Vinay S. Banakar

Senior Systems Engineer
Hewlett Packard Enterprise R&D Labs
Bangalore 560048

vinay.s.banakar@gmail.com
www.vinaybanakar.com
Phone: +91 7204662429

Areas of interest

Systems (Distributed, data intensive computation), Data + privacy management, Systems ML.

Research Experience

Research Fellow Remote
UT Systems and Storage Lab
University of Texas at Austin
Spring 18 – present

https://arxiv.org/abs/1903.04880 *HotStorage'19*

Advisor: Prof. Vijay Chidambaram

- We primarily investigated the impact of privacy policies like GDPR on storage systems. We modified Redis to strictly comply with GDPR requirements and found up to 20X drop in throughput. This illustrated how retro fitting existing storage designs to work efficiently with new privacy policies is inadequate, and also demonstrated how GDPR is really a compliance spectrum. This work was published at *Usenix HotStorage 2019.*
- To substantiate our findings on how compliance should be both efficient and strict, we modified PostgreSQL to be GDPR-compliant and measured the performance degradation using *YCSB*.
- We also built *GDPRBench*, a GDPR specific benchmark that will allow users to assess compliance level of a storage system and helps evaluate compliance-performance tradeoff.

Senior Systems Engineer
fall 18- present
Systems Engineer
fall 17- fall 18

Hewlett Packard Enterprise R&D Labs

Systems Architecture Lab: Dr Kimberly Keeton [Fall'19 – present]

- We intend to enable comparison between traditional cluster-based HPC programming model (*openSHMEM*) and a programming model designed for disaggregated persistent Fabric Attached Memory (*openFAM*) by designing and building memory driven application kernels using openSHMEM Benchmark Suite.

Software Defined Cloud Group [Fall'17 – present]

- I build software products for hyper converged datacenter infrastructure, especially to manage large scale datacentre hardware (*HPE OneView*).
- My research focus here is on easing Datacenter operability, to maintain minimum downtime and to improve hardware lifecycles.
- Contributed to Distributed Management Task Force (*DMTF*) *Redfish* features in OneView as part of Facebook's *Open Compute Project* initiative. Designed and built many components for OneView, namely OS boot management, Dynamic BIOS configuration, *Plexxi switch* port map configuration, Generic blade server device module management etc.
- Built *ServeFish* a tool that simulates any redfish compliant server hardware that helps engineers understand the capabilities of different servers in the market. This simulated server can also be imported into OneView like any other and will help perform scale analysis.
- I presented my work on predicting firmware-hardware compatibility failures in large clusters at *HPE TechCon* 2019 held at Houston, TX.
- Have filed 3 US patents relating to identifying failure root causes, intent/workload driven hardware placements and compatibility failure detections.

Advanced Development Group (CTO office): Tom Golway [spring'18]

- Helped develop *EBLAS* (Ethereum Blockchain Lab As a Service), a rapid application development and deployment platform for Ethereum DApps with automated REST endpoints generated for interactions with smart contracts. Presented at HPE World Wide Ambassador Summit'18, Dallas TX.

Research Intern
Converged Datacentre Infrastructure Team
Hewlett Packard Enterprise R&D Labs
Spring 17

HostSim: proposed and implemented a virtual host simulation platform that mimics *ESXi* instances in a VMware vCenter cluster. Scaled up to 800+ simulated hosts which were leveraged for performance evaluation in OneView. Simulated instances also supported mock network configurations.

Developer Intern
Signzy Technologies
www.signzy.com - *Fall 16*

Developed company's product mail service API using Mandrill in Nodejs.
Built peripheral UI components with unit testing using mocha and jasmine
Investigated smart contracts use cases for KYC real time validation.

Research Associate
Centre for Cloud Computing
and Big Data (CCBD)
PESIT
Spring 15

Advisor: Dr K. V. Subramaniam

- *High throughput image processing using GPU Enabled Apache Storm*, proposed and developed minimal GPU support for Storm with *jcuda* and designed haar-cascade topology for face detection in images, we observed 6x throughput improvement between GPU and non GPU topology for processing 16000 raw images with 6 local worker nodes.
- Indian Premier League (Cricket) team score prediction using K-means clustering on Spark with 5 years of previous IPL data hosted on HBase.

