAP, RFC-1221) on theDefense Simulation Internet (DSI). This project enabled efficient network utilization for multi-way videoconferencing and wargame simulations (i.e. distributed videogames for the military). The HAP interface has a transactional setup interface with backbone switches, so this required maintenance of the state of each request, as well as the membership of each dynamic group. This part of the HAP backbone implementation had not previously been fully tested due to the lack of a host-side implementation of the request protocol.

Realtime tuning
Tuned router code to eliminate hiccups in realtime delivery of videoconferencing and simulation traffic. Added processing pauses into the cooperative-multitasking pSOS processes on the T/20, to support better realtime behavior with a newly-developed scheduler. Profiled the code to determine long uninterrupted stretches of processing, and located safe places to put an opportunity for a context switch. If necessary, added additional locking mechanisms to the code which enabled adding context switch opportunities. Also enhanced support on the HAP interface to prevent datagrams, which were prioritized lower than the stream traffic, from being completely preempted in instances of heavy video traffic.

Additional projects included OPnet modeling, code compression and pruning to reduce executable size, ATM-related bug fixes, and enhancing the Token Ring and HAP drivers to add support for the ST-II protocol. There was also about a year of debugging the ST-II protocol implementation.

Network troubleshooting & support — June 1991-August 1992

A member of the combined development/troubleshooting/support team of the Defense Simulation Internet (DSI). Debugged and repaired software bugs on the Butterfly and T/20 routers. Setup sessions and debugged failures in large-scale wargame simulation exercises and proprietary WAN-based PictureTel codec videoconferencing. Debugged TCP/IP network and routing problems. Extensive experience with router configuration.

ComSAT Labs -- *Software Engineer/Intern* — Summer 1989, 1990

Programmed an IP stack for the NP multi-processor router. Debugged a RIP implementation and wrote an FDDI driver for the same.

Other Experience

Washington Street Art Center — October 1999-present

Photographer and member-at-large in an artists' cooperative. After involvement & responsibility gradually increased, at the end of February 2002 I was elected director of the art center, the first transition of leadership in the center's 4-year history. Responsible for high-level planning of the art center direction, structure, events, and maintenance. Also run monthly meeting of the membership at large, and additional special meetings such as recent ones to consider relocating to a larger building.

Education

Massachusetts Institute of Technology — 1987-1991

Bachelor's degree in computer science (S.B., 1991), with a minor in literature.