

# Dineshkumar Bhaskaran

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## Professional Experience Summary

Embedded/Storage Professional with 13+ years of collective experience in embedded systems, high performance computing, storage virtualization and Linux kernel development.

- Experience in working on all stages of product development like SoC validation, Board bring-up, porting/developing embedded driver development.
- Have strong background in Linux Driver development, Linux Kernel Programming, System integration, and troubleshooting skills. Exposure to kernel community interactions.
- Strong aptitude for algorithm/application design and implementation. Involved in optimization, parallelization of Image processing algorithms using high performance computing languages using OpenCL, CUDA and HLSL and proprietary OpenCL.
- Experience in developing, enhancing and maintaining a in-house Linux based operating system and GCC based toolchain for ARM/X86 32/64 bit platforms.
- Experience in middleware and application stack development and integration. Exposure to IoT based application development and IoT based stacks like Alljoyn and IoTivity.
- Experience with SCSI, Fibre Channel storage protocols, Target mode drivers and FC switch based virtualization application and products.
- Proficiency in designing and developing of Test automation framework using CPP unit/Python/Bash scripts. Experience with build automation for GCC using Linaro ABE.
- Have 4+ years experience in leading a team, and 3+ years of international experience in Japan and US.

No.	Organization	Period	Designation
1	Canon India Pvt. Ltd.	Mar 2010 - till date	Principal Engineer
2	Brocade Communications Pvt. Ltd.	Jan 2008 - Mar 2010	Engineer
3	Tata Elxsi Pvt. Ltd.	Sep 2003 - Dec 2007	Specialist

## Skill Set

### *Programming Languages, Tools*

C, OpenCL, Python, Exposure to C++, X86 32/64 and ARM 32 assembly languages. GNU development tools, Git, Rational Clear case, SVN, Synopsys Virtualisation Platform.

### *Protocol and Protocol Stack*

Expertise in Fiber Channel and Understanding of SCSI protocol and the SCSI protocol stack in Linux. Exposure to USB

### *Storage Devices*

Brocade switch series. Primarily Brocades 48K switch and Pizza boxes Flexline Array Controller, Sony AIT SCSI, IDE tape drives SDX series, L180 Tape Library

## Experience

### *Canon Embedded Linux Platform,*

### *Canon Inc, Japan and Canon India, 3+ years*

This project involves porting, enhancing and maintaining Linux based operating system for Canon embedded products like Surveillance cameras, Projector, Network scanners etc. The project involves wide scope ranging from

- \* Porting Linux kernels (3.x, 2.x based) with Real Time support to various Industry known SoCs like Intel Haswell, TI AM437x, Beagleboard, Xilinx ZC-702/ZC-706 and Canon proprietary embedded boards.
- \* Support and Fix issues with GCC based custom toolchain for architectures x86 and ARM 32, 64bit.
- \* Investigation of new Linux based technologies and fixing of Kernel Vulnerabilities.

#### **Involvement**

- Responsible as a Technical Lead (8 ppl team) for Project planning, execution, management, hiring, training and budgeting.
- Responsible for porting of multiple Linux kernel versions (3.10.x, 2.6.x) for Canon proprietary boards (for network surveillance products), ZC-702/ZC-706, TI-BeagleBone black, AM437x and Synopsis Virtual platform etc.
- Responsible for customization to Linux platform like enabling/porting support for OP-TEE (TrustZone for ARM) on ZC-706 and Porting Alljoyn (IoT stacks) and IoT application development for Canon Products.
- Involved in performance enhancement of Canon security IP hardware by developing multi-core Linux driver for CELP.
- Involved in building, testing, enhancing and maintenance of GCC 6.0 based Cross compiler toolchain with Multilib support for ARM v7/v8 32/64 bit and X86 32/64bit. Responsible to create a random C program generator for compliance testing of GCC based toolchain.
- Responsible for streamlining and automation of Testing process for Linux kernel and Real time testing. Involved in automation of Linux kernel vulnerabilities investigation. Involved in framing an organization wide policy to establish Linux kernel contributions by fixing issues in Linux stable kernel. Submitted a simple patch to community <https://marc.info/?l=linux-kernel&m=149406916222399&w=2>.

