

Mandar Joshi

Linux Developer
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About Me

I am a Linux Developer having spent over 9 years working with Linux based platforms. I have worked on developing applications and libraries on Linux, Point-Of-Sale Systems, Embedded Linux, working with ARM based hardware, Smart Cards and interfacing different devices and peripherals under Linux. During this period I've dealt with many unique problems which required innovative solutions. Most of this work has been in the open source field and over time I've had exposure to lot of open source libraries, UI frameworks, hardware and technologies. I use C,C++ & Python as my primary programming languages. I use the programming language that best suits the problem. Apart from C, C++ & Python, I've used Ruby, PHP, Javascript, C# in different projects. I use Fedora,Gentoo,Ubuntu,Debian or CentOS on most of my Linux boxes. I've done a project for CentOS, RootFS Build Factory <https://github.com/mndar/rbf> in Google Summer of Code 2015. I worked with ARMv7 development boards like Raspberry Pi 2, Odroid C1 and Cubietruck. My current project is a Linux based CCTV Smart Surveillance Framework using GStreamer. I presented a talk about this project at the GStreamer conference 2016.

My Work

- Independent Software Developer (9 Years+)
Working primarily on Linux based platforms.
To name a few: Gtk+ Widgets, Clutter components
Worked on many ideas including Media Box for music stores, generation of rootfs images for embedded platforms (Fedora, CentOS, Gentoo), Surveillance (a video surveillance framework based on GStreamer)
- Software Engineer in Teletronics, Mumbai (9 Months)
Worked on a VoIP product. Technologies: C++, Python Twisted Framework.
- Embedded Software Engineer in SoftwareWorkshop.NET, Mumbai (2 Years 1 Month)
Development of applications on Linux, Embedded Linux, Point-of-Sale systems running Linux, miscellaneous RnD and experimentation.
- Network Engineer in Excel Systems and Services, Mumbai (1 Year 4 Months)
Management of Trading Facility.

Latest Achievements

- Google Summer Of Code 2015 (Worked Remotely)
Developed RootFS Build Factory for CentOS. It is a set of Python and Bash scripts to generate rootfs images for 32-bit ARMv7 boards based on an XML template.
Link: <https://github.com/mndar/rbf/>
- GStreamer Conference 2016 (Berlin, Germany)
My proposal to give a talk about a new Video Surveillance Framework I developed using GStreamer was accepted in this conference. This framework allows you to write plugins to process video and report the results in a convenient manner using standard protocols.
Link 1: <https://gstconf.ubicast.tv/videos/intelligent-surveillance/>
Link 2: <https://gststreamer.freedesktop.org/conference/2016/talks-and-speakers.html>

Academic Qualification

B.E. Information Technology Engineering, University of Mumbai. CGPI 7.26

Skills

Operating Systems	Linux(Gentoo, Fedora, Red Hat, Knoppix, Debian, Ubuntu, CentOS etc.), Android, Windows
Architectures	x86, x86_64, ARM9, ARM7, 32-bit ARMv7
Servers	Apache, IIS, Active Directory, Vsftpd, Samba, CUPS, DHCP, DNS, NFS, VNC, Qmail, SSH
Networking	Fortigate Firewall, Basic Cisco routers, Linux
Embedded Linux	Gentoo, Montavista, Gemalto's OS X, PlaszmaOS (Zii Egg)
Programming	C, C++, C#, Python, PHP, Ruby, HTML, Javascript, Shell scripting(Linux), Microsoft .NET, Android (Java)
C Libraries	Pthread, CURL, LibUSB, LibXML2, Glib, Webkit, Cairo, Imlib2, Pcsclite, GDK, GStreamer
GUI Toolkits	The GIMP Toolkit(GTK+,gtkmm),Fast Light Toolkit(FLTK), Qt, MFC (VC++), Clutter (OpenGL Based)
Databases	MySQL, MS SQL, SQLite, Oracle
Web Frameworks	Ruby on Rails, Django, Joomla, ExtJS
Point-of-Sale	Gemalto X-Series(ARM9) & C-Series(ARM9), Castles Vega 9300(ARM7)
SmartCards & RFID	Mifare(ISO14443), SLE4428, Contact Based(ISO7816)(128K,1K), MicroProcessor Cards(TimeCos), Magnetic Cards
Development Tools	SVN, Git, Doxygen, Eclipse

Document Links

Embedded Linux	Surveillance , RootFS Build Factory , Gentoo Embedded , DaVinci Platform
Linux	Address Matching , C XML Parser , VoIP , PicoLCD Library
Point-of-Sale	Loyalty Program Bahrain , Canteen Management , Payment Terminals
Other	Hardware & Networking , User Interfaces , Web Interfaces , Linux Kernel , Smart Cards , Other Interests

My Projects

Embedded Linux

Surveillance: <https://gstconf.ubicast.tv/videos/intelligent-surveillance/>

Designed and Developed a framework for CCTV applications called Surveillance: Surveillance is a video surveillance framework for CCTV applications developed using GStreamer. The most notable feature of Surveillance is that the processing of video feeds happens on the camera end making the system inherently distributed and scalable. It allows you to write plugins for video processing and reports the results of the processing via TCP. Focus of the project is on converting dumb cameras into intelligent cameras. This project was presented at the GStreamer conference 2016 in Berlin, Germany. The intended target users of this framework are developers who can write plugins and viewers for their customized CCTV solutions.

The core of the framework has been developed on Linux. It's written in C using Glib & GStreamer. The viewers required to view the video feed and processed data can be written using any language on any platform. I've written viewers for Windows (Qt), Linux (Qt) and Android.

