

PINTU KUMAR

Mobile : +91 99450 59943

Email : pintu.ping@gmail.com ; pintu_agarwal@yahoo.com

LinkedIn: <https://in.linkedin.com/in/pintu-kumar-agarwal-b73a31b>



Seeking for an opportunity in core Linux Kernel areas in an R&D company, which can provide me a platform to apply my innovative ideas to develop futuristic embedded Linux product

Overall Summary:	More than 10 years of experience in Embedded Linux product development
Roles Played:	Individual contributor, Technical Leader, Troubleshooter, Mentor, Researcher
Major Work Background:	Base Linux Kernel development, Tizen/Android smart phones/devices board bring up, feature enhancement/porting, investigation, prototyping, tools, open source contributions, memory management subsystem, robotics design, Linux Real time system design, etc.
Onsite visit and Visa:	South Korea, Taiwan, Japan, US (B1/B2 multiple entry visa: valid till 2023)

Experience (Overall: ~15 Years)

System Software Architect (Linux Kernel Team), Sony India, Bangalore	Nov/2017 – Till Date
Principal Engineer, Samsung R&D India – Bangalore	(8+ years) Sept/2008 – July/2017
Senior Engineer, Sasken Technologies Ltd – Bangalore	(4+ years) Feb/2004 – Sept/2008

Qualification (B.E. + M.Tech)

M.Tech (Embedded System), Manipal University – Bangalore	(July/2012 – Feb/2015), CGPA: 9.09
[Equivalent to Canada's Master Degree – WES Report Available]	
B.E (Computer Sc. & Engg) – KIIT, Bhubaneswar, India	(1997 – 2001) SCORE: 73.6 %

Skills Highlights

C, C++, Linux kernel, device driver, u-boot, smart phone bring-up, Tizen, Android, Ubuntu
Experience in Linux Board bring-up across various chipsets (SPRD, MEDIATEK, MSM, EXYNOS, OMAP)
Proven ability in Linux Kernel development, enhancement, issues investigation, feature porting and upgrades.
Majorly worked in Linux Kernel Memory Management subsystem: (prototype design and feature integration) ION/DMABUF buffer sharing, Tizen DRM-GEM design, CMA, ZRAM, LMK, low-memory system design, etc.
Experience in Kernel code size reduction, boot time reduction, memory optimization, performance tuning, sluggish improvement, Linux Robotics and Linux real-time (preempt-rt, Xenomai) model design and demos.
Linux kernel mainline contributions, back-porting patches, reviews, bug reporting, proposals, discussions, participation and speaker in various Embedded Linux Conference (ELC) world-wide.
New Technology Evaluation: XENOMAI, RISC-V, PSI, OPEN-AMP, etc.
Good kernel debugging skills with ability to investigate and find the exact root cause of the issue.
Others: Agile/Scrum, git/gerit, yocto, kselftests, perf, systemd, qemu, gdb, trace-32, ramdump, memps, rt-tools
Major Interests: Linux board bring-up, Kernel memory management, Kernel upstream contribution, Linux based IOT/Robotics/Drones/Automotive bring up, research topics or value additional with in kernel, etc.

Achievements & Awards

Linux Kernel Mainline Contributions: [purely my own ideas]
https://lore.kernel.org/lkml/?q=pintu
https://git.kernel.org/cgit/linux/kernel/git/next/linux-next.git/log/?qt=grep&q=pintu ;
Some of the contributions includes:
* ION buffer sharing utility ; split cma-reserved in dmesg ; introduce CMA total/free in meminfo ; introduce oom_kill counter in vmstat ; proposal for shrink_memory node in /proc/sys/vm/ ; others
Git Hub Contributions: https://github.com/pintuk

Received Performance Excellence Award in SONY-2019 for the outstanding contributions done last year.
Technical showcase and demo presentation in SONY Open House – 2019
Complete architecture, design and coding of Tizen based robotic model bring up (both hardware and software): Check Video demo here: https://www.youtube.com/watch?v=n885XMAh7kI&feature=youtu.be Code contributed to Tizen open source : https://git.tizen.org/cgiit/contrib/robotics/
Technical paper presentation in Embedded Linux Conference World-wide: Tokyo [July/2019]: Xenomai based real-time automotive model – Link: XENOMAI-RT-MODEL.pdf San Diego [April/2016]: Tizen-based-Remote-Control-Robot – PDF - ELC2016-TIZEN-RC-CAR.pdf San Jose [March/2015]: System-wide-Memory-Defragmenter.pdf [<i>Samsung Best Paper Award, 2015</i>] Japan [June/2012]: Linux Memory Fragmentation : Observation and Analysis on Smart Phones [PDF here]
Submitted many potential patents, ideas, proposal, and demos during my tenure in Samsung.
Samsung Employee of the month award – Nov/2014 (for first time Tizen bring-up on Mediatek)
Presented Technical papers and demos in Samsung Technical Challenge (NIPUN) – 2010/2011/2012
Presented a Technical Paper in Sasken Technology Conference – 2007
Received Spot Awards during Sasken tenure – 2004/2006/2007

