CACHING STRATEGIES IN MANET USING DSR AND AODV ROUTING PROTOCOLS

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***Abstract*—** **We address cooperative caching in wireless networks, where the nodes may be mobile and exchange information in a peer-to-peer fashion. We consider both cases of nodes with large and small-sized caches. For large-sized caches, we devise a strategy where nodes, independent of each other, decide whether to cache some content and for how long. In the case of small-sized caches, we aim to design a content replacement strategy that allows nodes to successfully store newly received information while maintaining the good performance of the content distribution system. Under both conditions, each node takes decisions according to its perception of what nearby users may store in their caches and with the aim of differentiating its own cache content from the other nodes'. The result is the creation of content diversity within the nodes neighborhood so that a requesting user likely finds the desired information nearby. We simulate our caching algorithms in different ad hoc network scenarios and compare them with other caching schemes, showing that our solution succeeds in creating the desired content diversity, thus leading to a resource-efficient information access.**

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I. Objective

Our main objective is to propose a novel asymmetric cooperative cache approach, where the data requests are transmitted to the cache layer on every node, but the data replies are only transmitted to the cache layer at the intermediate nodes that need to cache the data. This solution not only reduces the overhead of copying data between the user space and the kernel space, it also allows data pipelines to reduce the end-to-end delay. Another objective of this paper is to propose AODV and DSR algorithm for the novel asymmetric cooperative cache approach and to evaluate the two proposed routing protocols namely, AODV and DSR, for wireless ad-hoc networks based on performance. This evaluation should be done theoretically and through simulation. Our objective also included the goal to generate a simulation environment that could be used as a platform for further studies within the area of ad-hoc networks.

II. EXISTING SYSTEM

The novel applications such as mobile multimedia are likely to overload the wireless network (as recently happened to AT&T following the introduction of the iPhone).

It is thus conceivable that a peer-to-peer system could come in handy, if used in conjunction with cellular networks, to promote content sharing using ad hoc networking among mobile users.

For highly popular content, peer-to-peer distribution can, indeed, remove bottlenecks by pushing the distribution from the core to the edge of the network.

Disadvantages of Existing System:

In the caching strategies based on information density estimation in Mobile Ad Hoc Networks (MANET), uses Flooding type Routing protocol, which faces several disadvantages.

- It is very wasteful in terms of the networks total bandwidth. While a message may only have one destination it has to be sent to every host. This increases the maximum load placed upon the network.
- Messages can also become duplicated in the network further increasing the load on the networks bandwidth as well as requiring an increase in processing complexity to disregard duplicate messages.
- A variant of flooding called selective flooding partially addresses these issues by only sending packets to routers in the same direction. In selective flooding the routers don't send every incoming packet on every line but only on those lines which are going approximately in the right direction.

III. PROPOSED SYSTEM

In the proposed system, we address the issue of disadvantages faced in flooding routing protocol, using DSR and AODV protocol. The advantages of our proposed system are:

- Efficient caching strategies can be achieved using DSR and AODV protocol. Where our proposed system uses a reactive approach which eliminates the need to periodically flood the network with table update messages which are required in a table-driven approach. In a reactive (on-demand) approach such as this, a route is established only when it is required and hence the need to find routes to all other nodes in the network as required by the table-driven approach is eliminated. The intermediate nodes also utilize the route cache information efficiently to reduce the control overhead
- We simulate and show the node routing between the cells, with all the information such as number of cells, number of hops, time taken etc.

- We also show the simulation results of Basic Routing and Secured Routing. Where basic routing, routes between the nodes which are nearby or by using the suitable protocol DSR or AODV. Whereas in secured routing, the routing is done through a cluster head, so the data is secured.

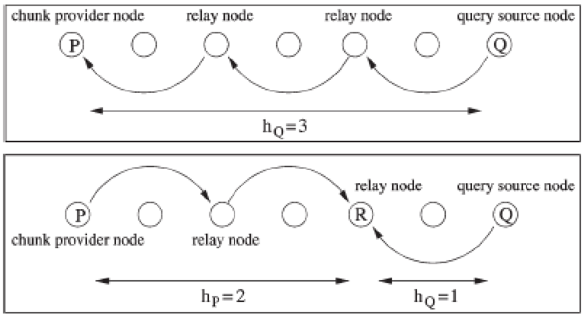
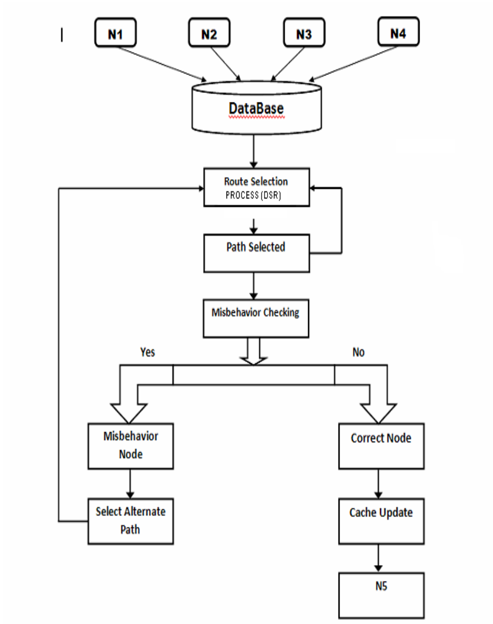


Fig. 2. Q and P denote, respectively, a node that issues a query and a node that provides the requested content. Node R in the lower plot is a relay node, overhearing the exchanged messages. The upper and lower plots, respectively, represent the case 1 h_Q value for the provider node P and the case 2 h_Q and h_P values for the relay node R with respect to the query source Q and the provider P.