Developed image processing plugins for Motion Detection and Face Counting using OpenCV for use with Surveillance. There is also a dummy plugin written to be provided as a reference to other developers.

RootFS Build Factory <https://github.com/mndar/rbf>

Designed and Developed set of scripts to generate rootfs images for CentOS and Fedora for 32-bit ARMv7 boards in the Google Summer of Code 2015 program.

RootFS Build Factory is a set of Python and Bash scripts which generate rootfs images along with bootloader & kernel based on a XML template provided by the user. A console based user interface was created using PythonDialog to ease generation of XML templates.

Peripherals with Gemalto Terminals

Integrated peripherals like USB Keyboard, CCID (Chip Card Interface Device) Smart Card Readers, USB Audio devices, Bluetooth Adapters, USB WiFi Adapters, CDMA modems, USB2Serial devices & USB Webcam. This involved cross compiling the required kernel modules and libraries. Also interfaced with Serial Port Devices like Pin Pads, Smart Card Readers etc.

Gentoo Embedded <http://mndar.github.io/freerunner/gentoo/>

Extensive experience with Gentoo Linux for generation of rootfs images for embedded systems and other dedicated systems on x86, x86_64 & ARM based systems. I've worked with ARMv4tl (S3C2410, Openmoko Freerunner), & ARMv7 (Raspberry Pi 2, Odroid C1, Cubietruck) systems. Well versed with building cross toolchains & distributed compiling for faster builds. Hands on experience with UnionFS

Texas Instruments DM355 DaVinci Platform

Hands on experience on TI Davinci DM355 evaluation kit. Experiments on Texas Instruments DM355 Development board having a DaVinci DSP processor. Wrote simple applications to draw PNGs on composite video out. The board ran MontaVista Linux.

Linux:

Data Processing: Address Matching

Development of an algorithm to match addresses from a large database. Project involved working on Lex, Yacc, C, C++, PHP. Ruby on Rails and Ext JS Library were used for creating the user interface. MySQL and MS SQL were used as databases. Experiments were also done on Oracle. The project also involved writing stored procedures for MS SQL server & Oracle.

C XML Parser. Expat

Data Processing Software for processing large XML files using C, Expat and MySql. This provided an improvement of over 5 times over the company's earlier parser written in PHP.

Opal VoIP, Python (Twisted Framework)

Worked in a team to develop a VoIP Conferencing system based on Freeswitch. This was an event driven system using the Twisted Python Framework. The VoIP library Opal was used on the clients. Qt was used along with the Opal VoIP library to talk to Freeswitch.

Library for PicoLCD USB Devices <https://github.com/mndar/picolcd>

C Library to interface with PicoLCD devices(20x4 & 20x2 USB LCD displays with IR and Keypad input) written using LibUSB 1.0.

Point-of-Sale

Loyalty Program in Bahrain

Development and Implementation of a Loyalty Solution for a client in Bahrain. The smart cards used were Mifare Classic 1K cards. The project involved writing an application that runs on a POS terminal (Castles Vega9300). The server side software included a Windows service and few other utilities written in C# for activities like creation of customer cards, editing its contents and report generation using transactions logs collected from the POS terminals. The database used was MS SQL 2005.

Canteen Management Vega9300

Developed client side of a Canteen Management System on Castles Vega9300 Terminals. This involved reading employee information from Mifare cards, retrieving information over Ethernet from server using HTTP, performing transactions and printing receipts.

Gemalto Payment Terminals Related Work

Completed training from Gemalto on X-Series terminals and PCI (Payment Card Industry) PED(PIN Entry Device) Standards.

Developed library to write to SLE4428 cards on Gemalto X-Series Terminals. A partially written library which implemented only the read functionality was provided by Gemalto. This involved understanding the technical data sheet from Siemens about SLE4428.

Hardware & Networking

Extensive experience as a system admin managing and troubleshooting issues with desktops, servers and routers. As a system admin, managed Fortigate firewalls, an Internet Trading Platform and a network of 100 computers & few servers.

User Interfaces

Developed a document management system in GTK+ 2.0 for an insurance company. This involved document scanning, archival and management

GTK+ Widgets made using Cairo for level display, temperature monitoring, speed monitoring and user input, keeping in mind Industrial Automation.

Wrote a cross platform UI for my Surveillance project using Qt and GStreamer. Tested that it works on Windows and Linux.

Wrote re-usable components using the Clutter library like Carousel, Media Player, Virtual Keyboard & Playlist.

Web Interfaces

Wrote a web interface using ExtJS 2 for the address matching project. The front-end was written in Javascript using the ExtJS 2 framework and was fed with data using Ruby on Rails backend which generated XML to populate grids and lists in the front end.

Hands on experience with Joomla.

Linux Kernel

Contributed couple of patches to the ALSA project to add support for a volume knob and LED on Creative USB X-Fi Surround 5.1 external USB sound card. This required reverse engineering to discover the protocol used by the sound card. I used a USB sniffer to capture the protocol.

Microsoft Windows

Wrote .NET Windows services and helper applications for the Loyalty program in Bahrain and for an Attendance Solution which interfaced with networked attendance terminals.

Smart Cards

Worked with Mifare(ISO14443), SLE4428, Contact Based(ISO7816)(128K,1K), MicroProcessor Cards(TimeCos), Magnetic Cards for a variety of applications. Used Windows as well as Linux and Embedded Linux (pcsc-lite) to interface with smart cards.

Other Interests

Over the last 10 years I have worked with many platforms. My primary interest lies in Linux and Embedded Linux solutions. Apart from my computer related interests, I've always enjoyed reading about cars, bikes, industrial machinery, medical devices and would love to implement solutions in these domains.