
VENKATESH BOLLA ([Linkedin](#))

(Linux Kernel & Embedded Developer)

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Having **7+ years** of Experience in System software development/Architect **residing in Singapore** with emphasis on design and development of Linux Kernel, Fast Path, Dataplane, Controlplane, event machine, Networking and Various Embedded System Applications etc.
Passionate about working on openstack, NFV, 5G, LTE and telco.

Professional Summary

- Possessing Strong knowledge on **C & OS** internals
- Extensive knowledge on **Linux kernel programming**
- Having Experience on Implementing **Linux Device Drivers**
- Knowledge in **Writing Applications** involving **Multithreading**
- Experience on **Linux BSP** and platform driver initialization.
- Possessing good experience on **Porting** Linux on Embedded Boards
- Experience on Kernel and Application **Debugging** tools.
- Having Experience on **U-boot Customization** for Embedded Boards
- Having Knowledge on Linux **Socket** Programming.
- Experience on **Shell Scripting, Python.**
- Hands on Experience on Build tools and Source Navigators.
- Extensive knowledge on Linux **Kernel Instrumentation Frameworks**
- Sound Knowledge on Understanding the complete Embedded System including the Communications and Interfaces with the various devices.
- Having knowledge on Device tree.
- Finite automata, State machines, DFA & NFA algorithms, PCRE, Regex, Natural language processing, pattern matching, perf.
- **TCP/IP, networking and OpenSSL/TLS**, Routing stack, **IPsec**, VLAN, XDP, T-Rex, pktgen, and iXIA traffic gens.
- Hands experience on cutting edge high throughput technologies **ODP, DPDK and F-STACK, OFP, VPP, Network Virtualisation, HW offloading co-processors** and profiling multithreaded code, performance tuning, and SIMD/NEON intrinsics for high throughput.
- Traffic gens: iXIA, Trex, Scapy and Spirent. Stateful and Stateless.
- ASDL, ATM, AAL5 and segmentation and reassembly.

Employment History

- Working as Sr Software engineer in **Intel** Singapore from March 2020 to till date.
- Working as Sr. Networking Software Engineer on Linux in **Cavium networks Pvt Ltd**, from April 2015 to March 2020.
- Worked as a Software engineer on Linux in **Veda Solutions**, Hyderabad from December 2012 to April 2015.

Technical Skills

- **Operating Systems** : Linux, Embedded Linux, Windows
- **Architecture** : x86, ARM, ARM64, MIPS
- **Programming Languages** : C, Python
- **Bus & I/O Standards** : RS232, SPI, I2C.

Formal Education

- 2008-12: Bachelor of Technology in electronics and Communication Engineering from JNTUK with 68.07 %.

Project Details

ATM/ADSL and PTM/VDSL(Telco):

Description:

ATM and PTM Single Line and bonding, AAL5

Platform: Openwrt, Linux, MIPS32

Languages: C

Role: Developer

IPSec with OFP (Open Fast Path):

Description:

IPSec with OFP is security over internet, achieved by tunnelling (like VPN). And it also does offload cryptographic computations to our CPT specific hardware. Fastpath is achieved by creating fastpath interfaces naming fp0 and fp1 in provided CLI. If any unsupported feature its redirected to Linux slowpath via tun/tap device. Security associations and Security policies are automated using IKEv2 negotiation using Strongswan(Slowpath to Fastpath sync achieved by sending netlink msgs). Working on anti-reply code recently. Inner fragmentation and Outer fragmentation; Reassembly.

Platform: Linux, Aarch64, OFP, ODP, DPDK

Languages: C

Role: Developer

Kernel Packet Fwd Performance:

Description:

Benchmarking Linux network path with XDP(bpf) and compare it against DPDK l2/l3fwd.

Type: Assessment project

Used: Clang, iproute2

TCP/IP stack:

Description:

Custom TCP/IP stack implemented for performance reasons, it runs on top of DPDK. Designed for Cavium ARM64 proprietary product line. Which does full fledged TCP handshake and connection establishment and file transfer. Standard RFC implementation allows us to use standard TCP tools like apache benchmark, telnet, netcat.

Platform: Linux, Aarch64, DPDK

Languages: C

Role: Developer

Compression/Decompression Unit:

Description:

Compression unit is a Cavium patent coprocessor which does the job of compressing different compression algo like GZIP, LZS, Huffman without intervention of CPU cores. I have implemented same on Linux and ODP (OPEN DATA PLANE framework).

