

Anil Yelam

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STATEMENT

I am broadly interested in building/improving systems and networking stacks that underpin modern cloud platforms. At UC San Diego, I am advised by **Prof. Alex Snoeren** and my current work focuses on developing systems for remote/disaggregated memory architectures.

EDUCATION

- **University of California San Diego** San Diego, CA
PhD in Computer Science *Fall 2018 - Present*
- **Indian Institute of Technology Kharagpur** Kharagpur, India
B.Tech. in Computer Science and Engineering *Aug. 2010 – July. 2014*

PUBLICATIONS

- **SmartNIC Performance Isolation with FairNIC: Programmable Networking for the Cloud** – Stewart Grant*, Anil Yelam*, Maxwell Bland and Alex C. Snoeren. *SIGCOMM '20* (*Co-first authors)
- **Covert Communication In The Cloud With Lambdas** – Anil Yelam, Shibani Subbareddy, Keerthana Ganesan, Stefan Savage and Ariana Mirian. *The Web Conference '21*

RECENT PROJECTS

- **High-Performance CPU scheduling on Remote Memory (In Progress)** – Memory disaggregation decouples and pools CPU and DRAM in rack to provide resource efficiency benefits but it comes at the cost of application performance due to increased memory latencies. I'm working on a CPU scheduler that hides this cost for highly-parallel applications while retaining traditional programming abstractions for backwards compatibility.
Keywords: Disaggregated Memory, CXL, Remote Paging, Userfaultfd, Shenango, Memcached, LinuxMM
- **NIC-assisted object serialization for managed runtimes** – Serialization consumes a significant portion of computation in modern data platforms like Spark. I explored the feasibility of offloading this work to NICs using their DMA capabilities to gather and serialize Java objects during transmit.
Keywords: Apache Spark, RDMA, PCIe & DMA concepts, JVM development
- **Covert channel in Cloud with Serverless functions** – Demonstrated the potential for a covert channel in the Cloud using serverless functions (lambdas) on major clouds like AWS and Azure. We developed a new co-residence detection technique for lambdas (a la MAC protocols) that breaks cloud isolation to detect lambdas running on the same underlying server, enabling the covert communication.
Keywords: Cloud security, Lambdas, Covert channels, Cloud cartography
- **Multi-tenancy in Programmable NICs** – Offloading computation to programmable NICs offers a scalable way for network processing at higher (40&100G) network speeds. In this work, we developed performance isolation mechanisms on these NICs to enable these offloading benefits for tenant VMs in the cloud, enabling easier adoption of these NICs in the Cloud.
Keywords: SoC SmartNICs, NIC Drivers & Firmware, Linux SKB, DPDK, C, Python

EXPERIENCE

- Research Collaborator, VMware Summer 2021 – Present
- Research Intern, VMware (**Mentors:** Radhika Niranjan Mysore, Marcos K. Aguilera) Summer 2021
- Teaching Assistant, Graduate Distributed Systems Spring 2020
- Software Engineer, Microsoft Azure 2014 – 2018

AWARDS AND ACHIEVEMENTS

- **Institute Silver Medal** and **Bigyan Sinha Prize** for the best academic performance at IIT Kharagpur, 2014.
- Top 0.1% in top-tier engineering entrance exams in India (JEE, AIEEE) that saw over a million applicants, 2010.
- Multiple promotions during the three years at Microsoft for exceptional performance in the Azure Database team.
- **Patent** for Automated Database Index Recommendations for improvements in Azure SQL Database, 2015.