V. SYSTEM ARCHITECTURE:



1. Cooperative Caching Module:

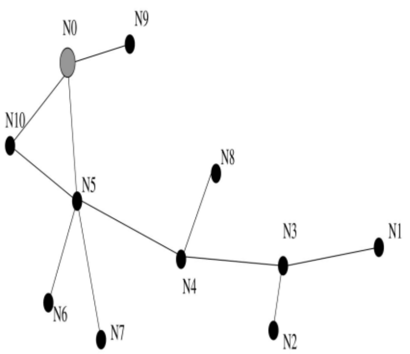


Fig: Caching P2P network.

See Fig Suppose node N1 requests a data item from N0. When N3 forwards di to N1; N3 knows that N1 has a copy of the data. Later, if N2 requests di;N3 knows that the data source N0 is three hops away whereas N1 is only one hop away. Thus, N3 forwards the request to N1 instead of N4. Many routing algorithms (such as AODV and DSR (Dynamic Source Routing)) provide the hop count information between the source and destination. Caching the data path for each data item reduces bandwidth and power consumption because nodes can obtain the data using fewer hops. However, mapping data items and caching nodes increase routing overhead,

2. Cache and routing module:

There is no de facto routing protocol for wireless P2P networks currently. Implementing cooperative cache at the network layer requires these cache and routing modules to be tightly coupled, and the routing module has to be modified to add caching functionality. However, to integrate cooperative cache with different routing protocols will involve tremendous amount of work.

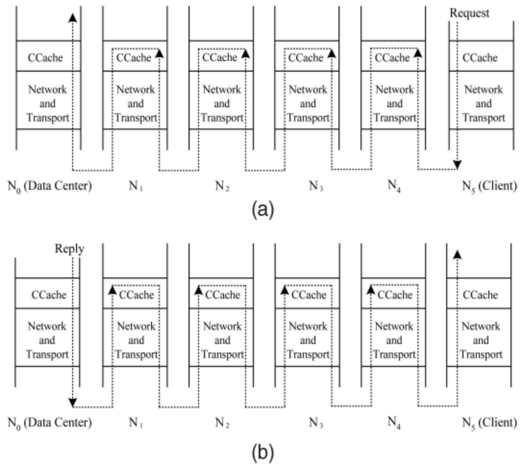


Fig. . Layered design. (a) The request Data flow and (b) the reply Data flow.

There are two options for the layered design. One naïve solution uses cross-layer information, where the application passes data request to the routing layer, which can be used to match the local cached data. However, this solution not only violates the layered design, but also adds significant complexity to the routing protocol which now needs to maintain a local cache table.

3. Asymmetric Approach Module:

Our asymmetric caching approach has three phases

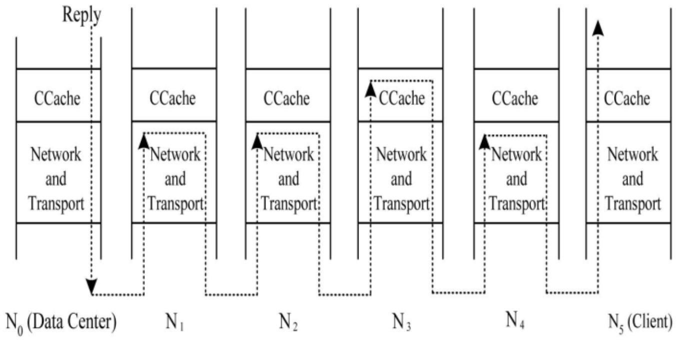
Phase 1: Forwarding the request message.

After a request message is generated by the application, it is passed down to the cache layer. To send the request message to the next hop, the cache layer wraps the original request message with a new destination address, which is the next hop to reach the data server (real destination). Here, we assume that the cache layer can access the routing table and find out the next hop to reach the data center. This can be easily accomplished if the routing protocol is based on DSR or AODV. In this way, the packet is received and processed hop by hop by all nodes on the path from the requester to the data server

Phase 2: Determining the caching nodes.

When a request message reaches the data server (the real data center or the intermediate node that has coached the requested data), the cache manager decides the caching nodes on the forwarding path, which will be presented in . Then, the ids of these caching nodes are added to a list called Cache List, which is encapsulated in the cache layer header

Phase 3: Forwarding the data reply. Unlike the data:



Request, the data reply only needs to be processed by those nodes that need to cache the data. To deliver the data only to those that will cache the data, tunneling techniques are used. The data reply is encapsulated by the cache manager and tunneled only to those nodes appearing in Cache List.

4. Cache routing simulation module:

There are two routing protocol used:

- Ad-hoc On-demand Distance Vector (AODV) routing protocol
- Dynamic Source Routing (DSR)

The data server needs to measure the benefit of caching a data item on an intermediate node and use it to decide whether to cache the data. After an intermediate node (Ni) caches a data item, node (Ni) can serve later requests using the cached data, instead of forwarding the requests to the data server, saving the communication overhead between node(Ni) and the data center. However, caching data at node (Ni) increases the delay of returning the data to the current requester, because it adds extra processing delay at Ni, and the data reassembly at node (Ni) may affect possible pipelines.

VI. CONCLUSION

Route caching is the major approach to decrease the flooding of the network by avoiding the route discovery operation due to this congestion and long delay are also decreases. Therefore the efficient caching strategies have the great impact on the performance of the AODV and DSR routing protocol. In general, our intuition was that the larger the value of cache size and ART parameter, the better the routing protocol should perform. However, smaller cache size and ART value actually can have an indirect effect in improving performance. By increasing the cache size and ART parameter, throughput decreases because of stale routes that are generated in the cache, due to the mobility of the nodes which decrease the performance of the routing protocol.

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