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Professional Experience Summary

High Performance Computing Professional with 19+ years of collective experience in AI/ML, HPC applications, Distributed Storage, and Linux Kernel development.

- Strong aptitude for algorithm/application design and implementation. Involved in optimization, parallelization of applications in AI/ML, Storage and Image processing domains using high performance computing languages like OpenCL, HIP, CUDA on various HPC platforms like NVIDIA, AMD GPGPUs, and Xilinx FPGAs.
- Have prior background in Linux Kernel Programming, System integration, and troubleshooting skills. Experienced in working on embedded board bring-up, porting/developing embedded driver development on Linux.

Experience

AMD India (Senior Member of Technical Staff) — *Aug 2019 - till date*

Radeon Open Compute (ROCm)

ROCM (https://github.com/RadeonOpenCompute/ROCm) is a software development platform for Hyperscale-class GPU computing. ROCm comprises of several components ranging from Kernel Drivers, Compilers to AI/ML platforms like Tensorflow/PyTorch for AMD GPU Hardware. More information at https://github.com/RadeonOpenCompute/ROCm.

Involvement

- Adapting Rapids Data frame processing library (cuDF) for use AMD platform. My responsibilities included ownership of porting, testing, and benchmarking of multiple rapids sub-projects like rapids-cmake and RMM.
- Lead efforts to enable MLPerf based inferencing infrastructure on AMD GPU using TVM and AMDs MIGraphX backend for primarily ResNet50 and Bert models.
- Ownership of the ROCm Compiler Support (https://github.com/RadeonOpenCompute/ROCm-CompilerSupport). Aug-2019 – Sept-2021.

Aricent India (Principal Engineer) — *Oct 2017-Jul 2019*

Accelerated Storage IO library.

Distributed storage functions like erasure codes, encryption, de-duplications codes are compute intensive. Aricent has developed an accelerated storage I/O library that utilizes GPUs to improve encoding and decoding processes in various 2 erasure-code algorithms for CEPH. In addition to improving performance, the Aricent EC-offload-engine (ECoE) library frees up the underlying compute for other storage applications. My responsibilities included:

- Ideation, budgeting, procurement, recruitment, and management.
- Identification of latest erasure code algorithms for the ECoE library. Collaborated with IISc Bangalore with to use their “minimum storage regenerating erasure code” for Aricent solution.
- Preparing White papers, Blogs, Demos, Client interactions. Presented the work at SDC India and SDC Santa Clara 2018.

Open Hardware

Open Hardware envisions to reduce total cost of ownership for the telecom operators by delivering a reconfigurable, modular edge platform for high performing software defined radios (SDRs) using open-source solutions for wide scale adoption. Open HW platforms consists of CPU banks, FPGAs, DSPs and GPU to provide generic compute resources for multiple technologies like 5G, DOCSIS and AR/VR etc. My responsibilities included as a tech lead for

- Containerization of software based open source 4G stack called OpenAirInterface for OpenHW. Further involved in offloading components of OpenAirInterface code to Xilinx FPGA VCU1525 and integration with K8S, for NVIDIA GPU and Intel platforms.
- Responsible preparing business collaterals, demos (enabling voice calls through private network).

Canon Inc, Japan, and Canon India (Principal Engineer) ***Mar 2010 - Oct 2017***

Canon Parallel Image processing library,

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. My responsibilities included:

- As key contributor in designing, implementing, and enhancing a complete Parallel Image registration framework for both intensities based and point based image registration algorithms. This framework composed of algorithms like ICP, popular numerical optimizers, metrics, Resampler implemented using OpenCL. Involved in designing and developing Test automation framework using CPP unit/Python scripts.
- Performance analysis and comparison of OpenCV CUDA and OpenCL implementation of various image processing algorithms. Experience with porting image processing algorithms to CELL broadband engines using FOXC OpenCL compilers for performance analysis and benchmarking.

Canon Embedded Linux Platform.

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, supporting and fixing issues with GCC based toolchain and investigation of new Linux based technologies. My responsibilities as a Technical Lead (8 ppl team) included for:

- Porting of in-house Linux for Canon network surveillance SoCs, ZC-702/706, TI-BeagleBone black, AM437x etc. customization to Linux platform like enabling/porting support for OP-TEE (ARM TrustZone) on ZC-706 and Porting Alljoyn (IoT stacks) and application development for Canon Products.
- Building, testing, enhancing and maintenance of custom GCC 6.0 based Cross compiler toolchain with Multilib support for ARM v7/v8 32/64 bit and X86 32/64bit.
- Streamlining and automation of Linux kernel vulnerabilities investigation and Testing. Involved in framing an organization wide policy to contribute to mainline Linux kernel development.

Brocade communications, India ***Jan 2008 - Mar 2010***

SAS (Storage area services)

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. My responsibilities included:

- Ownership of virtual initiator module in SAS, also involved in handling SAS related customer issues and maintenance.
- Involved in every phase of porting, development, and enhancement of SAS (primarily Virtual Initiator module) to next generation platforms like in Brocade WAN optimizer.

Tata Elxsi (Specialist Engineer) ***Sept 2003-Dec 2007***

FCTMD (Fibre channel Target mode driver),

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

- Development of LSI Logic Fibre channel driver to work in standalone mode with real world devices and with Software RAID Controller system when required and a character driver interface with 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.

Technical Writing/Papers and Conferences

1. Accelerated Erasure Coding: The New Frontiers of Software-Defined Storage - 2018
   - Presented at SNIA SDC Santa Clara: https://www.snia.org/events/storage-developer/presentations18
   - Presented at SNIA SDC india: https://www.snia.org/events/sdcindia/presentations18
   - Business white paper: https://www.aricent.com/whitepaper/preview/17451
   - Blog: https://www.datacenterdynamics.com/opinions/why-erasure-coding-is-the-future-of-data-resiliency/ https://www.networkcomputing.com/storage/how-erasure-coding-evolving/155400422
2. OpenHW - A new era in mobile edge computing. Business white paper - 2019
3. A novel mathematical formulation of GPU based parallel derivative computation in similarity metrics for Image Registration - 2015
4. Userspace I/O driver performance benchmarking - 2010
5. Writing a Network Device driver. Published in Linux Gazette online magazine – 2003 http://www.tldp.org/LDP/LG/issue93/bhaskaran.html

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Education

1. ***Deep Learning Theory and Practice***, IISc Bangalore (Certificate course)
2. ***M.S Software systems 2006-2009***, BITS Pilani.
3. ***B.Tech, Computer Engineering 1999-2003***, Govt. Engg. College Trichur