Major Projects Highlights

SONY Contributions	Nov/2017 – Till Date (SONY)
<ul style="list-style-type: none"> Several contribution in Base Linux Kernel Development for Sony's future products. Resolved many issues in Sony Kernel feature such as: page fault issue, cpu lock up issue, semaphore locking issue, smap issues, sync issue, rebooting issue, irqsoff latency issues, kernel oops, backtraces, etc. Investigation about DRM/HDMI display bring-up after snapshot boot resume on i.MX6 board (in progress). Porting and improvement of unique-page, zswap feature from Kernel 3.0 to 4.9 to reduce snapshot-image size. Complete design and implementation of GPIO IRQ affinity feature (including snapshot boot suspend/resume support) for i.MX7 board with Linux Kernel 4.1. Using this, now GPIO devices can use the dedicated CPU. Detailed investigation of Kernel vDSO support for ARM-32 boards (i.mx7, pi2). 	

Value Addition:

- Mentorship:** for M.Tech college intern to explore new technologies in Kernel areas.
- OpenAMP:** Investigation about OpenAMP and rpmsg/remoteproc interface in Kernel (**in progress**).
- PSI:** Investigation and experimentation about PSI feature in mainline Linux Kernel 4.20 → 4.9 (**in progress**).
- REAL-TIME:** Xenomai 3.0 bring up, evaluation, prototype, demos with Kernel 4.9 on various x86/arm boards.
 - First time Xenomai Kernel 4.9 bring up on Qualcomm chipset sdm845, Resolved many boot up issues.
 - Complete architecture, design and implementation of **Xenomai based real time robotic model** using Raspberry Pi-3 and Linux Kernel 4.9. Demonstrated the working ideas in various forums.
- RISC-V:** RISC-V Linux Kernel 4.18 bring up and evaluation on QEMU environment.

Used – C, Linux Kernel, i.MX{6/7}, Raspberry Pi, Beagle Bone, Hikey620, Qualcomm Snapdragon-845

TIZEN Smart Phone Development [SPRD chipset]	April/2014 – June/2017 (Samsung)
<i>[Complete ownership for India/Asia model release]</i> Samsung Z4 & Z2 Model (SC9830, 1GB, 4GLTE), Z3 (SC7730, 1GB, 3G), Z1 (SC7727, 768MB, 2G): <ul style="list-style-type: none"> Technical Leader for Tizen Kernel/BSP team including individual contributions below: First time Tizen smart phone bring up on Spreadtrum (SPRD) chipset with Linux Kernel 3.10. Initial Zinitix touch screen driver bring up and customization for Tizen Z4 model. Improving SPRD-DRM-GEM (drivers/gpu/drm/sprd) and ION buffer sharing mechanism. Enhancing and tuning memory management areas [ION, CMA, ZRAM, OOM, LMK, vmpressure, etc.]. Finding issues in vendor kernel, back porting patches from mainline to improve system stability. 	

