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ESDPMANT: Efficient Service Discovery Protocols for Mobile Ad Hoc Networks.

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Abstract: A few years ago there has been increasing research in service discovery protocols (system of rules governing affairs of state or diplomatic occasions.) for **M**obile **A**d **H**oc **N**etworks (MAHNET). The most capable a way of dealing so far addresses energy efficiency by integration the service discovery process with the routing algorithm. In fact that the service information is attach to into routing messages, in order that a node is at the same time informed of available services and of routes towards the equivalent service providers. This cross layering leads to enhanced version to the network setting and at the same time to important energy savings. Those savings are inconvenient if the two processes are implemented individually, as then each network have to use its own messages. We are intending such a hybrid make suitable protocol for energy consumption-avert users. This protocol is based on the **I**ndependent **Z**one **R**outing framework (IZR). We also add a method to adjust the sending rate of pro-active messages on each knob based only on local passage monitoring. Through imitate we show that using this method, the energy efficiency achieved is considerably privileged compared to similar hybrid service and route discovery protocols.

Keywords— Cross-Layer, Energy Efficiency, Mobile Ad Hoc Networks, Service Discovery.

I. INTRODUCTION:

The Mobile Ad Hoc Networks have involved noteworthy research hard work of the networking society in the previous years. Though, MAHNETs have not veteran the prediction popularity in terms of mass usage and applications. A potential reason for that the main bulk of research expected at solving the cruel problems at the low level of the protocol that such networks experience. Though, MAHNET were visualize to allow mobile users to contact services and data without relying on any communications, solving connectivity problems was not enough; it became vital to also build up protocols for discovering data and services inside MAHNET. A few years ago there has been on the rise interest in upward energy efficient service discovery protocols. The most efficient of those protocols were proved to be cross layer protocols. These protocols are based on integrating the routing process with the service discovery process. The stimulus for integrating routing and service discovery is to reduce the redundancy. When each of those two processes uses its own messages.

The Cross layer service discovery exploits the capability of at the same time acquiring service information along with routing information by carry by service information on routing messages. This way, surplus transmissions of service discovery packets at the application layer are avoided and energy is saved. Consider of given that routing layer hold up for service discovery. Who extensive a reactive routing protocol, namely Ad Hoc On insist distance Vector protocol (AODV). In [1] the authors have extended the Ad hoc On-Demand Distance Vector (AODV) routing protocol with service discovery functionality and have based on untested ideas compared it. Their conclusion show that the combine protocol produces 30% to 50% less control in the clouds and has 2 to 7 times lower service acquirement latency than the application layer based protocol. The difference between a *reactive* routing and service discovery protocol and a *proactive* routing and service discovery protocol and the Objective-Sequenced Distance Vector protocol (OSDV) were extended to provide service find functionality.

The extended DSR protocol proves to have the least messaging transparency among the three, with second best the extended OSDV protocol. It is not the only proactive routing protocol extended with service discovery functionality. In the extended the Optimized Link State Routing (OLSR) proactive routing protocol to support service discovery. We are Compare the proactive, reactive and hybrid integrated protocols one can see that the most energy efficient and also effective protocols are the hybrid. Which is a hybrid service and route finding protocol, we will briefly present existing hybrid integrated protocols. In hybrid routing protocols each node controlling a situation rather than just responding to it advertises the routes and services it is responsive of by occasionally sending control messages to its neighbors up to a some number of away are believed. The large collection of data for routes or services outside this zone may be bring together only upon request.

II. THE DESIGN OF ESDPMANT

In the ESDPMANT, a hybrid service and route discovery protocol that differs from other service discovery protocols based on ZRP, in that it not only allows variation of region radius but also adaptation of the rate of hands-on messages sent by nodes, based only on local traffic monitoring on each node. we present our inspiration for creating ESDPMANT and also appraise ESDPMANT in terms of energy utilization, distinct it to similar service discovery protocols. Hybrid routing protocols have been confirmed to operate more efficiently than proactive or reactive protocols in MAHNET, the main cause being their flexibility to adapt to altering network conditions. This was the case for ZRP, which uses a proactive protocol for restricted routes and a reactive protocol for unrestricted routes. In fact that the proactive protocol serves as a basis for the global reactive protocol to discover remote routes more effectively. In ZRP, a node's sector is defined as the distance in many number of hops to which the Proactive route advertisement packets are allowed to Propagate.

