

(440) 342-3142
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Dan Kable

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Wickliffe, Ohio 44092

I am an embedded Linux software engineer that excels at full system development from custom board level Yocto or Buildroot Linux distributions to developing efficient C/C++ multi-threaded control, web sockets, and database services through to Intuitive, interactive, and responsive HMI using html5, javascript / JQuery, AJAX, and REST. I create standalone or connected devices leveraging my fluent development and expert problem-solving skills in all key embedded systems disciplines for web, communication, and database development to create IOT, Cloud, or user-managed devices that will exceed all cost and quality standards.

My current core development tools include: C, C++, SQL, HTML5 / CSS / javascript / jquery / ajax / json / REST / PHP / WEBSOCKETS / SQLite3 or MySQL, SOAP, Yocto, Buildroot, U-Boot, and LTIB. I create usability, efficiency, and performance in Embedded Linux devices.

I have a focused tenacity solving technical problems while keeping sight of the bigger picture.

Professional Experience

Stock Equipment 16490 Chillicothe Rd Chagrin Falls OH 44023

2/2015 –

Strengthened R&D software / firmware development team at Stock Equipment, in their environmental controls product lines. Assisted in evolution of legacy Coldfire / 680XX / WINXP based control system to Linux ARM 9 (ATMEL SAM9G45/SAM9M10) with a SPA web based GUI. My experience allowed me to support existing technology as well as development of new designs.

- Developed an intuitive, interactive single page web reporting tool based on jquery/ajax/mysql provided user defined FLOT graphing, data grid display, and formatted reports with csv and pdf downloads.
- Precipitator Voltage Control waveform capture and display
- Developed Mongoose / JQUERY Web based system diagnostics, firmware upgrade, network monitoring, log conversion, download, and network configuration application.
- Assisted in vendor development of control service in C/C++ and GUI in Backbone and Marionette.
- Developed X86 device simulators and compilation to allow debug on development machines.
- Implemented project GIT repo. Migrated legacy SVN repositories to new GIT repo.
- Created single command version build and manufacturing load for device that created all 8 system services from source into a manufacturing loadable usb image or upgrade package. Created X86 simulators which provided environment for running and debugging complex web GUI to multiple multi-threaded embedded tasks on the development machine.
- Created Redmine server for bug tracking, project tracking, and wiki support. Integrated custom AT91 BSP build and GIT source repositories into this server.
- Developed replacement for discontinued GUI serial configuration device using libwebsockets, jquery, javascript, bootstrap on a low cost beagleboard system.
- Developed low cost Raspberry PI based remote monitoring system that gathers data from problem voltage controls at customer sites.
- Moved Atmel Arm Linux applications to more powerful X86 Linux and sqlite3 to MySQL.
- Supported multiple on-site installs through multi-day visits.

Allegion 11910 N. Pennsylvania St. Carmel IN 46032

4/2017 – 7/2017

Part time consulting position. Provided board bring up code for new CTE online lock product that featured both NXP Kinetis K66 and K24 processors. Provided K66 development for external SDRAM, ethernet, IP, SPI, i2c and gpio. Used FreeRTOS, SDK 2, armgcc, and LWIP. Directly support hardware engineers requests in code to better diagnose design issues. Integrated final application into older SDK 1.3 MQX system based on KEIL on windows development to more easily integrate for in house developers.

Mobile Awareness 31200 Solon Rd #12 Solon OH 44139

5/2012 – 12/2014

I came on board and salvaged the MobleTRAQ advanced commercial vehicle tire safety monitor from a contract engineering firm that was off track and late. A focused 11 month Embedded Linux redesign and development effort created a consistent platform that impressed the small company's investors to keep the project moving toward the current sale-able products. A list of features of the devices can be found on www.mobileawareness.com.