#### **Canon Parallelized Image processing library, Canon Inc, Japan and Canon India, 3.8 years**

This project involves in preparing an advanced parallel library on Linux for medical image processing algorithms with support for NVIDIA, AMD and X86 based platforms. The whole library is developed in OpenCL and highly optimized to perform faster than some of open and free solutions in similar domains like OpenCV and ITK and Canon internal solutions.

#### **Involvement**

- Responsible for Implementing and enhancing a complete Parallelized Image registration framework for both intensity based and Point based image registration related algorithms and simpler image processing algorithms.
- Responsible for performance analysis and comparison of OpenCV CUDA and OpenCL OCL implementation of various image processing algorithms.
- Responsible for porting a image processing algorithms to CELL broadband engines using proprietary compilers for performance analysis and study.

#### **SAS (Storage area services), Brocade communications, India and U.S, 2.3 years**

Brocade Storage Application Services (SAS) on Brocade 7600 Fabric Application Platform Switch provides fabric-based services through integration with high-performance storage applications. SAS delivers intelligence in SANs to perform fabric-based storage services, including online data migration, storage virtualization, and continuous data replication and protection. SAS is successfully deployed in storage world with Brocade and OEM partner's storage solutions like DMM, EMC Recover-point and Invista.

#### **Involvement**

- Responsible for SAS enhancements and related development features. Worked through SAS v2.x to v3.x versions.
- Responsible for handling SAS related customer issues and maintenance.
- Ownership of virtual initiator module in SAS.
- Multiple deputations in Brocade-US for facilitation of SAS co-ordination activities between on-site team and India team.
- Involved in every phase of porting, development and enhancement of SAS (primarily Virtual Initiator module) to next generation platforms like in Brocade WAN optimizer.

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### **DVR-SMM (Digital Video Recording), Tata Elxsi, 6 months**

This project involved in conceptualization of a DVR (Digital Video Recording) product based on client proprietary Hard drives. This solution involved component development like stream file system, stream I/O scheduler and enhanced disk driver for the hard-drives.

#### **Involvement**

- Module lead for Stream Scheduler (SS) module. Deputed on-site for demonstration purposes for POC phase.
  - Zero copy implementation in Linux-2.6.12-3. Back porting of blktrace utility for testing.
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### **FCTMD (Fibre channel Target mode driver), Client - CMS, Japan, 1.2 years**

The project involves in development of Target Mode driver for LSI logic FC HBAs which are based on LSI-Logic Fusion Message passing technology.

#### **Involvement**

- Developed of LSI Logic Fibre channel driver to work in standalone mode with real world devices and with Software RAID Controller system when required.
  - Developed of a character driver interface and a user interface for configuration of the driver
  - Developed a proficient kernel memory leak detector which will trace various kernel memory allocation interfaces like kmalloc, vmalloc, alloc\_pages etc. for a kernel module and will generate a report when required or when the module exits.
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### **Virtual Storage Management), Client - SUN, USA, 8 months**

The VSM product line involved in complete development of virtual storage management solutions for MVS (Mainframe) clients. The fibre channel tapes(3x90 series) are virtualized for infinite storage and high availability with SUN proprietary tape drives and libraries.

#### **Involvement**

- Implementation of 3490, 3590 Tape drive emulation (TDE) in the VSM product for MVS clients. This involved implementation of 3490 commands (READFWD, WRITE, BSF, FSF, REWIND, WTM, and NOP).
  - Implementation of Linux character driver IOCTL interface for dynamic testing by injecting tape commands to TDE.
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## **Technical Writing/Papers**

1. A novel mathematical formulation of GPU based parallelized derivative computation in similarity metrics for Image Registration (Internal). This idea is currently under the process of patenting. - 2015
2. Userspace I/O driver performance benchmarking (Internal) - 2010
3. Writing a Network Device driver. Published in Linux Gazette online magazine - 2003  
<http://www.tldp.org/LDP/LG/issue93/bhaskaran.html>
4. A performance based evaluation of ARMv8-A 32 bit and 64 bit execution. - 2017 (Under writing)  
<https://github.com/dinu81/phoenix/blob/master/doc/journal.tex>

## **Education**

- M.S Software systems (Distance learning course) 2006-2009, BITS Pilani (cgpa 5.8).
- B.Tech, Computer Engineering 1999-2003, Govt. Engg. College Trichur(71%).
- 12th (CBSE), Kendriya Vidyalaya Trichur. (88.8%)

## **Personal Details**

Date of Birth : 04-Oct-1981

Marital status: Married