# Implementation of Seed Selection Algorithm for Sharing Multimedia in D2D Communications

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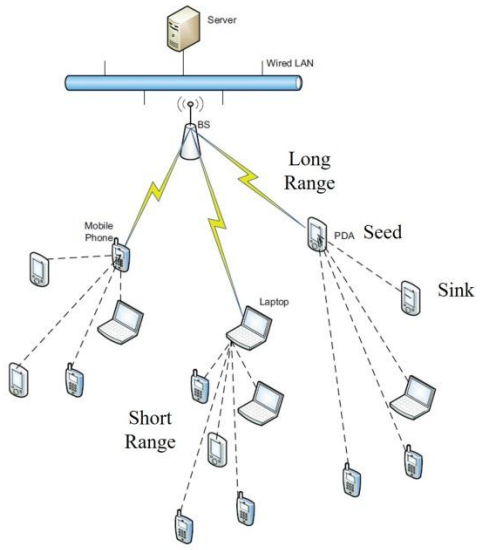
## 1. Introduction

### D2D Communication

D2D communication in cellular networks is defined as directed communication between two MDs without using the BS. One class of D2D communication is D2D relaying. in one-hop D2D relaying, Network-controlled smart devices can realize cluster-based communication in an ad hoc manner. The D2D relaying can be used to efficiently offload data, when a large number of similar requests are received by the BS. This is a simultaneous multicast common real-time content delivery to a group of MDs over a broadband wireless network, such as news download (e.g., breaking news) and multimedia multicasting (e.g., mobile TV and live sport events) .




## 2. The Algorithm

### ➢Concepts

- The purpose of this algorithm is to reduce energy consumption rate in BS and create balance between downloaded data size of D2D network nodes.
- In this project we assume that we have a reliable node which plays the BS role, called "BS node".

### ➢Implementation

- First of all, all nodes calculate their throughput, then BS node start working and other nodes connect to this node and send their throughput and IMEI to BS node.


allnodes.txt

78000
353975053322109
78000
358001078467269

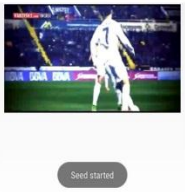
- When all the nodes connect to BS node, the algorithm starts working

$$sum = \sum_{i=1}^{total\ client\ count} \frac{1}{throughput[i]}$$

$$ratio[i] = \frac{1/throughput[i]}{sum}$$

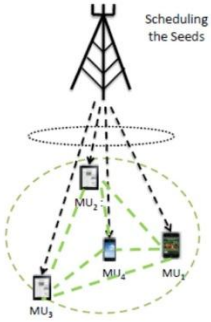
$$Time\ to\ be\ Server[i] = Session\ Time * ratio[i]$$

- Algorithm results and session key are sent back to other nodes and session starts based on the order in the file that has been given and video starts playing.




allnodes.txt

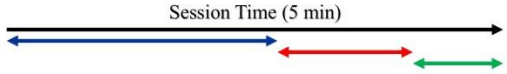
19800
353975053322109
19800
358001078467269
19800
359235049502577
nymb90sns5




## 3. Experimental Test Results

- Session Time = 5 Minutes
- Cost and Energy consumption rate in BS has decreased by 3 times (due to 3 nodes).

| Nodes | Throughput (mbps) | Ratio | Time to be Server (sec) |
|---|---|---|---|
| A | 0.5 | $\frac{6}{11}$ | 164 |
| B | 1 | $\frac{3}{11}$ | 82 |
| C | 1.5 | $\frac{2}{11}$ | 55 |




## 4. Conclusions:

- In this project we have proposed a novel distributed model for one-hop collaborative real-time content delivery protocol with selfish MDs and implemented it in android. We have assumed that the BS unicasts the content to the selected MDs (seeds) of the coalitions over the LR cellular links. Then, each seed cooperatively multicasts the received content to other MDs that belong to its coalition over an SR D2D link (WIFI).
- This application is an innovative application that could be a baseline for future researches in this field. It shows us the differences of simulation and real-world environments and help us to make required infrastructures for this field.
- Application results show the One-hop collaborative Real-Time Content Delivery protocol captures the desire of MDs and tries to create balance between each node's downloaded file size and reducing the energy consumption in BS.