

Load Balancing Mobile Data Overload in Drop Zones using DSR

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Abstract: Because of the progressive changes in the innovation and creation of cellular networks, the versatile clients are using ubiquitous internet access. As the mobile internet access becomes heavy in densely populated cellular base stations, there are several challenges for cellular operators in providing constant speed to all users without throttling speed connection. We have provided load balancing in selected base stations called drop zones where the cellular infrastructure is upgraded and internet access is provided at low cost. There is more chance for drop zone to be overloaded beyond its capacity due to low cost and good speed and as it is located in populated areas. Drop Zone approach with load balanced dynamic source routing protocol forms ad-hoc network with incoming mobile hosts if it needs to download prefetched content by other mobile hosts. If the incoming mobile host need to upload content and if the capacity of the drop zone is overloaded then the mobile host is routed to the nearby normally loaded drop zone by knowing the user's route.

Keywords: Load balancing drop zone, DSR, Cellular Networks.

I. INTRODUCTION

Cellular networks that utilize substantial number of base stations having restricted power that spreads just a constrained territory called as cell. Without causing impedance these cells can re-utilize a similar recurrence of a couple of cells far from the base station with restricted power[7]. Rare recurrence assets are utilized by cell arrange in proficient way. As indicated by the quantity of clients the extent of cell can shifts for certain territory and movement created by the client. Region of the cell size will be little when much activity is happened than in rustic zones. These days offering information administrations to cellular network users is a major test for cellular operators due to use of multi-media content over Cellular system increments drastically. Fig.1 shows cellular network display. The issue caused by the high movement of cell phones is that clients are not any more just devouring information but have begun delivering content at an exponential pace [8]. Today's modern mobile phones comes with high resolution cameras and lot of social network and instant messaging websites leads to lot of multimedia data uploads and downloads in mobile. AT&T authorities cautioned that the Internet won't have the capacity to adapt to the expanding measures of video and client produced content being uploaded [12]. For instance, clients are probably going to transfer substantial content, e.g., photographs and recordings, that range from a few many KBytes up to a few MBytes, to prominent destinations, for example, Flickr, Facebook, whatsapp, climb, IMO or Youtube, are send straightforwardly to their companions. As opposed to customary content (e.g., the one shared at famous distributed applications) client created content is exceptional and frequently important just to a client and his group of friends. Trestian et al coined the term drop zones to contain the mobile data explosion by selectively upgrading cellular infrastructure of certain base stations using greedy approach. Mostly delay tolerant contents are uploaded in drop zones.

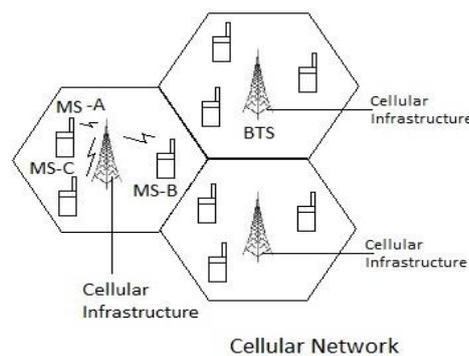


Fig 1 Cellular Networks



The approach includes following: First, by breaking down versatility and transfer properties of about 2 million clients of a portable 2.5G and 3G organize, clients are probably going to transfer overwhelming data from most events, inferring that the issue is wide-spread[15].

Be that as it may, the client produced content issue is a client behavioral issue as a result of an auxiliary examination of joint client versatility and transferring properties. An individual client is probably going to transfer overwhelming data from a little subset of areas, normally relating to his/her home or work locations [10]. Since the client created content transfers grow exponentially at most areas with the end goal that the areas are distinctive for various clients. Second, properties of client created content transferred by means of cell phones to prevalent locales, for example, Flickr or straightforwardly sent to companions are analysed[9,11,14]. The proposed approach manages versatile information storm that considers Load balanced based Multipath dynamic source routing protocol which is the directing procedure that uses various option ways through a system, which can yield an assortment of advantages, for example, adaptation to non-critical failure, expanded data transfer capacity, or enhanced security. The different ways figured may be covered, edge-incoherent or hub disconnected with each other. This convention is utilized to transfer the client produced content on drop zone.

