**Project title:**  Scalable simulation of end-to-end cloud microservices

**Brief Description of Design Project Goals:**

**Overview:** Microservices are a new paradigm in cloud computing services. Instead of the traditional monolithic application design, where all functionality is included in a single binary, cloud applications under the microservices programming model consist of 100s or 1000s of very small services, each responsible for a small fraction of the overall application functionality. The benefit of microservices is that they are much simpler to develop and debug. The disadvantage is that they complicate scheduling and resource management substantially since the cluster scheduler needs to consider a complex graph of dependencies between microservices. The goal of this project is to leverage an existing queueing network simulator to capture dependencies between microservices in an accurate, and scalable way. Students will then use the simulator the evaluate scheduling policies, including autoscaling, and rate limiting and explore whether they can satisfy quality-of-service when the system is highly utilized.

**Specific MEng Contribution:**
- Generalize the existing simulator to capture dependencies between different types of microservices.
- Validate the accuracy of the simulator against real (already setup) microservices-based applications.
- Evaluate rate limiting and autoscaling mechanisms.

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**Project Web Site:**  Contact Christina for more details.

**Number of MEng Students Needed:**  2-3

**Required Skills:**  Experience in C++/Python, Linux, networking, basic distributed systems principles.

**Estimated Project Time Frame:**

2017-18 Academic Year, Two (2) Semesters