***[Capstone Category]***

|  |  |
| --- | --- |
| **Project Name** | **A Java API for unifying ad-hoc Wifi networking** |
| Team Lead: | Peter Banis |
| Team Member(s): | Peter Banis, Klaus Çipi, Michael Kolar, Robert Olsen |
| Faculty Advisor(s): | Dr. Marius C. Silaghi, Dept. Of CES, Florida Institute of Technology |

Our goal was to create a single API utilizing existing Ad-Hoc wifi capabilities across Windows, Linux and Mac operating systems(OS). Also, we aimed to incorporate the Wifi Direct standard across Linux and Android systems. We pursued this project because there is not currently a standardized tool to create Ad-Hoc networks using multiple OS.

One of the major challenges was that each OS has a different API for networking. There was a difficulty in finding a useful and generic interface for our API users that could properly convey information to each OS’s API. Finally, we had trouble identifying devices on our networks.

In order to address the aforementioned problems we came up with some intricate solutions. For each of the OS’s we identified a core set of information needed to create and join Ad-Hoc networks that was common to all OS’s. This meant we could not take full advantage of each OS’s capabilities, but the resulting interface is clear and straightforward to anyone utilizing our API. Each OS utilized a series of scripts for creating and joining networks. In order to identify connected devices we limited the subnet to 255 IP’s.

We identified two factors relating to the network as critical: Number of connections supported, and Number of packets dropped in communication. The unifying nature of the Java API will allow for easy cross-platform communication and enable easier transfer of files or other information between devices, which will be convenient for their users via Ad-Hoc networks.

The API supports three operating system groups (Windows, Mac, Linux), and each network can handle up to 255 devices connected at the same time. A reliable network connection can be maintained for up to maximum range of 230 feet. Bandwidth between two devices on an Ad-Hoc network will fall within a range from 1.04 to 1.33 megabits per second (Hardware-dependent).

 