II. RELATED WORKS

This segment includes different talk of restraining of versatile information in dropzone. Lee et. all [1] have suggested that two sorts of offloading: on-the-spot and deferred. On-the-spot offloading utilized for unconstrained availability to WiFi and exchange information on the spot. A large portion of the present advanced cells bolster on-the-spot offloading as a matter of course. In deferred offloading, every datum exchange is related with a due date and the information exchange is restarted at whatever point getting in the scope of WiFi until the point that the exchange is finished. In the event that the exchange does not complete inside its due date, cell organizes at long last total the exchange. Clients with high versatility have low transient scope. It measure spatial scope which is characterized to be the part of a range that is under any WiFi scope. Amiya Bhattacharya and Sajal K. Das [2] have proposed versatile on-line calculation system. The compressibility of the variable-to-settled length encoding of the acclaimed Lempel-Ziv group of calculations lessens the refresh cost though their inherent prescient power can be successfully used to decrease paging cost. The rule of utilizing LZ78 pressure systems in portability expectation may have a greater potential than simply productive area administration. Trevor Armstrong and Olivier Trescases [3] have recommended that a mechanized and effective approach straightforward, programmed information revive for perusing HTML pages with powerfully changing substance on cell phones. It should be possible utilizing both WiFi and GPRS correspondence on a genuine cell phone and assessed on true information follows. IonutTrestian et al[4] have suggested that utilized an artful drop-off strategy, where a client transfers his content to the primary Drop Zone that he meets. Ravenous calculations used to oversee drop Zone to be ideal that can be utilized to decide the base station areas at which to build limit (WiMax or LTE) first instead of wherever in the meantime and successfully helpful for organize administrators. Robinson et al [5] have proposed the investigation of passage position issue, first acquainting a system with effectively register portal constrained reasonable work limit as a component of the dispute at every entryway. At that point show two door situation calculations adjusted from nearby scan heuristics for related office area issues with provable execution ensures. The MinHopCount calculation adjusts a neighborhood scan calculation for the capacitated office area issue and limits the normal remote jump include for all ways the system, iteratively assessing the entryways remote limits. The MinContention calculation is adjusted from an answer for the uncapped k-middle issue and limits the normal conflict locale measure inside a provable estimate proportion of $3+\epsilon$. MinHopCount is broader and can deal with non-uniform portal costs, while MinContention can give better execution ensures. Chaintreau et al[6] have suggested that Naive sending calculation may convey information with a limited expected deferral on account of light followed between contact times and additionally when versatility of gadgets infers influence law between contact with coefficient more noteworthy than 1. Be that as it may, these calculations have without a doubt a boundless expected defer when portability infers control law with coefficient littler than 1.

III. PROPOSED SYSTEM

This section depicts and dissects the mechanics of proposed approach for giving better framework to content conveyance at certain extraordinary areas. Some substance can be set apart as put off for conveyance by the client and will be conveyed just at these areas that have better network. Underneath we present the particular technique we use for distinguishing applicant areas for better network. The Drop Zone arrangement and load balancing issue definition depends on the accompanying perceptions. The proposed Drop Zone approach expects a middle of the road conveyance delay for all clients to think of a position and load adjusting. Second, because of clients' portability designs, there exist arrangements of normal areas, through which numerous clients go by sooner or later in time.



A. LOAD BALANCED WITH DYNAMIC SOURCE ROUTING PROTOCOL

The Load Balanced based Dynamic Source Routing (DSR) convention which is a basic steering convention proposed especially for use in specially appointed systems of versatile hubs. The Load Balanced based DSR (LBDSR) protocol relies upon source steering, which suggests that the originator of each bundle finds a requested rundown of hubs through which the parcel must pass while spreading to the goal hub. The DSR convention contains two fundamental procedures: Route Discovery and Route Maintenance.