The IERP protocol uses an apparatus called border casting in order to discover an existing route towards the queried target. With border casting the query is not rushed off your feet to all the neighbors of the initiate node but it will sent only to those nodes that located on the border of the requesting node's sector. The individual's border nodes check their IARP tables to see if they congregation any route towards the queried objective, and if they do they uncast an IERP reply message to the requesting node informing it of the existing path. If the border node does not find any related entry they just re-border cast the query to their own border nodes. In order for ZRP to operate efficiently in any MAHNET, it is implied that all nodes fix their zone radius to the best value, assuming that they know a priori the call rate and the mobility rate in the MAHNET. Likewise, all nodes following ZRP have to use the same region radius, which is difficult when different areas in the MAHNET present different call to mobility ratios. In order to remove these hypotheses the authors in have proposed IZR. IZR is a stylish version of ZRP, which allows every node to have a different region radius and also to enthusiastically tune it on the fly by monitoring local interchange. We briefly explain the operation of IZR and the extensions made to it in order to build the ESDPMANT route and service discovery protocol. The basic dissimilarity of IZR compared to ZRP is its system for adapting a node's neighborhood radius to changing conditions in the MAHNET. The travel produced by moreover IERP or IARP is mostly dependent on the region radius. The larger the region the more IARP traffic is created and the less IERP traffic is wanted, since more destinations are inside the local region and there are fewer queries for out of zone nodes. In fact it is techniques shown that the total traffic is a having an outline function of the region radius.

The transfer rate has increased compared to the existing period, then the region radius in changed in the opposite direction of the one that was followed in the existing period. The algorithm stops it has been shown that small values for the region radius give better routine. At what time the mobile call ratio is small and vice versa. This is considered to be the best region radius for achieving a short-term smallest amount routing traffic overhead. The minimum corresponds to current network conditions and should be incessantly adapted.

This adaptation is done using the **A**daptive **T**raffic **E**stimation (ATE). Having reached a provisional minimum, ATE takes control and tries to adapt the region radius by increment or decrement it in order to contest the changing network conditions. Have as an orientation the ratio IERP traffic corresponding to the minimum discovered by Min-searching. An increased ratio means that the IERP traffic dominates the routing traffic and hence the region radius is smaller than it should be, given the existing network conditions, and must be increased. Increasing the region radius would lead to more efficient border casting and less IERP traffic. In the opposite case, where the current ratio is measured to be less by a factor of more than H than the reference ratio, then ATE decides to decrease the zone radius. A decreased traffic ratio means that the IARP traffic is now controlling and hence the region radius is bigger than it should be. In case that a very large change is detected in the present IERP/IARP traffic ratio, then the Min Searching mechanism is re-initiated in order to find the new optimal region radius.

The obvious outcome is that such be more precise, the adaptation mechanism, called **B**roadcasting **F**requency **O**ptimizer (BFO), adapts the frequency with which the service aware NDP and IARP messages are broadcasted. The basic idea of BFO is that nodes that are not currently engaged in service invocation, discovery or provision (either as clients, providers or intermediates), can It decreases the proactive traffic in cases that the node seems not to be too involved in sending or receiving traffic. In Figure 1 we show how the broadcast intervals for proactive traffic affect a node's outgoing traffic. Also, the increase of the IARP broad cast interval is accompanied by an increase in the NDP broadcast interval, which means that fewer changes in the 1-hop neighborhood of two subsequent broadcasts of IARP and NDP packets by T seconds. In the opposite case, it decreases both these intervals by T seconds. In order to avoid the two extremes of setting the broadcast interval to arbitrarily high values or to zero, a maximum allowable and a minimum allowable value for the broadcast interval are taken also into account such that nodes are detected and hence the amount of expedited IARP messages can also be decreased, thus further decreasing the total proactive traffic. This is done because it is crucial for itself and for the connected nodes to maintain accurate connectivity information. Decrease their rate of sending proactive traffic in order to conserve energy. BFO runs periodically on every node. In each period the node measures only the data traffic2 that passes through it and compares it to the data traffic passed through it in the previous period.