Development Innovations

- Modifications to QT Open Source Webkit framebuffer browser overcame limitations of graphics system and native QT development. Allowed full javascript, jquery, and css for widely accepted rapid development programming environment.
- Distinctive touch screen Web UI overcame limitations of small screen with low resolution and large fingers through expanded and separated touch points, zooming and scrolling, overlay area reuse, logical screen progression, and menu consistency.
- Device is designed to log tire telemetry and user interaction for up to 12 months. Employing small footprint web server, ajax, jquery, php, and sqlite3 to communicate between the UI and monitoring services created natural tire telemetric and user event logging.
- Low cost, consumer 3/4G modem support and cloud gSoap services overcome limitations of standalone logging and configuration which opened up device to large fleet sales.
- Plug and play serial ports overcome limitations of two available statically defined ports for the three available external serial devices: Backup Distance Sensors, GPS, and tire sensor reception extender. This allowed customer choice without additional configuration or software updates.
- Manufacturing support tools development overcome limitations of Freescale provided tool that failed load on 20% of devices. This allowed for more than 20 concurrent device firmware load, serialization, configuration, and test.
- Patching services overcame limitations of no field updates and logging uploads through usb memory stick, wifi, or 3/4G.
- Recognition of power source change in kernel overcame limitations of manufacturer provided code to allow charging of battery under all vehicle powered conditions.
- Efficient multi-threaded services overcame slow single core processor and local server / browser UI.
- Highly reliable NAND UBIFS filesystem and recovery scripts overcame random power downs destroying the filesystem which rendered the device useless.

Details

The first version of the hardware predated my arrival and had serious issues. The existing firmware was non-functional. I started by evolving the LTIB Freescale provided 2.6.35 kernel from reference hardware design to our custom I.MX28 device with a focus on changes to the bootloader, NAND, memory, and power. Once firmware was functional on modified original hardware, guided two additional generations of hardware design in SOC type, pad definition, support chips, and power.

Created firmware collects, stores, transmits, and displays real time commercial vehicle tire status data. Development includes kernel level modifications, drivers, wireless pressure and temperature sensor data collection services, backup distance sensor monitoring, device patching, GPS logging, management services, web based user interface, local database configuration, and real time cloud based 3/4G or WIFI soap configuration management and status reporting. After device was functional and stable, I continued system maintenance, added features, and evolved kernel using Yocto 3.17 for more WIFI device options. Both kernels are very stable and services highly reliable and efficient.

- Created stunning touchscreen user interface that could be rapidly developed, prototyped, and debugged. It was created using QT Open Source WebKit to provide direct frame buffer support for the device's 320x240 color touch screen display. 270 images and 24K lines of Javascript / JQuery, CSS, PHP, and 4 sqlite3 databases provided the interactive, single page, web application for near real time display of status, alarms, and device configuration. The extensive browser UI interacted with data collection and configuration services through Javascript / JQuery / AJAX / JSON / LIGHTTPD / PHP / SQLITE3 on the device.
- Developed innovative web based user interface with 3 level menu overlays, separated and expanded user touch areas, and logical screen scrolling which allowed reuse of the limited touch screen display. The single page web application has 25 different functional screen layouts. The zoom-able status screens could show 4 vehicles with up to 8 axles and 32 tires at 3 magnifications.
- Designed, wrote, and tested efficient multi-threaded C language services that implemented 433MHZ tire sensor data collection, vehicle power line carrier communication, also sound, nmea gps status, wireless backup distance sensor, web UI user touch events, wifi/3g/4g data transfer, and reliable sqlite3 database entry. These user space services interacted with kernel hardware interface drivers for i2c, serial, spi, nand, and usb.
- Developed specification for system patching and transitioned development and testing to another highly qualified Linux embedded developer. The development effort included updates, usb printing, memory stick handling, and gnupg security access service.
- Created data collection, and remote configuration service that worked with usb memory sticks, intermittent wifi, or real time 3/4G from a cloud soap database server.
- Moved kernel and drivers from the Freescale LTIB 2.6.35 to the Community YOCTO 3.17 which gave greater WIFI device compatibility and a modern WPA Supplicant for WIFI-Direct and P2P secure device access. This opened up device to PC or Android device access.
- Made single page web application to test all aspects of the device web GUI. The JQuery/Ajax/PHP based application enabled less technical QA support to fully test all aspects of the device's web GUI as well as allowing easy screen capture for documentation.
- Modified the Freescale MXS bootstream bootloader to allow manufacturing serial number writing of the OTP rom fuses as well as properly setting power configuration registers for the condition of both battery and vehicle power.
- Developed ALSA recorded voice enunciation warning and alarms. Added sound chip to second HW revision to provide voice warnings instead of gpio/pwm beeping.
- Custom driver module and kernel driver modifications for power and battery charging, NAND, and device configuration.
- Yocto kernel device tree custom board modifications for LCD video, touch screen, memory EMI configuration, gpio, i2c, spi, power and battery charging, GPMI/NAND/UBI, RTC, CAN, PWM, USB, and SAIF (serial audio interface).
- Created capability for CAN bus monitoring using the Freescale FlexCAN kernel drivers and libsocketcan

