CSCI.6560 Distributed Computing over the Internet
Project Proposal:
“Adaptive Load Balancing Practice between Various Devices and Clouds”

Shigeru Imai
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1. Motivation

In recent years, applications running on mobile devices such as Apple iPhone, iPad and Google Android are very popular. Also, Apple just announced that they are going to introduce the new Mac Store [1] for Mac just like they have the App Store for iPhone, iPod Touch and iPad.

If the same application could run on these platforms, it would be beneficial for users. For example, applications for iPhone run on iPad or possibly on Mac, however, the user experience might be suffered due to the differences between device platforms such as memory, CPU frequency, and persistent storage capacity because these application are typically optimized to get the best performance out of the specific device platform.

One idea to resolve this issue is to balance the load of the application between the device and the cloud in run-time so that users can get the same user experience regardless of the platforms when they use their favorite applications. [2] formalizes this issue and discusses research challenges.

2. Project Description

As illustrated in the Fig1, given a computationally intensive task on 1) iPhone, 2) Laptop, and 3) Multi-core PC, connect them to a cloud (one of the servers at the CS department), and compare how each device offloads their task to the cloud based on a model depending on the following factors:

A) Processing power on the device and the cloud
B) Network bandwidth and latency
C) Energy consumption on the device

The computationally intensive task will be one of the followings (TBD):

- JPEG decoding
- Fibonacci number computation
- Image recognition
- etc…
Fig. 1 System Architecture

References