Faculty Name: Dr. Muhammad Jaseemuddin

Project Title: Design and Implementation of Caching in RAON and Cloud

Description of Project (Provide ½ page project description)

Resource-Aware Overlay Network (RAON) is a P2P-based middleware for mobile applications in multi-hop Mobile Ad Hoc Network (MANET) that is developed at Ryerson. With the widespread availability of WiFi hotspots, the application of MANET is becoming more important. The principal benefit of RAON is that only the nodes involved in the application execution maintain the application states and all other nodes perform networking related functions. It provides application development and deployment platform. RAON modifies Gia’s biased random walk query forwarding decision to take into consideration link instability and power constraints in MANET. It introduces a Neighbor Coloring Scheme (NCS) used by each node to keep track of its neighbor’s energy levels and the delay it experiences with each of its neighbors. The NCS colors a link based on round trip time (RTT) and the neighbor’s energy. In RAON, a node measures the stability of a link to its neighbor by measuring the RTT on the link. We also designed a Cooperative Caching scheme for RAON (RACC) considering link instability and constrained node power. The RACC improves content delivery efficiency and content availability through exposing node resource constraints to application level caching decisions in the overlay network. Furthermore, in order to decrease network energy and bandwidth consumption more efficiently, it is desirable that proposed caching mechanism brings in to account the demands and supply of the network and energy of each intermediate node while making caching decision. The objective of this mechanism is to reduce the energy consumption of the whole network and reduce the delay that a node faces when requesting for a specific data. RAON is implemented in Android in our lab, which is augmented by a team of students with credit-based system as an intensive for file transfer. In this project, RACC will be implemented in RAON on Android. Also, RAON’s interface with Open Stack cloud will be investigated and implemented for the purpose of storing cache in the cloud. Currently, we have RAON running in a network of Nexus 7 devices running Android. We also have Cloud Broker implemented in Open Stack Cloud.

Responsibility of Student (Specify the duties and responsibilities of the student)

1. Review RAON and RACC design
2. Design RACC support for RAON in Android
3. Implement RACC in RAON over Android
4. Develop and execute test plan for RAON+RACC
5. Design RAON’s interfacing with Open Stack cloud
6. Implement caching support for RAON in Open Stack cloud
7. Write the report and assist writing paper.
2015 Research Internship

Specify Requirements (Please state any specific requirement of this position)

1. Hands on experience in Java.
2. Experience with Android SDK is preferred.
3. Have completed course on Algorithm Design and Data Structures.
4. Familiarity with Data Networking, especially working knowledge of Internet and its protocols.
5. Intent passion for system and software development.
6. Be able to work independently in a research environment with flexibility in making design decisions.
7. Good writing and communication skill.