

Edge Computing Graduate Research Assistantship

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Project Overview

Edge Computing is a novel paradigm in which much of the processing takes place at the *edge* of the network (not in the network *core* as in Cloud Computing.) This approach is growing in popularity because of the Internet of Things (IoT) and the immense amount of data that sensors generate. It is inefficient to transmit all the data a bundle of sensors creates to the Cloud for processing and analysis; doing so requires a great deal of bandwidth and all the back-and-forth communication between the sensors and the Cloud can drastically impact applications' performance. Edge Computing is particularly critical in medical as well as (man-made or natural) disaster incident scenarios, where the locations generating, *e.g.*, imagery or video content are rarely equipped with high-performance computation capabilities to run intensive data processing, such as machine learning algorithms (on big datasets.) To offload such computations, network virtualization is essential to overcome the limitations of the best-effort nature of the Internet. Existing network virtualization literature however, lacks of pertinent knowledge on how to satisfy the needs of medical or incident-supporting Edge Computing applications, *e.g.*, on virtual path management algorithms and application-aware network design. In this project, candidates are required to address such knowledge gaps by investigation of new approaches to bootstrap and manage virtual networks hosting Edge Computing applications and services, with security and high-performance computing requirements.

Project Setup and Required Qualifications

This project has openings for several (semester or year long) research assistantship starting over the summer or the fall 2017, each supported with an hourly rate or a monthly stipend. The expectations will include formal meetings at Saint Louis University campus at least 1-2 times a week. The meetings will begin with an overview of the problem and related work, and will include some individual work reading papers on the subject, coding to build edge computing networked systems or simulations, and writing to report results. Every piece of code generated by the project must be released with an open-source license. Students are expected to be in good academic standing, and to have good (object oriented) programming skills in Linux environments. Good communication and writing skills are also required. Knowledge and hands-on experience with the following theories and technologies is not mandatory but will be considered as a plus: optimization and control theory, SDN controllers *e.g.*, Open Network Operating System (ONOS) or OpenDayLight, cloud platforms such as OpenStack or OpenStack++, revision control systems (*e.g.*, git); container systems, *e.g.*, Docker or Kubernetes and single-board computers such as Raspberry PI.

How to Apply

To apply for this research opportunity, please email Dr. Esposito (espositof@slu.edu) with a paragraph describing why you are interested in the program. Please include a list of any classes you have taken and describe any other relevant background in this email, as well as the name of a professor who has taught you at least one CS or Engineering course who can be contacted as a reference.