CiC (FRCC): Towards a Mobile Cloud Computing Framework to Support Next-Generation Mobile Applications

PROJECT SUMMARY

While much work has been focused on improving cloud computing infrastructure, less research has been focused on what fundamental modifications need to be made to such a cloud computing infrastructure to support billions of mobile computers, i.e. smartphones. The main goal of our research is to define and develop a common cloud computing framework that can be used to stimulate the design and development of the next generation of mobile applications. The proposed research will identify a fundamental set of new mobile cloud services that are needed by next-generation mobile applications. For instance, context awareness is becoming essential in mobile applications, yet the cloud today lacks a basic service that would respond to an application query with a user's comprehensive context, such as their current activity, messages, social networking preferences and friendships, in addition to their location. We intend to identify such foundational services and will further develop the infrastructure needed to integrate such services together into a comprehensive mobile cloud computing framework.

Future mobile applications will likely become increasingly context-specific and demand ever more resources from the cloud while insisting on real-time performance. With this observation, we plan to develop a representative next-generation mobile application called VideoLense tricorder application that poses new and unique challenges, different from traditional cloud services. Based on the requirements of this application, we seek to investigate key research questions to enable such futuristic mobile applications. The key research questions are (1) what common set of new cloud services and components need to be supported to spur the growth of next-generation mobile applications?, (2) what kind of framework should be built to integrate these common services, adapt them to the cloud, and interface easily with developers to make it easy to build next-generation mobile cloud computing applications, and indeed an entire context-aware ecosystem?, and (3) how would existing cloud platforms/infrastructures need to be enhanced to accommodate this new framework? Broadly speaking, we will explore research issues related to context analysis, data privacy, context-aware data mining and recommendation, and architectures that involve context-aware compilation.

Our hope is to work with the community to develop an open source prototype that creates a mobile cloud computing infrastructure and ecosystem accelerating the development of next-generation mobile applications.