

# TRAVIS K GEISELBRECHT

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## SUMMARY

Experienced in embedded and large-scale platform design and implementation, kernel development, hardware interfacing, GPU development, game engine, and system bringup.

## EXPERIENCE

**Jawbone**  
*OS Architect*

Sunnyvale, CA  
9/2010-current

Primary designer and implementor of a real-time embedded operating system.

- Board level bringup on cortex-m3 based microcontroller boards.
- Implementation of SDIO/MMC/SD, USB, and other peripheral drivers.
- Design and implementation of microkernel based embedded operating system.

**Palm, Inc.**  
*Principal Kernel Engineer*

Sunnyvale, CA  
10/2007-7/2010

Designed and implemented much of the low level framework for Palm's webOS platform.

- Designed and implemented preemptive, multi-threaded low level kernel for bootloader and diagnostics.
- Designed and implemented single source bootloader across multiple chip families.
- Designed and implemented low level usb protocol (novacom) and server across all aspects of the system: bootloader, kernel, application development.
- Implemented linux kernel port to Nvidia Tegra based cpus.
- Numerous deep bug fixing sessions with external vendors for hardware issues (MMC, DRAM).

**Secret Level**  
*Sr. Game Engine Developer*

San Francisco, CA  
1/2007-10/2007

Responsible for porting and maintaining a new, modern game engine to Playstation 3 hardware.

- Ported low level graphics library from Xbox360 (DirectX based) to PS3 GPU.
- Implemented and optimized build time tools for PS3 specific texture and shader formats.
- Multi-threaded the game engine to run more effectively on multi core game consoles.
- Hoisted various engine components onto Cell SPU processors.
- Heavy optimizations in C++ code to run much more efficiently on gcc vs msvc compiler.
- Implemented hardware SIMD vector library for Xbox and PS3.
- Participated in shipping *Iron Man* and *Goldenaxe* console games.

**Apple Computer**  
*Sr. Firmware Engineer*  
*OS X kernel/iPhone*

Cupertino, CA  
8/2005-1/2007

Responsible for file system design, low level kernel optimization, hardware validation, and boot loader design and implementation for the Apple iPhone.

Accomplishments include:

- Development on a full read/write UDF file system driver for Mac OS X.

- Low-level assembly optimization for speed critical routines on the ARM architecture. Cycle-level performance monitoring and analysis of developed code.
- Hardware validation for new cpu silicon. For testing, developed a standalone kernel with debugging facilities to sandbox test hardware. Worked with hardware vendor to diagnose and correct silicon design defects.
- Implemented complete drivers for much of the hardware to test all of the functionality of the silicon against written specs. Drivers include uarts, memory controller (DDR ram initialization), flash memory controller, i2c, i2s, spdif, led controller, timers, gpios, power management, dma controller. Developed test harnesses to externally validate some of the hardware (uarts, timers, gpios).
- Developed iPhone bootloader, with full kernel and debugging facilities. Boot loader supports debugging facilities such as USB and Ethernet (tftp) loading, full command prompt with hardware tweaking commands, FAT file system support, multi-threaded kernel to allow for background tasks, and a UI to support system selection.

**Danger Incorporated**  
*Sr. Firmware Engineer*

Palo Alto, CA  
7/2001-7/2005

Responsible for core kernel design, implementation, and maintenance on a handheld PDA/cell phone device (T-Mobile Sidekick). Helped take the system from a pre-production prototype through multiple product shipments. Accomplishments include:

- Kernel design and implementation: Primary owner of low level interrupt handler and context switch through high level tasking, file system interface layer, core file system, block device abstraction layer, virtual memory system.
- Boot loader development for second generation devices. Booted from NAND flash from journaled file system in limited space (16KB).
- Low-level driver development and power management.
- Many debugging sessions of crashed units with minimal debugging facilities.
- Initial hardware bring-up using logic analyzers and JTAG.
- GSM/GPRS radio integration. Over the air upgrades of radio firmware module.
- Make system redesign and implementation for a more modular build environment.
- Source code rearrangement and API refactoring to allow porting of the system to different system-on-chip implementations.
- Worked with hardware team on new product designs, schematic reviews.

**Be Incorporated**  
*Kernel Engineer*

Menlo Park, CA  
5/99-5/2001

Developed many kernel-space drivers and modules for the BeOS, a fully multithreaded, multiprocessor desktop operating system. Kernel accomplishments include:

- Developed file system drivers for Linux ext2 and NTFS volumes.
- Developed high performance memory based file system.
- Helped develop, with optimizations, a custom fully journaled, compressed file system.
- Primary maintainer of other in-house file systems including FAT, ISO9660, and BFS.
- Numerous bug fixes across all levels of kernel code, with much experience with debugging crashed systems and corrupted file systems.

#### **PERSONAL ACCOMPLISHMENTS**

**NewOS** – <http://newos.org/>

Development of highly portable, posix compliant, open source operating system. Forked to form the basis for the Haiku project at <http://www.haiku-os.org/>.

I wrote an article in Dr. Dobbs Journal covering NewOS in the December 2001 edition.

**LK Embedded kernel** – <http://git.newos.org/?p=lk.git> – Modular embedded preemptive kernel for use on ARM, x86, and AVR32 based systems. Kernel used unmodified for Palm's webos bootloader. Has been used in various commercial products, including Qualcomm's bootloader for their MSM cpu family and the Android reference bootloader.

**ARM Emulator** – <http://git.newos.org/?p=armemu.git> - Full ARM system emulation, from ARMv4 through ARMv5e cores with full mmu support. Highly optimized, can emulate an arm at approximately 100Mhz on a 2Ghz host machine. Have written multiple embedded ARM kernels of various complexity and features for personal projects, to test ideas, and to stress the emulator.

**Ray Tracer** – Currently working on simple but continually advancing multithreaded ray tracer. Very interested in multi-threaded optimizations and common ray tracing data structures.

**OpenGL Based Game Engine** – Developing shader based, OpenGL powered game engine.

## SKILLS

Much experience in kernel design and kernel-mode programming, device drivers, file systems, networking, hardware bring up, and portable standalone system development.

- Extensive assembly and system mode experience with many processors including ARM, Intel IA-32, Power/PowerPC, Hitachi SH-4, AVR32, and some older 8- and 16-bit cpus including 6502, 65c816, and z80.
- Have written file system drivers in various products for FAT, ext2, NTFS, iso9660, UDF, NFS, and have studied the design and implementation of other file systems such as ffs, reiserfs, xfs, and zfs.
- Have written many drivers for various embedded cores and platforms. Especially proficient in drivers for uarts, usb clients, Ethernet, timers, memory controllers, dma controllers.
- Experienced in using built in cpu profiling facilities to benchmark and optimize core routines.
- Proficient in assembly, C, C++, Objective-C, python, shell scripting, VB, C#, and others.
- Network Programming / TCP/IP. Use and implementation.
- Experience in large scale make system design.
- Proficient in source control use and maintenance: git, svn, p4.
- Digital Design / Verilog.
- Experienced in cg and GLSL based shaders and shader debugging.
- Small and constrained systems development, working with limited resources.

## INTERESTS

Professional interests include kernel design/development, file system development, embedded system bringup/development, game engine programming, source and assembly level optimization, cpu/compiler design, build systems and build pipeline development.

## EDUCATION

**Texas A&M University**  
BS - *Computer Engineering*

College Station, TX  
9/95-5/2000