Sid **Agrawal**

Software Engineer · Ph.D. Candidate

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Summary

Software engineer with 8 years of experience seeking full-time system software development roles. Prior experience in kernel (Linux, seL4) development, DevOPs, and micro-services.

Does not require authorization in Canada (citizen) and has an I-140 approved for the US.

Work Experience

Systopia Lab, University of British Columbia
Vancouver, Canada

PhD Candidate | Engineer, Research and Development — *Jan 2021 - present*

- Develop a new OS on the seL4 microkernel to demonstrate research ideas related to isolation mechanisms. Source Code & Wiki.
- As part of that new OS, developed hypervisor, device drivers, and new isolation mechanisms. 50K SLOC in C.
- Modified Linux kernel to replicate part of the new OS's functionality in Linux's memory subsystem.
- Research optimization in the Linux's memory subsystem and kernel compartmentalization techniques.
- Led and mentored a team of three engineers for the development effort.

ARM
Remote

Intern, Research - Operating Systems Security — *May 2022 - Aug 2022*

- Ported a microkernel (seL4) to ARM's Morello experimental platform with hardware capability support (CHERI). Blog & Source

Arista Networks
Vancouver, Canada & SF Bay Area

Software Engineer — *Sep. 2016 - Dec. 2020*

- Developed and deployed (k8s) micro-services to detect, triage, and fix faulty testbeds.
  This automation led to savings of 10s of person-hours per month per engineer.
- Developed and deployed services to store distributed file systems blob data in a NoSQL store.

Panzura
SF Bay Area

Software Engineer - File Systems — *Apr. 2015 - Aug. 2016*

- Designed and implemented support to transactionally update file metadata
  for Panzura's Global Distributed File System, which heavily simplified recovery after crashes.

Oracle
SF Bay Area

Kernel Engineer — *Mar. 2012 - Apr. 2015*

- Enhanced the virtual memory predictor in Solaris by developing an algorithm to determine which segments in the address space can be upgraded to large pages
- Developed C and assembly level kernels to stress test cache interconnects and database co-processor of the SPARC microprocessor

Education

University of British Columbia
Vancouver, Canada

Ph.D. in Computer Science: Operating Systems Architecture and Security (Advisor: Prof. Margo Seltzer) — *Jan. 2021 - XX*

- Develop a formal model to compare and build OS isolation mechanisms.

University of Florida
Florida, USA

MS. in Electrical and Computer Engineering — *Aug. 2010 - Dec. 2011*

BITS(Birla Institute of Technology and Science) Pilani
Goa, India

B.E. in Electrical and Electronics Engineering — *Aug. 2005 - Aug. 2009*

Tools and Languages

Languages	C, Golang, ARM and x86 Assembly
Operating Systems Internal	seL4 (high), Solaris, Linux and FreeBSD (beginner)
Debugging and Infra	GDB, KDB, Dtrace, Kubernetes
Hardware Features	Intel: MPK, VT-X. ARM: MTE, PAC, CHERI

Publications

OSmosis: No more Déjà vu in OS isolation
ArXiv 2309.09291

Sidhartha Agrawal, Reto Achermann, and Margo Seltzer

This work lays out the ground for an isolation model for the entire operating system, and it is the groundwork for my thesis.

CHERI-picking: Leveraging capability hardware for prefetching *PLOS 2023, Germany*

Shaurya Patel, **Sidhartha Agrawal**, Alexandra Fedorova, and Margo Seltzer

The work uses a new ISA (CHERI), which was built for security and instead used to build a higher-performance system.

Securing Monolithic Kernels using Compartmentalization *ArXiv 2404.08716*

Soo Yee Lim, **Sidhartha Agrawal**, Xueyuan Han, David Eyers, Dan O'Keeffe, Thomas Pasquier

A survey of intra-kernel compartmentalization techniques