<ul style="list-style-type: none"> Proposed and implemented several new features in kernel: reduced daemon swapping, dynamic low memory killer, automatic system-wide memory shrinker and compaction, slow path monitoring, oom kill count monitoring, cma tracking, sgt-list allocation fallback, exact mem-available feature, gem buffer tracking, etc. Developed sluggish-test utility to quickly reproduce sluggish behavior and find root cause. Others: mainline patches porting, gerrit code review, vendors follow-up, ramdump analysis, log analysis, issues investigation, boot time analysis, sluggish analysis, memory leak analysis, memory failure analysis, etc. Proposal to enhance Tizen ecosystem for OEMs and thereby promoting chipset vendors to adapt Tizen. 	
Platforms/Software Used - C, Linux Kernel 3.10.xx, Tizen 2.3/2.4/3.0, Spreadtrum (SPRD) chipset	
TIZEN - MTK Bring up (MT6571 chipset, RAM: 512MB) [1 month onsite in Taiwan MTK HQ]	Nov. 2014 – March 2015 (Samsung)
<ul style="list-style-type: none"> First time Tizen smart phone bring up on Mediatek chipset (MT6571) with 512 MB RAM, Kernel 3.4. Kernel customization, console shell bring up, Kernel patches porting, Tizen sdb shell bring up. First time, complete architecture and design of MTK-DRM-GEM (drivers/gpu/drm/mtk) for Tizen Graphics/Display bring up on Mediatek smart phones. Kernel memory optimization (~12 MB), kernel boot time reduction, issues analysis and investigation. Received “Employee of the Month Award” and appreciation from MTK folks. Finished bring up in 3 weeks. 	
Platforms/Software Used - C, Linux Kernel 3.4, Mediatek chipset, Tizen 2.3	
ULC Feature Phone Bring up (SC6821 chipset, RAM: 128MB)	Aug 2013 – Jan 2014 (Samsung)
<ul style="list-style-type: none"> First time Tizen bring up on Spreadtrum (sprd) chipset with 128MB RAM, and NAND flash (UBIFS). First time, complete architecture and design of SPRD-DRM-GEM (drivers/gpu/drm/sprd) interface for Tizen display/graphics bring up on smart phones and make it light weight and portable. Kernel code size reduction below 5MB, reserved memory reduction below 40MB, boot time below 40s. ZRAM driver integration, CMA/ION backporting (3.8 to 3.0) to save ~8MB reserved, performance tuning, etc. Implemented SWAP field in Tizen memps utility to show used swap space by each process. 	
Platforms/Software Used - C, Linux Kernel 3.0, SPRD (sc6821)	
TIZEN Smart Phone Bring up on QUALCOMM (QC) chipsets 3 months onsite leader for base camp @ San Diego & Hyderabad]	Sept 2012 – July 2013 (Samsung)
<ul style="list-style-type: none"> Co-worked with QC team for first time Tizen menu-screen bring up on QC chipset – 7x25, 8x10. Reserved memory analysis and optimization. CMA, COMPACTION, ION, ZRAM porting and stabilization. System stability issues analysis, OOM analysis, memory/fd leak analysis, DRM-GEM/ION buffer sharing. 	
Platforms/Software Used - C, Linux Kernel 3.4, MSM8974, MSM7x25, MSM8x10, MSM8x26	
TIZEN – ION/DMABUF Investigation and Integration	Mar 2012 – Aug 2012 (Samsung)
<ul style="list-style-type: none"> First time study and demonstration of ION and DMABUF buffer sharing mechanism in Kernel. Developed sample drivers to verify zero-copy in Kernel/User space using DMABUF and ION mechanism. Co-work with HQ counterpart and Tizen Graphics/Multimedia team in integrating the whole solution for Tizen smart phones. 	
Platforms/Software Used - C, Linux, Kernel 3.0, Exynos 4420, MSM 8974	
SLP - Linux Memory Fragmentation (Analysis & Research)	April 2011 – Dec 2011 (Samsung)
<ul style="list-style-type: none"> Detailed study, experimentation and research about Memory Fragmentation problem in Linux Kernel. Developed sample modules and utility to measure fragmentation level across each zones and orders. Conducted several experiments and implemented techniques in Kernel to improve page allocation success rate by about ~90%. Check ELC Paper [here] Suggestion to backport memory compaction from mainline Kernel 2.6.36 to track memory fragmentation. 	
Platforms/Software Used - C, Linux, Kernel 2.6.32/36	

Samsung Boot loader Development (Loke3/s-boot)		Aug 2010 – Mar 2011 (Samsung)
<ul style="list-style-type: none"> Complete development and bring-up of Samsung Loke3 boot loader (aka s-boot) for OMAP4 board. S-boot customization, UART bring-up, i2c interface, USB and charging support, LCD bring up, partition management, ODIN protocol porting, binary flashing and downloading mechanism, kernel booting etc. 		
Platforms/Software Used - C, Linux, u-boot, X-loader, OMAP4430, omapflash, Odin		
CDR – SD Card Data Recovery Solution for Mobile Phones		May 2010 – July 2010 (Samsung)
<ul style="list-style-type: none"> Complete architecture, design, porting and implementation of Samsung patented data recovery solution for Linux based mobile phone. Implemented multi-threaded sector scanning capability to speed up formatted card recovery by 1/4th times. Implemented new features such as: date/filename based recovery, listing deleted files, automatic detection of mount point, recovery progress status, automatic detection of memory leaks etc. 		
Platforms/Software Used - C, C++, Linux, FAT32 file system		
SASKEN - PROJECTS		Feb 2004 – Sept 2008 (Sasken)
<u>TUX4.0 - Linux Based VoIP Phone Development (Nortel Networks)</u>		
VCOM driver porting, reduced licensing cost by porting open source gcomm library to core upload module , implemented ideas for automatic core upload to MSC card during boot up , resolved many critical issues such as initial clipping of voice.		
<u>SHARP – GPS Driver Porting (Texas Instruments)</u>		
Complete porting and integration of TI GPS Linux driver for sharp mobile including SUPL interface.		
Platforms/Software Used - C, C++, Linux Kernel 2.4, 2.6, Shell scripting, PPC, OMAP3430		