Vinay S. Banakar

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Areas of interest

Systems (Distributed, data intensive computation), Storage, Privacy and Systems ML.

Research Experience

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

http://arxiv.org/abs/1910.00728 GDPRBench
https://arxiv.org/abs/1903.04880 *HotStorage'19*
https://www.gdprbench.org

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 thus observed up to 5x drop in throughput.
- We also built *GDPRBench*, a GDPR specific benchmark that allow users to assess compliance level of a storage system and helps evaluate compliance-performance tradeoff. This work is submitted to VLDB 2020.

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]

- Enabling 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 applications/benchmarks similar to 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 like Boot Order, dynamic BIOS configuration, CNA/HBA portmap configuration, 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.
- Have filed 3 US patents related to identifying failure root causes, intent/workload driven hardware orchestration and compatibility failure detections.

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

- Helped develop *EBLAS* (Ethereum Blockchain Lab As a Service), an application development and deployment platform for Ethereum DApps. It was intended to ease decentralized application development and management by providing automated REST endpoints for smart contracts deployed. This work was 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 as hosts 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 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 GPU support for Storm with *jcuda* and designed haar-cascade topology for face detection in images, we observed 6x throughput improvement between GPU enabled and normal Storm.
- 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.
- Won first prize in TechnoBiz track at 8th IEEE international conference on Cloud Computing in Emerging Markets (CCEM) 2019.

Patents and Publications

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

[2] **Preemptive compatibility failure detection using graph structure learning in datacentres**
- US patent filed – 2018

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

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

[5] **Intent driven hardware placement using rack capability inference engine across Datacentres**
US patent filed – 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.
Frameworks: MPI, openMP, openSHMEM, TDD

Contributions and communities

- Part of HPE TechCon 2020 review committee
- Artifact Evaluation Committee member: 27th ACM Symposium on Operating Systems Principles-SOSP 2019
- Invited speaker at *Virtue insight Blockchain 2019* conference - *How GDPR is a double edged sword for Blockchain*
- Open source contributions: Apache Ratis, Postgresql and YCSB
- Volunteer for *Igniting Young Minds*, as part of the NGO every weekend we teach orphans and less 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.
- Member Technical Staff at Ordell Ugo, PESIT, 2013.