

Balakumaran Kannan

System Programmer

Linux system programmer having 9 years of experience with a Bachelor of Engineering degree specialized in computer science and engineering. Open source contributor, hobby blogger and a proud fan of Vim

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Bangalore

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Work Experience

Now
|
2019
Jun

Flipkart

System Engineer Bangalore

- Managing a private cloud - 2 Datacenters, 30K+ Baremetals, 70K+ VMs
- Linux release management, Driver porting, Kernel & Userspace debugging
- Live utilization metrics collection and analysis (minute level granular)
- In house VM life-cycle orchestrator development

2019
Jun
|
2014
Aug

Hewlett Packard Enterprise

Software Engineer - System Bangalore

- Owner of Service OS for ARM based switches
- Board bring-up, U-boot and Linux port to ARM platforms

2014
Aug
|
2012
May

SONY

Consultant Software Engineer Bangalore

- Linux kernel debugging

2012
May
|
2011
Jun

Tata Elxsi

Software Engineer Coimbatore

Education

2011
|
2007

B.E., Computer Science & Engineering

Jeppiaar Engg. College Chennai
72%

2007
|
2005

Higher Secondary Education

SRV Higher Secondary School Namakkal
92.6%

2005
|
2003

SSLC

Govt. Higher Secondary School Pattukkottai
93%

Skills

C

Linux

Python

Shell

Assembly

Work Highlights

Flipkart

- Performance impact analysis of L3-cache on VMs - perf, Linux schedule domain, qemu, IPI - Inter Processor Interrupt, VM_EXIT

HPE

- Syscon-reboot driver update in ARM64 to enable DDR self-refresh before reboot. Kernel idmap, Cache-line alignment. Done for enabling secure-boot
- Enabled D-cache in kexec-purgatory to reduce boot time significantly
- Kernel core-dump capture to remote server

Sony

- Open source contribution to Linux kernel - Fixed bugs in loopback interface and phy driver

Patents

Patents Granted

- [10862859] DHCP-HA service on a Blockchain

Patents Filed

- [20200195431] Multiple-site VPN secured by IPsec, using Blockchain
- [202141004517] Common IP based network communication between VM and Host
- System and method of optimizing VM disk data transfer time for cold migration by pre-loading page-cache

Projects

Now
|
2020
Jun


Utilization metric collector - Minute level granularity

 Flipkart  Bangalore

- Collect CPU, Memory, Network and Disk utilization every minute from 70K+ VMs across 2 DCs
- Architected the project end-to-end from design to delivery
- Developed a new method for VM-Host communication and patented it

2020
May
|
2020
Mar

Performance evaluation of virtual L3-cache

 Flipkart  Bangalore

- Thoroughly analysed the performance impact of exposing L3-cache information via Qemu
- Analysed the IPI (InterProcessor Interrupt) and corresponding VM_EXIT overhead of exposing L3-cache
- Used perf and perf-kvm tool to analyse the impact on Linux scheduler due to Linux schedule domain changes
- Used performance benchmark suites like schbench, sysbench, fio and NAS-PB
- Found out a loss of ~8% performance on scheduler intensive tasks

Now
|
2019
Jun

Other significant activities

 Flipkart  Bangalore

- Evaluated AMD EPYC CPUs
- Defining new VM types for customer needs - compute, storage, graphics-SIME, etc.,
- Customizing Debian for different Baremetals - Volume management, RAID configuration, Network configuration, etc.,
- VMC (Virtual Machine Controller) development.
- Custom Image Builder development. Customer can build custom images on top of the image provided by us and use it on their VMs. Similar to Google custom images.

Now
|
2017
May

Linux OS development for ARM & ARM64

 Hewlett Packard Enterprise  Bangalore

- Brought-up two boards. One is an ARM64 based SoC provided by NXP, another is an in-house developed ARM32 SoC
- Prepared our own Linux distribution using Yocto
- Worked on kernel config and userland package selection
- Managed device-tree changes for the board
- Fixed multiple compile-time and bring-up issues

Now
|
2018
Sep

Bootloader development for ARM32

 Hewlett Packard Enterprise  Bangalore

- Developed First Stage Loader (FSL) for the in-house build ARM32 platform
- U-boot is configured, built and kept as an integral part of FSL
- After console and DRAM initialization, control will be given to u-boot
- Worked closely with hardware team for DRAM initialization sequence and BIST enablement

Now
|
2017
May

Other significant activities

 Hewlett Packard Enterprise  Bangalore

- Updated syscon-reboot driver to set DDR in self-refresh mode before reboot. It required a proc-fs file creation, an ideal mapping section in kernel and careful alignment of reset code.
- Enabled D-cache in kexec purgatory code, which reduced boot time
- Debugged multiple early-boot issues with early_printk and JTAG
- Spent significant amount of time with ARM, ARM64 Assembly code
- Designed a core-dump capture system to capture kernel-core dump via NFS

Projects

2017
May
|
2014
Aug

HA/RFS module development

 Hewlett Packard Enterprise  Bangalore

- Owner of High-Availability [HA] and Redundant File System [RFS] modules for a range of HPE procurve switches
- Played a key role in the core-team that developed Front Plane Stacking [FPS] switches
- Re-architected HA/RFS modules to make it work seamless in both BPS and FPS environment
- Participated in complete development cycle - Design, Develop, Test and Maintenance

2014
Aug
|
2013
Apr


Preparation of SONY Linux

 SONY  Bangalore

- Part of a team that developed a Linux distribution for SONY devices
- Ported open source network packages like Curl, OpenSSL, Squid, IPSEC tools
- Performed IPv6 Ready Logo tests with TAI test framework
- Identified bugs with Linux kernel. Contributed fixes to kernel community

2013
Mar
|
2012
May

Networking library development

 SONY  Bangalore

- Developed a network library with wired and wireless support
- It was used in SONY TVs and Blu-ray DVD players and are still in use
- Participated in all phases of development cycle

2012
May
|
2011
Jun

Application development for connected devices

 Tata Elxsi  Coimbatore

- Developed two prototype applications - BigFlix and Flickr - on Samsung Smart TV, Panasonic ViEa connect TV, Roku and BOXEE streaming player