# SUPRAGYA RAJ

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## Experience

**Browserstack** Mumbai, MH, India
*Software Engineer (Desktop Platform team)* *Dec 2019 - Present*

- Actively Developing for and managing (Dev + Ops) a highly heterogeneous cloud infrastructure with over 7000 active terminals consisting of machines running all macintosh and windows platforms.
- Current cloud infrastructure consists of **disparate components** such as AWS, Windows KMS, VMware ESXi, reverse proxies, jumphosts, smokeping, DHCP etc.
- **Hera SPOC framework**: Architected and developed a single point of contact framework + tool for internal engineering teams to access, debug, automate and run diagnostics parallelly on terminals.
- Hera Framework allows one to extend diagnostic tests, do status checks, configuration and actions from a **single control panel**.
- Hera based **Parallel diagnostics** allows diagnostics tools to be provided as an web endpoint to different teams **without worrying about accesses and privilege sharing**, helpful for support teams. Proves vital for actively monitoring **production health and uptime**.

**Cisco Systems** Bangalore, KA, India
*Software Engineer (Enterprise wireless controller team)* *July 2019 - Dec 2019*
*Software Engineering Intern (Enterprise wireless controller team)* *Jan 2019 - June 2019*

- **Fast wireless swarm upgrades**: Designed and implemented heirarchial (pre)download mechanism allowing enterprise grade access points to download device images in a peer to peer fashion which earlier used to be central download based architecture.
- The Fast wireless swarm upgrade mechanism reduced bandwidth load on Cisco wireless controllers and sped up download times from **O(n)** time to **O(logn)**, becoming highly effective in enterprise deployments as well as deployments with a remotely connected controller.
- The Fast wireless swarm upgrades system allowed a speed up of about **6 times**, reducing average swarm upgrade times from **90 minutes to 15-20 minutes per image upgrade**.
- Implementing controller side support for **802.11r (wireless fast transition)**, allowing fast roaming between Cisco enterprise grade WiFi access points, lowering roam times by around **10 times**.
- **Configuration translator**: Developed mapping layer code to translate **openconfig** standard based wireless management to commands usable by Cisco devices.

## Projects and Open source contributions

**HLang Shell Language and Interpreter**

- Developed a scripting language and its interpreter to provide a subset of functionalities provided by the Bourne Shell (bash) on an opensource **microkernel** (HelenOS) operating system.
- The system included building AST, compile time optimisations etc.

**Raw video container format** Google Summer of Code 2018

- Extending an already existing video file format: Magic Lantern's MLV video container (which existed for Canon cameras) to be used by apertus open source cameras.
- This allows video recording to be done straight onto a well supported video file format: MLV instead of only earlier option: image sequences.
- Implemented, tested and benchmarked the performance of our usage of MLV file format on **RAID 0 configs**.

**libfuse-FrameServer** Google Summer of Code 2018, Mentor - 2019

- A pseudo file system implementation based on libfuse to provide **RGBA video output** for applications such as VLC, Adobe Premiere Pro from a **raw stream of camera sensor output voltages**.
- The frameserver acts as a middleman which processes raw stream to RGBA values on the other end.
- The framesever allowed one to control elements of stream processing such as **HW acceleration, denoising, demosaicing, downscaling etc**.
- A related precursor project PiNG12RAW recieved **over 120 forks on github**.

## Publications

- Raj S., Chodnekar S.P., Harish T., Sriraman H. (2019) **eMDPM: Efficient Multidimensional Pattern Matching Algorithm for GPU**. In: Tiwari S., Trivedi M., Mishra K., Misra A., Kumar K. (eds) Smart Innovations in Communication and Computational Sciences. Advances in Intelligent Systems and Computing, vol 851. Springer, Singapore.

## Education

**Vellore Institute of Technology** Chennai, India
*Bachelor of Technology in Computer Science and Engineering* ***GPA: 9.02/10.0*** *July, 2019*

**Army Public School, Shankar Vihar** New Delhi, India
*Senior Secondary, (PCM + CS), 12th CBSE:* ***95.6% (aggregate), 98% (CS)*** *May 2015*
*High School, 10th CBSE,* ***CGPA 10.0*** *May 2013*

## Awards and achievements

- **Winner, Smart India Hackathon 2019, Goldman Sachs**: Mentored the team from IGDTUW, Delhi in GS problem set - smart transportation held at NIT, Calicut.
- **IOStream OpenEnd**: A youtube based channel and open source initiative to mentor students for GSoC. The community worked on multiple projects ranging from Audio Fingerprinting to Automatic Trailer generation mechanisms.