The University of Queensland

Review

Distributed Computing Assignment – 1

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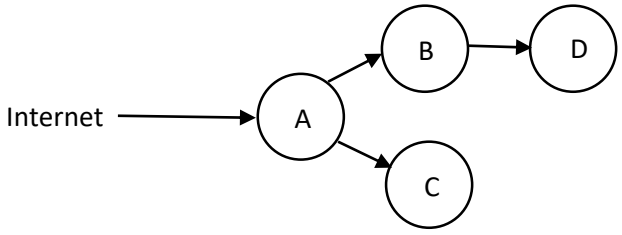
Contents

1. Mobile Data Offloading

In [1] the authors Regin Cabacas and In-Ho Ra have put forward a good discussion on content based routing for mobile data offloading. They discuss a method known as the Pocket Switched Network (PSN) to achieve mobile data offloading efficiently.

We have reached a point in time where everyone has a cell phone and everyone wants to be connected to the internet for one or the other reason. We see that most of the users are mainly interested in topics like weather, news, online shopping advertisements etc. This requires rapidly adapting/growing and improving networks with increase in the number of users. Wi-Fi and femtocells being the most popular approaches to solve this issue, work well only in a limited region and the installation and maintenance costs to serve a large number of users is not really worth the effort as discussed by the authors. To overcome the problem of network congestion and to achieve better mobile data offloading, the authors suggest PSN approach. They suggest using other mobiles/nodes to offload data i.e. if many users are interested in current weather, not all the users have to connect to the server to get the weather, instead they could get the data from other mobile users. This does appear like a better approach, however the security of user data and what is made accessible to other users/nodes is something to be considered with a very high priority.

In the proposed approach, the users which are not interested in the content may still have to receive the content for a better routing of the data. The author discusses of Freeman's centralization approach to discuss which node/users receive the message to forward achieving the shortest path i.e. if there are three groups of nodes and the connecting nodes are not interested in the message content, they still have to subscribe to that message and forward it to the interested nodes in the group. Also, if a node is not interested in the message content, it will have to subscribe to the message if that results in the shortest path. Considering the figure below, even though all the nodes can connect to the internet, for mobile data offloading, the node "A" first receives the message and then forwards it to the nodes that are interested in the message. In this figure, the node B will have to subscribe to the message even if it is not interested if the node "D" is interested and this path results in the shortest path.



From the results of their simulation, it is seen that more message offloading is seen with more number of users with even a single publisher. It is also seen that the latency in the message delivery decreases with increase in the number of nodes. From the discussions and the simulation results, it can be concluded that this a reasonable approach to achieve better mobile data offloading.

2. Content Based Video Streaming

In [2] the authors Sankar Padmanabhan et al. put forward a model for content based video streaming using ns2 network simulator. The users accessing internet have specific requirements and this has to be taken care of by the content providers. The authors discuss how the content aware networks with content based routers help in meeting the specific user requests. Their analysis on why using just the content routers results in failing to handle fault tolerance is substantial i.e. it will not be able to handle the routing with increased number of users and failure of this router will result in total failure of the system. Their idea of using event notification service appears to be feasible for this kind of implementation.

There is a wide range of sites offering access to video content. The videos can either be downloaded or be viewed in real-time by streaming method. As seen in our day to day browsing, streaming a video is very much difficult with buffering, bandwidth issues etc. This has to be looked into when implementing content based routing for video streaming.

The authors suggest an approach where there are publishers and subscribers in a network connected by routers. The nodes use these routers to notify their content of interest. The router also subscribes to these contents of interest. The network is made responsible to deliver the content to the client in which he is interested in. The publisher has the tags for the videos that they maintain. The publisher first publishes the tags which is then multicasted in the network by the routers. When a subscriber interested in this will send back the video tag which will then be multicasted in the network. Once the publisher receives this, it starts streaming the video and thus the video will be made available to the subscriber for streaming.

The authors carried out simulation using ns2. The network consisted of 26 nodes with five publisher nodes, six subscriber nodes and the remaining nodes being routers. The publishers could publish the videos to multiple subscribers and the subscribers could subscribe to multiple videos from different publishers based on the availability. The broken links were taken care of by the routers by calculating the shortest path and routing appropriately. The parameters considered were delay, throughput, jitter and peak signal to noise ratio.

The authors have listed out the quality parameters successfully with their suggested approach. The authors' idea on the implementation of video tag and the corresponding response is a little unclear in the paper. There isn't a very clear understanding on the quality parameters and their importance for this approach. It can be concluded that the approach put forth seems to be satisfactory to tackle the targeted issue.

3. References

[1] R. Cabacas and I. H. Ra, "A content-based routing scheme for mobile data offloading in pocket switched networks," vol. 9992, ed, 2016, pp. 696-701.

[2] S. Padmanabhan, K. Parameswaran, A. Natarajan, A. R. Chelladurai Vijayakumari, and C. Chinnagounder, "Modeling and Simulation of Content-Based Video Streaming Using ns2," in *Global Trends in Computing and Communication Systems: 4th International Conference, ObCom 2011, Vellore, TN, India, December 9-11, 2011. Proceedings, Part I*, P. V. Krishna, M. R. Babu, and E. Ariwa, Eds. Berlin, Heidelberg: Springer Berlin Heidelberg, 2012, pp. 598-606.