- **Route Discovery:** The initial step of information transmission is course disclosure. Course disclosure is instated just when a sender hub tries to forward a parcel to a collector and doesn't mindful of a course to it. While the course disclosure stage is begun, the sender hub sends a "RREQ" (course ask for) with a novel ID as a solitary nearby communicate parcel. This RREQ is forward to goal through one bounce neighbors of sender hub. When one bounce neighbor hub gets this RREQ bundle, at first it checks whether it has seen the RREQ or not. In the event that the neighbor hub has effectively watched the RREQ implies, it will drop the parcel; else it will assess its Route Cache whether there is a way to the goal. On the off chance that it has the way to recipient in its directing reserve, it sends a "RREP" (course answer) to the initiator of the course disclosure, giving a duplicate of the suited course put away from the RREQ; else it advances the RREQ until the RREQ is acquired by the beneficiary.
- **Route Maintenance:** After the course disclosure stage the Enhanced DSR convention completes the course support stage for trading the parcels from sender hub to beneficiary hub. In any case, when the bundle exchange association between the sender and the collector hub is softened or else switches up organize design is watched, that prompts correspondence disappointment amongst sender and beneficiary. In this situation upgraded DSR conventions uses the course system, to decide some other conceivable known course towards the beneficiary hub to transmit information. In the event that the course support neglects to process an option known course to set up the connection then it will conjure the course disclosure to find the new course to recipient hub.
- **Load Balancing:** When starting another parcel landing in drop zone, a drop zone base station must play out the accompanying strides:
 - If no such course is found in the Route Cache perform Route Discovery for the goal address.
 - If add up to courses accessible in Route Cache goal address are more than 1, select the most limited courses.
 - Identify way to transmit parcel on, considering load adjust.
 - Transmit the parcel by means of the recognized source course.
 - After substantial load emerge in drop zone base station, the versatile hub goes into their drop zone range got a question message about their course from the comparing drop zone base station. At that point the versatile hub answers their course to relating drop zone base station. The drop zone base station of that portable hub ask for close-by drop zone base station for transferring substance to next drop zone range on their course. On the off chance that the adjacent drop zone base station acknowledges that demand implies the portable hub will transfer their substance with decent deferral.

In our drop zone approach the clients are uploading as well as downloading their interested contents. The load balanced dynamic source routing protocol will balance the load by forming temporary ad hoc network inside the drop zone base station when the drop zone is heavily loaded. For that every new entry of client under heavily loaded condition only, the drop zone base station will check whether that new client entered into their area for uploading or downloading. (i) If the new client wants to download any content means the drop zone base station will check if the content requested by the new client is already downloaded by any other clients. After finishing the checking process the drop zone base station will connect the new client to that other client which having their content by forming temporary ad hoc network. After exchanging the data it will disconnect their temporary network. (ii) If the new client wants to upload their content means first the drop zone base station will send request to that new client for linking them to another drop zone base station based on their interest and their movement of location. The new client sends their movement of location to drop zone base station. After that their drop zone base station will check their nearby base station for that content upload of their user. Then it will forward the link to another base station. The client will move on to their base station and upload their content.

IV. RESULTS AND DISCUSSION

The simulations are done using built-in random generator in Network Simulator 2 (version NS-2.34). The protocol evaluations are based on the simulation of 70 wireless nodes forming a cellular network, moving about over a 5m/s. In our experiment, we have set the communication range of mobile node to 300m. The media access control layer we used in simulation is 802.11 MAC protocol. We generated all the movement scenarios using setdest command in NS2. Here the performance measures such as throughput, packetloss, overhead is analyzed.



Table 1 Simulation Parameters

Parameter	Value
Channel Type	Wireless
Routing Protocol	Load Balanced based DSR
Queue Length	50 Packets
Number of Nodes in Topography	70
Node Placement	Random
Simulation End Time	65 sec
MAC Protocol	IEEE 802.11
Packet Size	512 bytes
Traffic Type	CBR
Path Loss Model	Two Ray Ground
Energy	500J

Transmission Power	1.0
Receiving Power	0.5
Mobility	5m/s
Frequency	5mhz
Communication Range	300m

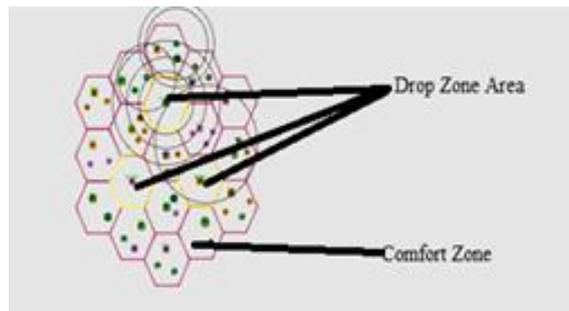


Fig 2 Cellular Network Formation and neighbor information transmission

Fig 2 demonstrates that the screenshot of cell arrange development and reference point message transmission. Here absolutely 19 cells are framed. In that, there are 3 drop zone territory is framed inside that 19 cells. Yellow color hexagon represents drop zone cell and brown color hexagon represents comfort zone cells. After cellular and drop zone cell formation the cellular users can exchange its neighbor information. The drop zone territory having refreshed data transmission to exchange and transfer the client created content which are deferred by the client with passable postponement.