Awards and Accomplishments

- 2nd place at MyWired *Open hack* 2016, by Cowrks.
- 2nd place at SimpliHack'15, hackathon by Simplilearn**.** Named the best out of the box thinking award.
- Certificate of recognition by Microsoft – 2014, for demonstrating Excellency in windows app development.
- One of very few to have reached level 5 at Google FooBar Challenge, was offered interview by Google.
- Ranked among top 1% globally in ProjectEuler, a series of challenging mathematical problems intended to be solved with computer programs.
- Multiple certificate of Appreciations – HPE RnD group 2018, for presenting at *Technical Symposium'18 and 19***.**
- Distinction Award at PESIT, Semester wise cash prizes for excellent academic performance.
- Acknowledged by *Dr William Stallings* in *Preface* of the book "**Effective Cybersecurity**: Understanding and Using Standards and Best Practices" for my contribution, book released in July '18.
- Winner of 2018 ReportBee Research Fellowship.

Patents and Publications

[1] **Topology based root cause triangulation of hardware issues in datacentres**
US patent filed. - 2018

[2] **Pre-emptive compatibility failure detection using graph structure learning in Datacentre.**
- US patent filed – 2018 and presented at *Techon'19, Huston TX* (Annual HPE research conference)

[3] **Dynamic infrastructure management for generic hardware systems using Redfish**
Nominated for Defensive publication, accepted at *Technical Symposium'18* HPE. - 2018

[4] **Intelligent orchestration of disaggregated applications based on class of service**
US patent filed – 2019

[5] **Analyzing the Impact of GDPR on Storage Systems**
USENIX HotStorage19 - 11th USENIX Workshop on Hot Topics in Storage and File Systems

[6] **Intent driven hardware placement using rack capability inference engine across Datacentres**
US patent filed – 2019 – More work done on this is submitted to *IEEE Infrastructure 2019*

Education

PES Institute of Technology (PESIT), Bangalore *2013-2017*
B.Eng in Computer Science and Engineering - CGPA: 8.26/10
Relevant Coursework: Advanced Algorithms, Data Structures, Computer Organization and Architecture, Operating Systems, Computer Networks, Digital Design, System Modelling and Simulation, Software Engineering, Network management, Analysis and design of Algorithms, Database Management Systems, Unix system Programming, Big Data Analytics, *Applied Machine Learning*.

KLE integrated Pre-University College, Bangalore *2011-2013*
Science, specialization in Electronics – PCME: 93%

Computer Skills

Intermediate: Java, Python, JavaScript, PostgreSQL, Chef, CSS, HTML, Node.js, Maven
Basic: C, Golang, JQuery, Solidity, Latex.

Contributions and communities

- Part of HPE TechCon 2020 review committee.
- Invited speaker at *Virtue insight Blockchain 2019* conference - *How GDPR is a double edged sword for Blockchain*
- Open source contributor for Apache Ratis, a java implementation of Raft consensus algorithm.
- Club Secretary – Toastmasters International, 2017.
- Volunteer for *Igniting Young Minds*, as part of the NGO every weekend we teach orphans and under privileged children basic education and life lessons and occasionally take them to field trips.
- Event conveyer of Ayana 2016, Annual open hackathon at PESIT.
- Head designer and web developer of *Aatmatrisha'15* (Annual techno cultural fest)
- Microsoft Student Ambassador, PESIT, 2015.
- Web development head and founding member of Entrepreneur-Cell (*E-Cell*) at PESIT, 2014.
- Helped organize hackathons: Endeavour'14, hackEye'14, Accsathon'14, #Code'16.
- Member Technical Staff at Ordell Ugo, PESIT, 2013.
- Artifact Evaluation Committee member: *27th ACM Symposium on Operating Systems Principles-SOSP 2019, CA*