Platform: Linux-4.9, Aarch64

Languages: C

Role: Developer.

Data Deduplication:

Description:

DDF is a Chip implementation of cuckoo based algorithmic lookup engine which also includes bloom filter characteristics to improve the existence of data in the hard drive/physical storage/secondary storage devices. Eventually you will end-up having data without any duplicates. Duplications can be done certain levels. And heavily used in Datacenters which hold large data sets to save disk spaces in larger amount.

Platform: Linux-4.4, ARM64 Processors

Languages: C

Role: Module & Algo developer.

Summit: Given presentation on how effective RAID + DEDUP combination works together at **SNIA**.

HyperFinate Automata:

Description:

(Algorithmical Pattern matching/Search for DPI & IDS):

HFA Chip does the offloading the core intensive complex pattern matching from **MIPS/ARM64** based **OCTEON/ThunderX** Cavium Specific Family of processors. Supports Strings and Regex(PCRE) expression matching. Basically, it does DFA and NFA algorithmic pattern matching for optimized faster outcomes. Widely used in Deep Packet Inspection and Instruction Detection and Prevention Systems for Security purposes.

Platform: Linux-4.3, MIPS & ARM64 Processors

Languages: C

Role: Module & Algo developer.

Touch Screen Support for Navigation System:

Description: Navigation system shows the current GPS location. It contains Focal tech capacitive touch screen sensor which transfers the co-ordinates through serial interfaces using I2C and SPI. The features of ft5x are support multi-touch upto five points at a time. And its controller contains firmware which has fast detection algorithm.

Platform: Linux-3.10, ARMv7 cortex-A8 Processor

Languages & Tools: C, Qt, tslib

Team Size: 2

Role: Senior Member - module Developer

Responsibilities:

- Implemented focal-tech capacitive touch screen Module initialization & probing with information obtained from h/w device and host controller specification.
- Set up External interrupt for respond to touch screen multiple inputs and put them into wait-queue.
- Implemented input subsystem support to touchscreen device.
- Created root file system with various directories tree list by using file system utility Busybox.
- Porting the Module code onto embedded board through Ethernet by using tftp server.
- Cross-compile and port the tslib tool to calibrate touch values and set the pointer to absolute position.
- Test the demo apps in the Qt project on touchscreen module.

Bluetooth for Navigation System:

Description: Enable Bluetooth support to navigation system which supports following features : Transfer files or images between target and other bluetooth supported devices. And give support for audio streaming for bluetooth supported devices.

Platform: Linux-3.10, ARMv7 cortex-A8 Processor

Languages: C , Shell Script.

Team Size: 2

Role: Senior Member - System Developer

Responsibilities:

- Enable bluetooth support drivers in the kernel and create uImage.
- Cross-compile the bluez project and its dependencies and install them to appropriate root filesystem directories.
- Install dbus to support systembus management for bluetooth kind of apps.
- Porting the root filesystem onto embedded board through Ethernet by using nfs server.
- Tested Bluez utilities, host control interface, and Pairing with other bluetooth devices.
- Cross compile and load open-obex file transfer tools into root filesystem to transfer files to other bluetooth devices.

GPIO driver:

Description: GPIO driver gives the support to high level drivers to change the different functions for each multiplexed portpin. For that implement kernel APIs and patched to the kernel. Those APIs change the functionality, pullup/down, Multi driving, update data ,read data and also enable the external interrupts for port pins.

Platform: Linux-3.4.10, ARMv7-cortexA5.

Languages: C.

Team Size: 2

Role: Member - Module Developer

Responsibilities:

- Implemented gpio driver initialization which remapped all gpio base memory.
- Implement a logic which finds the port and port pin in the specified port.
- Implement an APIs to set the configure register of the given port pin with given functionality.
- Write an APIs to get pullup/down status and set different pull states.
- Write the APIs to enable external interrupts and set their modes to raise interrupt.
- Testing and debugging all the APIs on target board.

Self Development

Device tree update for Atmel-at91 SOC family:

Description:

This project required DT support for an existing customers product based on Atmel-at91 SOC. DT support was needed to update product to use new kernel features and support new driver model.

Platform: Linux-3.14, ARM9.

Languages: device tree script.

Team Size: 2

Tools : DTC

Role: Member - Developer

Responsibilities:

- Design and implementation of .dtsi and board dts files.
- Kernel bsp update with device tree support.
- Verification and test.

**Thanks for your time,
-Venkatesh Bolla.**