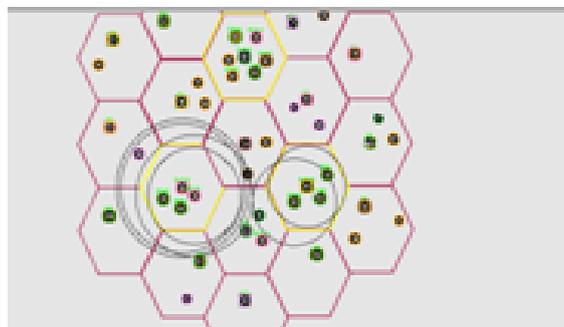


Fig 3 User movement to drop zone

Fig 3 shows that the content uploading in drop zone. The users want to upload their data should be moves to drop zone area and upload their content to drop zone base station. The user can upload the content like text, image or video etc. In our simulation the image and video files are not directly uploaded. For that the image and video frames are converted into hexadecimal files using MATLAB. The hexadecimal value will be the text files. After that the hexadecimal files are uploaded by the user into their base station.

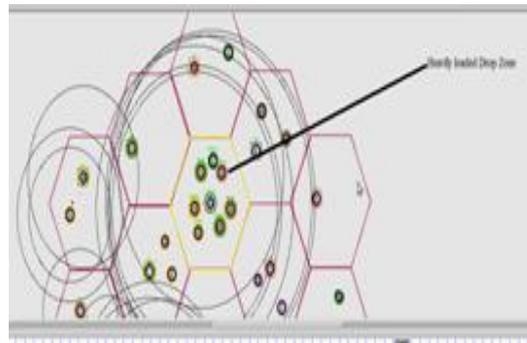


Fig 4 Heavy load on drop zone area

Fig 4 shows the screenshot of heavy load on the drop zone area. In our simulation we assume the drop zone base station will serve the maximum number of users is six only. In this screenshot, the drop zone base station 33 will have heavy load as it serves already maximum number of users so, the single strength of that mobile nodes get very slow and it can have high delay for content uploading. So the new arrival of the mobile node will be transferred to another base station according to their interest. Here in drop zone base station 33 the new arrival of mobile node is 32. Because of heavy load it will be move to another drop zone area based on their interest.

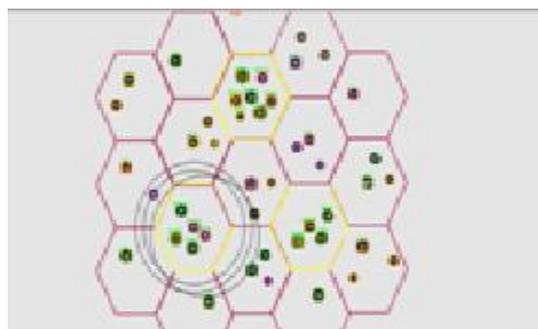


Fig 5 Load balanced data transmission

Fig 5 shows that the load balanced data transmission. Node 32 will move to the destination towards location with longitude and latitude values 436.345 245.345. So it will be upload the content from drop zone base station 1. The node 32 will upload the content successfully.

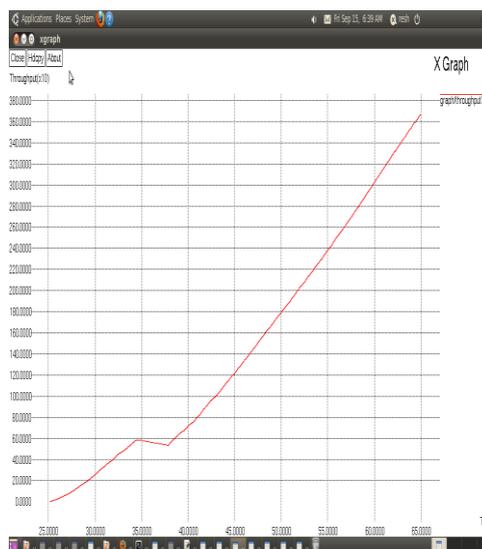


Fig 6 Throughput

Fig 6 shows the throughput graph. Throughput is defined as amount of data received at the receiver side. It is represented as bits per second. Here in our drop zone base station the amount of data will be successfully uploaded to



the base station. The clients will upload the data such as text, image and video frames as hexa-decimal text files. The files are uploaded with load balanced dynamic source routing protocol. So as the amount of data transfer 3800bps.