Developed Contract Manufacturer device firmware load, serialization, configuration, communication, and test tools. The system had the capability to load more than 20 devices concurrently within 3 minutes. It took another two minutes for the devices to be dynamically serialized and configured.

- Created private vpn using OpenVPN between contract manufacturer configuration system and Mobile Awareness corporate linux router that allowed secure software updates and Mysql replication and backup of configuration and serialization databases.

- Created BASH and PHP device configuration scripts that used soap to get serialization, active features, gnupg security key, and current time from contract manufacturer configuration system. Created soap web services on the contract manufacturer system to handle device configuration soap requests.
- Developed MySQL database for device serialization and features configuration, set replication and daily backup to Mobile Awareness Corporate VPN system.
- Rebuilt disastrous Freescale Manufacturing tool with a reliable, all Linux solution based on Yocto Kernel, U-Boot, NFS, Bootp, and Mxslr. Effort reduced to 0% from over 20% factory firmware load failures.

Advanced product with Sales and Marketing to meet multiple large customer requirements. Created JQuery / Ajax / PHP / MYSQL and gSoap framework to assist a small team (3) of engineers and a graphic artist to quickly respond to cloud based opportunities.

- In only 2 weeks of intense focused effort, guided team development of cloud based device tire telemetry reporting and real time configuration. Demonstration was controlled by customer Android phone, tablet, or Windows PC based devices through the cloud based web single page web application to a MYSQL database that the MobileTRAQ monitoring device was communicating via 4G modem.
- Created device 4G modem control and reconnection service that used gSoap to send cloud MYSQL database the device tire telemetric data and to read and execute cloud device configuration updates.
- For a different customer, expanded sales demonstration to 3 carriers (T-Mobile, ATT, and Verizon) and added GPS functionality to the device. Customer successfully used on 5 vehicles test that made five 5200 mile test trips across the country. Guided team to develop web site to show current tire status, vehicle location, status history, and Goggle Maps location history from the real-time Cloud database.
- Developed multi-threaded cellular modem application that handled a Sierra and a Telit 3/4G modem on 3 separate carriers: T-Mobile, ATT, and Verizon. The application handled the differing states for all modem or carrier identification, initialization, configuration, connection, and most importantly, reconnection when signal was lost. The application used the gSoap library to send tire telemetry data to a central cloud database server to be queried by demonstration web application for customer real time access.

Technicolor 101 W. 103rd St. Indianapolis IN 46290

3/2011 – 11/2011

Made significant contributions to a large, Buildroot Embedded Linux, C/C++, multinational, firmware development team for Technicolor's next generation "Revolution" set top box (STB) project. The project used the Agile methodology, Hudson/Jenkins Continuous integration, and google unit tests.

- Developed libcURL and SQLite based, internet file download dbus component that provided HTTP, FTP, TFTP, and FILE downloads with concurrency, priority, bandwidth throttling, recovery, pause/resume, cancel and previewing capability.
- Implemented uPnP/DLNA "Destroy Object" and "Update Object" functionality using libXML and SQLite. This asynchronous dbus component provided uPnP/DLNA content directory service (CDS).
- Supported system wide component interface changes to the system test component. This interfaced a gSoap web back end with each individual system component through dbus for system test.

