Roshan R Nair

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Education

Birla Institute of Technology and Science, Pilani (Goa Campus)   Aug. 2015 to Aug. 2020
- M.Sc. (Hons.) Mathematics   (CGPA: 8.79/10)
- B.E. (Hons.) Electrical and Electronics Engineering

Industry Experience

Samsung Semiconductor India Research, Staff Engineer   Aug. 2020 to Present

Project: FDP eco-system   Oct. 2023 to Present

I currently work on enabling NVMe FDP in various eco-systems (like Meta's CacheLib) along with studying the benefits and trade-offs that come with using FDP. I also work on workload analysis, data grouping problems and multi-tenancy in the context of FDP.

Project: Distributed Block Storage   Aug. 2020 to Sep. 2023 (3 years 1 month)

Worked on Samsung's in-house disaggregated (controller-storage) distributed block storage solution which leveraged SPDK and NVMe-OF. Some of my research outputs as well as key contributions by leading end-to-end module development are:
- State machine replication using Consensus Algorithms (specifically Raft)
- Flexible node scaling and failure management
- Data and meta replication and recovery: N-way synchronous replication
- Load balancing policies: Researched different policies and simulated various cluster configurations to analyze the policies. This work lead to the design of the optimized load balancing policy used in the in-house solution.
- Performance analysis: Built an in-house framework to identify various performance deficiencies (ex. using flamegraphs, load distribution, etc.)
- Internal benchmarking whitepaper comparing Ceph with the in-house solution on architecture and design along with KPIs like BW, IOPS, Latency, etc.

Samsung Semiconductor India Research, Software Research Intern   July 2019 to July 2020 (1 year 1 month)

Worked on the research problem of Multi-Workload Identification in DC environments.
- Created a framework to run different workloads (OLTP, OLAP and ML/AI workloads) on a SPDK target and collect data from different layers of the Linux Kernel.
- Developed a ML module using classifier-chains to identify multi-workloads in a DC environment.

Invento Robotics, Software Intern   May 2017 to July 2017 (2.5 months)

- Worked on implementing a Face Detection and Recognition module on Raspberry Pi for Invento's in-house robot - "Mitra".

Publications

Numerical solution of a nonlinear fractional model for hepatitis C by using Haar wavelets   Amit Setia, Pushpendu Ghosh, ***Roshan R Nair***   2018

AIP Conference Proceedings 🔗 ()

Patents

Device and method for data replication in disaggregated distributed storage system, *First Inventor* — US Patent, Filed 2022

Method and system for performing replication recovery operation in a disaggregated distributed storage systems, *First Inventor* — US Patent, Filed 2022

Method and system for distributing and managing io in a disaggregated storage architecture, *Inventor* — US Patent, Filed 2022

A system and Method for Multi-Workload Identification, *First Inventor* — Indian Patent, Filed 2022

Teaching

Birla Institute of Technology and Science, Pilani

TA, EEE F244: Microelectronic Circuits		Spring 2019
TA, MATH F312: Ordinary Differential Equations		Fall 2018
TA, MATH F214: Elementary Real Analysis		Fall 2017

Academic Research Projects

Mathematical modelling and stability analysis of fake news spread with Simulink — Spring 2019

Stablity Analysis of linear and non-linear dynamical systems — Spring 2017

Study of Vaccination as a control strategy for Swine Influenza — Fall 2018

Additional Experience And Awards

Employee of the Month Samsung Semiconductor - March 2021

Chief Coordinator The Literary and Debating Club, BITS Pilani (August 2016 - August 2017)

Editor, College Magazine BITS, Pilani (August 2016 - August 2017)

INSPIRE Scholarship, (Jan 2017) Scholarship rolled out by the DST - Gov. of India to top students pursuing natural sciences.

Skills and Technologies

c++, python, c, bash, ansible, tox, vagrant, ceph, spdk, nvme-of, ML, storage, distributed systems, mathematical modeling, dynamical systems

Languages

English - Full Fluency, Malayalam - Native, Hindi, Kannada