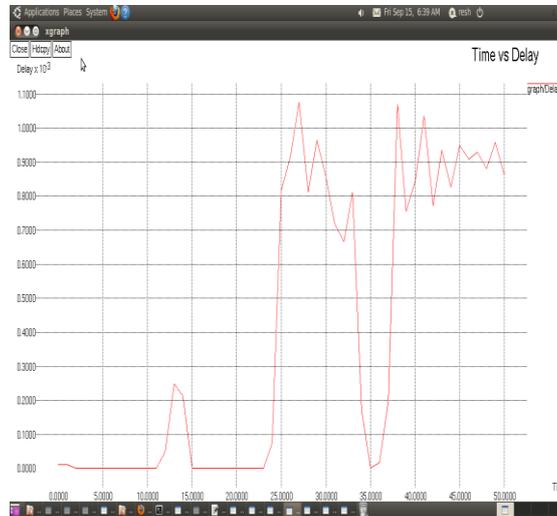


Fig 7 Delay

Fig 7 shows that delay graph. Delay is time taken for total data transmission between nodes. It is measured in sec. The total simulation time is 50 sec. Here each time the client will upload different data types. For each data type the time taken for uploading will differ. The delay time taken for image or video frame hexadecimal text file will be 1.1 ms and for text file it will be 0.23ms.

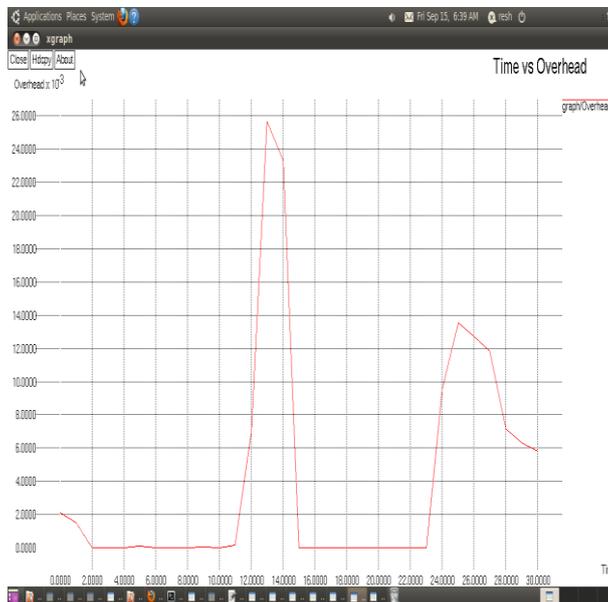


Fig 8 Overhead

Fig 8 shows that overhead graph. Overhead is any combination of excess or indirect computation time, memory, bandwidth, or other resources that are required to perform a specific task. It is a special case of engineering overhead.

V. CONCLUSION

In this paper we have given a cell arrange drop zone design that endeavors to manage the developing issue of increment in client created content. The key thought is to update foundation in a couple of select areas called as Drop Zones specifically and stack adjusting on that drop zone region. The proposed calculation built up an arrangement calculation to position the Drop Zones in areas that contains countless and could figure out how to convey bigger amounts of substance in a put off way. Likewise load balanced based dynamic source routing protocol is utilized to adjust the

overwhelming burden. On the off chance that one drop zone is vigorously stacked means the additional clients can get an opportunity to transfer their substance in light of their inclinations and activity sort. As per their inclination and movement rate on the drop zone they can transfer their substance with a picked drop zone or solace base station. The simulations are done in network simulator 2 and the execution of the framework analyzes the parameters such as throughput, delay and overhead. In this proposed scheme the load balanced in drop zone achieved by creating a temporary ad-hoc network for exchanging the downloaded content and exchanging the uploaded link to another drop zone base station for a new client downloading and uploading condition respectively using dynamic source routing protocol. However forming an ad-hoc network and access control between ad-hoc networks have some vulnerabilities related to their security level and privacy of their personal data's. The future work will deals with access control of the data and providing security to the clients connected in ad-hoc network.

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BIOGRAPHIES



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