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Ingersoll-Rand 11910 N. Pennsylvania St. Carmel IN 46032

1/2010 – 10/2011

Provided embedded firmware product development, testing, documentation, support and web / jQuery / javascript / Ajax / PHP / MySQL test and emulation applications for Ingersoll's flagship real-time electronic security access systems.

- As an on-site contractor and integral part of the engineering team, helped define and then developed firmware for standalone electronic access control device in C on the Microchip PIC24 MCU. As part of the definition, implemented a new simpler event driven architecture. Compared to previous devices in the product family, this product was delivered in 50% less time and had 80% less defects during its first 6 months of deployment. This high quality embedded firmware was delivered ahead of schedule, under budget, with greater flexibility, and functionality than the evolving specifications had defined.
- Created noninvasive, real time, production release, event injection and status monitoring test tool on top of new product event driven executive code. Tool used unused UART on MCU to interface with any serial terminal to allow state changes and event execution which provided for more accurate feedback than a traditional In-Circuit debugger (ICD). Results of enhanced development testing provided for higher quality code and the faster acceptance by System Test Department of any access control product tested. This new event driven architecture was adopted as the basis for the next generation products
- Developed VC++ MS Windows application that interfaced between serial ports (connected to access control devices with evolving event queue mechanism) and MySQL ip connected database. Designed database to hold tests for various locks and the status results for analysis. Created web / jQuery / javascript / Ajax / PHP application to interface with the database for test creation, device execution, and result display.
- Developed an innovative web application that cross compiled and executed developer created PIC24 C source code on an 64 bit X86 Linux server. The product integrated JQuery, JqueryUI, Javascript, and JSON based Ajax at the client browser with PHP, MYSQL, and developer provided embedded source application on a Linux Apache web server to provide a near real time, intuitive, and interactive test or training environment.

Mustang Microsystems, Inc.

2008 - 2010

- Created web based, multi-country, distributed media subscription service, zookz.com, in less than four months. Integrated all hardware, software, file store, database, security, networking, and administration resources.
- Produced database based web content management system (CMS) and presentation applications enabling non-technical management of DHTML web content while maintaining site consistency and browser compatibility.

Arhaus Furniture 7700 Northfield Road, Walton Hills, OH 44146

2006 - 2008

- Originated low cost, IIS corporate Intranet. Converted existing MSACCESS services to an integrated, intuitive, interactive, IIS/SQL Server database system.
- Developed a series of web based tools to quantify then report on delivery and product quality that allowed a 35% reduction in customer returns.
- Modernized store technology. Implemented web based local store sign-age and bar code printing.
- Converted leased line frame relay network to higher performance and lower cost internet vpn regional wide area network solution.
- Supported, extended legacy multi-valued database sales/crm/erp applications based on IBM's Unidata.

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2002 - 2006

- Created low cost, XP Embedded, Distributed, location aware, low speed WAN efficient, manageable, and recoverable Point of Sale (POS) platform that saved **\$3,000,000** from software vendor design, while adding redundancy and increasing performance.
- Generated a set of applications with a graphical, intuitive web front end that enabled the help desk to solve remote store problems, allowing the network staff to focus on other issues. Applications extended the life of in store wireless infrastructure by adding manageable security saving **\$300,000**.
- Provided traditional and multidisciplinary, vendor independent unconventional Network Engineering and support that is highlighted by centrally implementing remote store changes without visits saving up to an additional **\$1,000,000**.

Mustang Microsystems, Inc.

1992 - 2002

Created Mustang Microsystems Inc. in 1992 to develop and manufacture specialized PC based hardware used by companies such as Revco D.S. Inc. Mustang is now used for technology consulting.

- Developed VOIP SIP voice conferencing system based on Windows 2000 Pro in C and assembler. Single 900MHZ system was able to handle up to 400 concurrent conversations in any number of conferences.
- Created distributed Delphi / SQL Server application to provide authentication, access, billing and routing for a private long distance voice network.
- Provided several companies with application, database, web development, network engineering, systems integration and administration.
- Built and delivered 1700 highly reliable communication PC based systems that provided a bridge between Revco's legacy X.25 network and IP. These system integrated custom software, a csu/dsu, x.25 pad, SDLC, and Ethernet.

