



Services

- BSP development, porting, enhancements and customization
 - Boot loader
 - Kernel porting
 - Device drivers
 - File systems
- Development and porting of network and communication protocol stacks
- Physical validation
- Integration and maintenance with third party BSP
- Compliance testing



Focus Areas

- **Consumer electronics** - Dual mode phone
- **Automation** - Multifunction protocol converter
- **Audio & video** - Video door phone
- **Home and industrial automation** - Digital home solutions
- **Networking** - Gateway devices



Linux flavors:

- Embedded Linux 2.4, 2.6
- μ Clinux
- MontaVista

Overview

Linux and its various flavors have been a popular choice of operating systems for use in embedded computing systems such as mobile phones, personal digital assistants, media players, set-top boxes etc.

Aftek has identified key advantages of using Linux in embedded devices and has acquired rich skills in Linux BSP development on various platforms. End to end solution providing capability combined with expertise in Linux has enabled Aftek to deliver diverse applications to customers.

Aftek's Expertise

Linux flavors: Embedded Linux 2.4, 2.6, μ Clinux, MontaVista

Device drivers

- **Displays** - Graphical LCDs (TFT, STN), Character LCDs, Analog displays
- **Camera interfaces** - Digital camera, CCD, CMOS, VGA, CCIR 656, digital RGB, Y'UV, Analog camera
- **Audio interfaces** - I2S, AC97, PCM, FXS, FXO
- **Codec engines** - Video encoder and decoder
- **Memory devices** - Flash (NAND / NOR), SDRAM, CompactFlash, SD/MMC
- **Communication peripherals** - Bluetooth, Wi-Fi, GSM, GPS, Modem, Ethernet
- **Bus interfaces** - USB host and device, SDIO, PCI, PCMCIA, I²C, SPI, IDE, RS-232, RS-485
- **Power management**
- **Flash file systems** - JFFS2, JFFS, CRAMFS, ROMFS, YAFFS
- **Disk file systems** - FAT32, ext3, ext2, RAM file system - RAMFS

Architectures and processors

- **Application processors** - ARM (ARM7, ARM9, ARM11), ARM Cortex, x86, PowerPC, SH-3
- **Multimedia processors** - TI DaVinci, TI OMAP, Freescale i.MX
- **Network processors** - XScale (IXP425), MIPS
- **Mobile/PDA processors** - XScale (PXA27x, PXA25x), StrongARM, DragonBall
- **Soft processors** - Nios II, MicroBlaze

Boot loaders

- RedBoot™
- ARMBoot
- U-Boot
- Blob

Protocol stacks

- Bluetooth – Affix, lwBT, BlueZ
- Wi-Fi
- USB
- TCP/IP
- VoIP - oSIP, oRTP
- SNMP

About Aftek

Aftek Limited is a full spectrum technology services company from India. Over last 20 years Aftek has gained significant exposure to variety of technologies. Rich technological capabilities, focused investments in Research & Development and industry exposure enables us to reach beyond the basic IT services to design and deliver projects, products and implement end-to-end solutions to customers in variety of industries. Our service spectrum covers key services as Hardware Development, Firmware Development, Embedded Systems, Application Development, Application Maintenance and Testing Services.

Case studies

Residential gateway

Residential gateway is a multimedia, voice and data gateway for home (apartments, houses and housing complexes). It provides features like safety, security, automation, communication and information. Rich set of features required that a high performance and optimized communication platform is created for this application.

- Aftek developed Linux 2.4 BSP for platform based on Intel IXP425. This included enhancements and customizations in Linux kernel, boot loader and file system implementation
- Developed test routines for hardware board bring-up
- Ported, enhanced and customized device drivers like USB host, USB device serial class, IDE, CompactFlash, FXS & FXO, Ethernet, Ethernet switch, flash, PCI, serial, I²C, SPI, PCM, SDRAM
- Implemented echo cancellation for FXO/FXS calls. This was achieved by tuning parameters for FXO/FXS and optimizing network delays

Dual mode phone

This was world's first GSM and Wi-Fi-VoIP dual mode phone to be demonstrated at CeBIT 2004. It supports voice communication on GSM as well as on Wi-Fi based VoIP. Data communication is supported using GPRS or Wi-Fi. Dual mode phone also takes care of hand-off of active voice and data connections while roaming across wireless and cellular networks. PC and PDA connectivity is based on Bluetooth and USB.



- Aftek ported Linux kernel 2.6 on PXA270 based platform
- Enhanced and customized ARMBoot boot-loader by adding support for diagnostic tests and firmware upgrade over USB and serial
- Customized CRAMFS and JFFS2 file systems
- Developed device drivers for flash, LCD, keypad, PMU, USB, serial and GPIO
- Ported and customized of wlanctl-ng driver package for Intersil Prism and Philips BGW WiFi chipset (for 2 generations of the phone). Implemented WPA, WPA2 and WEP (64-bit and 128-bit) security for WiFi. Also, implemented 802.1x authentications using methods like EAP-MD5, EAP-TLS, EAP-SIM, EAP-MSCHAPv2
- Ported Affix 2.0.2 Bluetooth stack
- Implemented power management modes like idle, sleep, active and turbo to optimize power consumption