

## RAJSIMMAN RAVICHANDIRAN

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### EDUCATION

**Master of Applied Science**, University of Toronto (U of T) 2016-2018  
Major in Electrical Engineering  
Thesis: *Autonomic Management System in SAVI-IoT*

**Bachelor of Applied Science**, U of T 2009-2014  
Major in Electrical Engineering with 1 year Professional Year Experience (PEY)

- Final year GPA: 3.51, Dean's List

### TECHNICAL SKILLS

- **Programming:** Python, Shell Scripting, C/C++, SQL, HTML, CSS, JavaScript
- **Operating Systems:** Linux (RedHat, Ubuntu, Kali) and Windows
- **Applications:** OpenStack, Docker, Elasticsearch, Kibana, Beats, Django, Tornado
- **Tools:** Git, OSSEC, Fail2Ban, Splunk, MATLAB, WireShark

### RELEVANT ENGINEERING EXPERIENCE

**Master of Applied Science Thesis Research**, U of T Sept. 2016 - Dec. 2018

- Designed Autonomic Management System (AMS) to manage both compute resources and network resources for multi-tier Internet of Things (IoT) applications
- Developed autoscaling modules for microservices and virtual machines (VMs) using Docker
- Utilized Software-Defined Networking (SDN) to self-govern network bandwidth for applications to maintain expected quality of service
- Investigated economic denial of sustainability (eDoS) mitigation techniques to secure AMS
- Deployed Neurocomputing-based anomaly detection models to prevent eDoS attacks
- Created IoT application to monitor crowd movements using WiFi information collected passively by Onion IoT devices
- Evaluated AMS on research cloud platform using crowd monitoring application
- Released AMS source code for open-source community use:  
[https://github.com/RajsimmanRavi/Elascale\\_secure](https://github.com/RajsimmanRavi/Elascale_secure)

**Network Analyst**, Bell Canada Jan. 2015 - Sept. 2016

- Created web portal to provision virtual machines on Bell Toronto-IP-and-Innovation-Centre (TIPIC) Lab Cloud Infrastructure
- Implemented open-source Linux framework to provision Point-to-Point over Ethernet (PPPoE) sessions from Cloud platform to main routing offices over Bell's wide area network
- Developed application to create PPPoE sessions on-demand for network testers to troubleshoot network-wide issues
- Designed software for Network Operations Team to correlate Bell Customer identity and network information
- Engineered automated scripts to parse and aggregate Simple Network Management Protocol (SNMP) data (generated by routers) for network troubleshooting purposes
- Produced Customer Intelligence Reports to provide interesting insights on Bell's Wireline Internet technologies using data analytics tools such as Splunk and Deepfield

**Research Assistant**, Smart Applications on Virtual Infrastructure (SAVI) May - Dec. 2014

- Actively worked on national distributed application testbed that provides platform for creating and delivering future Internet applications and network architectures
- Focused on extending the capabilities of the monitoring and measurement services (Ceilometer) of OpenStack open-source cloud computing platform on SAVI Testbed
- Installed software and hardware servers for cloud infrastructure management
- Created Email notifications service for Ceilometer alarm service
- Developed automated scripts to measure the query speed of Ceilometer API and database
- Implemented communication drivers between Kafka messaging broker and Cassandra database used by monitoring architecture for resource management on Testbed

## **COURSES AND PROJECTS**

**Team Lead**, User Behaviour Analysis using OSSEC on Cloud Infrastructures, U of T Dec. 2016

- Analyzed user behaviours on VMs for OSSEC Host-based Intrusion Detection System (HIDS)
- Profiled users based on input shell commands on the environment
- Utilized Naive Bayes Supervised Machine Learning model to accurately classify multiple users
- Trained learning model using open-source UNIX public dataset
- Achieved 69% accuracy without any hyper-parameter tuning or advanced training
- Implemented prototype on SAVI Testbed
- Released source code for open-source community use:  
[https://github.com/RajsimmanRavi/UBA\\_OSSEC](https://github.com/RajsimmanRavi/UBA_OSSEC)

**Team Lead**, Video streaming on the Edge, SAVI Design Challenge, U of T Aug. 2014

- In a team of 4, created an application that connects video content publishers on SAVI cloud platform to subscribers interested in streaming the content
- Utilized Twitter social platform to communicate between the publisher and subscriber
- Incorporated stream processing to filter real-time tweets and find both parties
- Built application on SAVI Testbed in 3 days, **won Design Challenge**

## **PUBLICATIONS**

**Rajsimman Ravichandiran**, Hadi Bannazadeh, Alberto Leon-Garcia, eDoS Mitigation for Autonomic Management on Multi-Tier IoT, *14th International Conference on Network and Service Management (CNSM 2018)*, Nov. 2018

**Rajsimman Ravichandiran**, Hadi Bannazadeh, Alberto Leon-Garcia, Anomaly Detection using Resource Behaviour Analysis for Autoscaling systems, *2018 IEEE Conference on Network Softwarization (NetSoft 2018)*, June 2018

Hamzeh Khazaei, **Rajsimman Ravichandiran**, Byungchul Park, Hadi Bannazadeh, Ali Tizghadam, Alberto Leon-Garcia, Elascle: autoscaling and monitoring as a service, *27th Annual International Conference on Computer Science and Software Engineering (CASCON 2017)*, Nov. 2017

Jieyu Lin, **Rajsimman Ravichandiran**, Hadi Bannazadeh, Alberto Leon-Garcia, Monitoring and Measurement in Software-Defined Infrastructure, *Integrated Network Management (IM 2015) IFIP/IEEE International Symposium*, May 2015

**References Available Upon Request**