Profil préféré de l'étudiant : GL ou IR

Titre du stage proposé : Application level transparent handover for video delivery in Wi-Fi network

Type et configuration du matériel sur lequel le stagiaire travaillera

Operating system : Linux, Android

Languages : Python, Java, C, (Javascript, html maybe need in case the internship goes well)

Tools: Python SimpleHTTPServer, Eclipse Android development kit, DASH, VLC

Sujet propose - détaillé

Loosely controlled Wi-Fi networks, such as deployed at festivals and events, typically do not provide a full coverage of the terrain. As a result, the user experience of a mobile user watching a video stream is rather erratic, because of frequent disconnections and re-connections. However, these periods of disconnections are generally rather short (10 - 50 seconds for a coverage area of around 70%). To ensure a continuous experience in this case one needs to graciously handle these "disconnection gaps" until a client connects to the subsequent access point. In this internship our ambition is to build a disconnection prediction mechanism called disconnection predictor (DP) and pre-fetcher (PF) to successfully initiate a transparent handover ensuring a continuous user experience for video streaming.

The DP predicts disconnections and re-connections based on a collaboratively generated connectivity map. Once a disconnection is imminent, the DP also has an understanding when the user is expected to reconnect. This information is used to activate the pre-fetcher, which will start to download video material to the user device, which will be needed during the disconnected period. When the mobile user physically disconnects from the network, the video will continue to play as the requested data has been buffered on the mobile device. When the user re-enters a connected area, the wireless network connection is restored and operation is resumed as normal.

In our previous work, we have realized some of the functions of the DP system, which applies a server client mode. The DP server is implemented using Python SimpleHTTPServer. It can collects the information from real mobile devices, draw the collective connection map. However, the prediction function has only been test in a simulation environment but not real-world implementation. On the client side, an android application is developed using Android library 4.4W. It includes a Wi-Fi Connection Manager that allows the mobile device to automatically connect to a Wi-Fi network that is configured to be measured when the network is available, a Sensor Manager (monitoring component) that periodically collects the measured results and send them to DP server. But the prefetching mechanism has not been developed yet.

The objective of this internship is to complete the implementation of the DP system. The intern needs firstly understand the functionalities of the components in the system, and setup a public DP server to collect user information. Then, he will work on Python SimpleHTTPServer to complete and test the prediction (scenarist) function of the server. Thereafter, he will work on android to continue de development of the mobile application. Here the aim is to let the mobile device take correct reaction (e.g., trigger prefetching mechanism) upon receiving the prediction from the DP server. Finally, if everything goes well, the intern will develop the prefetching mechanism based on Dynamic Adaptive Streaming over HTTP (DASH) on android device.

michele.wilmet@jcp-connect.com