Revco D.S. Inc. (Now CVS) Twinsburg, Ohio

1988 - 1993

- Researched, selected, debugged multi-vendor X.25 private national wode area network to link 2800 stores to first ever centralized on-line pharmacy system saving **\$4,000,000** over vendor suggested proprietary solution.
- Created flexible, open, expandable, and cost effective store architecture that leveraged existing technician force, and non traditional component sourcing that saved an additional **\$4,000,000**.

IBM East Fishkill Hopewell Junction, New York 12603

1984 - 1988

- Developed Standard Bus based, real time control system for Steppers, Servos, analog to digital, timers, Optical IO for automated, centrally managed, control of manufacturing tools in C and 6809 assembler reducing cost of by ten times.
- Developed SECS protocol on a multi port, co-processor board that allowed the PC to be used to control semiconductor manufacturing, further reducing the cost of manufacturing control systems.
- Produced Basic-like interpretive language to control x-y table movement and Cognex Vision system to aim, focus and then trigger Excimer laser ablation. This enabled research technician's easy programmatic control of their device.

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Technical Expertise

Software / Firmware Development:

C / C++	Doxygen	.NET / ASP	Delphi / Pascal	MPLABS	X86 and Motorola Assembler
PHP	Seapine	VB / Script	Javascript	DHTML	Visual Studio 6 / 05 / 08 / 2010
SQL	SPLINT	Test Track	Microchip	Surround	Embedded Linux
D-BUS	Autotools	Rally	curl / libCurl	Buildroot	Hudson CI
Agile	RedBoot	Googletest	open source	ClearCase	Klocwork
U-Boot	gSoap	uPnP/DLNA	busybox	libXML2	Windows Embedded
QT	netlink	ubifs / nand	YOCTO	LTIB	Open Embedded
Kernel	SOAP	menuconfig	Freescall	RFID	WIFI Direct / P2P
libmodbus	GIT	libwebsockets	BASH Scripts	Redmine	Device Tree / DTS
FreeRTOS	MQX	LWIP	libwebsockets	ATMEL	framebuffer touch screens

Hardware / Infrastructure / Administration:

HP / Dell / IBM	Servers/Laptop/Desktop	RS6000	Linux	Exchange	Enterprise Patching
Active Directory	NT/2000/2003/XP/WIN7	Nortel	Zabbix	NAS	DNS/DHCP
Virtual Box	Routing / Switching	Cisco	PIC24	AIX	Network Monitoring
OpenVPN	ARM 9	x86/atom	I.MX28	AT91	Hudson/Jenkins
i2c	CAN / Flexcan	SPI	SAM9G45	SAM9M10	Kinetis K24
beagleboard	ETHERNET	Rasp Pi		SDRAM	Kinetis K66

Web Development:

Apache Win/Linux	IIS / .NET	PHP	XML	DHTML	JSON
Javascript	JQuery	AJAX	CSS	SQL	gSoap
ASP/ .NET	JqueryUI	Visual Basic	DHTML	PEAR	TLS/SSL
SPA/SPI	QT Webkit	Lighttpd	REST	FLOT	bootstrap
				websockets	libwebsockets

Network / Communications:

IP	LAN	Etherpeek	DNS/DHCP	SNMP Monitoring	802.11q VLAN
X.25	Cisco	Wireshark	DMZ	Packeteer/Shaping	802.11a/b/g Wireless
Serial	Nortel	QOS	Zabbix	Fiber/Cat 3/5/5e/6	802.1x Access
Synchronous	VPN	Netrix	Core Routing	Security / Firewall	Edge Switching

Database:

MSSQL 6/2000/2005/2008/MSDE	MySQL	ODBC	Unidata	Replication
Stored Procedures/Functions	SQL	Access	Progress	SQLite

Education

The Ohio State University Columbus Ohio
Bachelor of Science, Computer and Information Science
Bachelor of Arts, Photography and Cinema

Syracuse University, Syracuse New York
Completed course work in Computer Engineering Masters Program