If the present traffic is found to be lower than the traffic of the preceding period, the node increases the time intervals between We could say that ESDPMANT uses Minimums Searching and ATE to decrease the whole traffic in the network, and also employs BFO in order for every node to decrease its own leaving traffic. Also BFO tries to do this in a safe way for other nodes. Function of the IARP and NDP broad cast intervals, since raising these intervals means sending packets more thinly. Hence IERP traffic is an increasing function of IARP and NDP broadcast intervals. Now, BFO tries to optimize the retiring traffic by changing the broadcast interval accordingly, and it does so with the aim of not disrupting the service and routing processes that currently go through the node. We could say that BFO is not artificial by Min Searching or ATE since it measures only the data transfer on every node and not the control traffic. We experimentally investigate the effects of co-existence of the BFO method with the Min-Searching and ATE method, as discovered by the service success ratios and the energy spending achieved when using those two methods with and without BFO.

III. PERFORMANCE EVALUATION OF ESDPMANT

The original broad cast periods for IARP and NDP have been set to 10 seconds, which is also the lowest allowable periods, and the maximum allowable intervals have been set to 100 seconds. The Min Searching and ATE method are run every 200 seconds and the BFO method runs every 100 seconds.

The entire nodes are move following the Random Waypoint Mobility model (RWP) with stable speed of 3,5 m/s and no pause time. The wireless transmission range is set to 380 meters. Every server may at least one host out of three possible service types. Every 100 seconds, each client selects with prospect 1/3. One out of the three accessible services types and tries to establish a service session with anyone of the servers that hosts the requested service type. Each service session involves the transfer of one item of 200KB size using File Transfer Protocol (FTP).

We take for granted that once the FTP session with a server has been predictable, then if the server gets removed from the client before the completion of the item transfer, the client cannot transfer the session to another server. To make known the possible costs particularly of the BFO system we should also take into account the completed service sessions. Essential the accurate presentation metric is however not trivial. As a first approach, we assume that the most select operating point for all protocols is at the point where the ratio of Success Ratio to the Total Energy expended is maximized. We have experimental through simulations that this simple metric is maximized when they set their broad cast timers to the maximum allowable. At this point although the protocols are confined to intolerable success ratios. This also means that using the aforesaid simple metric, a protocol that can reach higher success ratio compared to another at a sensible additional energy cost could be characterized as less performance. To copy with this state of affairs a better presentation metric would take into account not the success ratio and the total energy expended but the success ratio and the number of successfully delivered services per unit of energy expended.

We use these dissimilar scenarios in order to see the collision of the data transfer on the recital of BFO. The data transfer is higher as the ratio of clients to server's increases, since there exist more clients in the network request services. The results stand for regular values obtained over 10 runs for each experiment. By proceeding to the experiments mention above we investigate what is the best value for transaction, which represents how many seconds the BFO will increase or decrease the broad cast periods each time.

Adjusting the broad cast period with larger step Transaction leads to perhaps greater energy gains but at the cost of decreased success ratios for ESDPMANT. This is as if during a service session all routes to district the destination terminate due to rare broad casting, the client or server must try to find out again the route on the way to each other. In the mean time the application's acceptance may be worn out and the service session may break before completion.

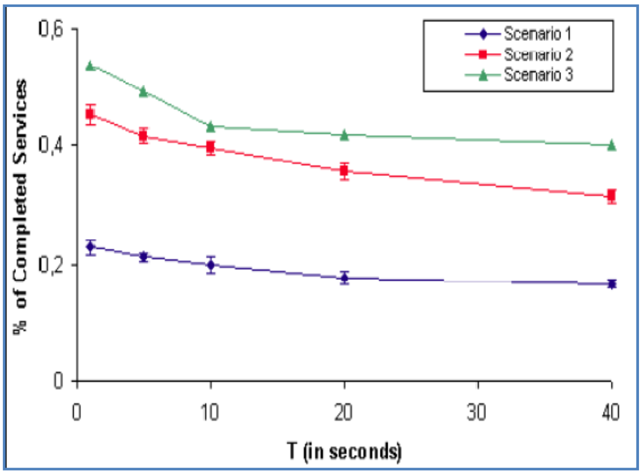

Fig. 1. Effect of the T parameter on the Percentage of Completed Services for ESDPMANT.

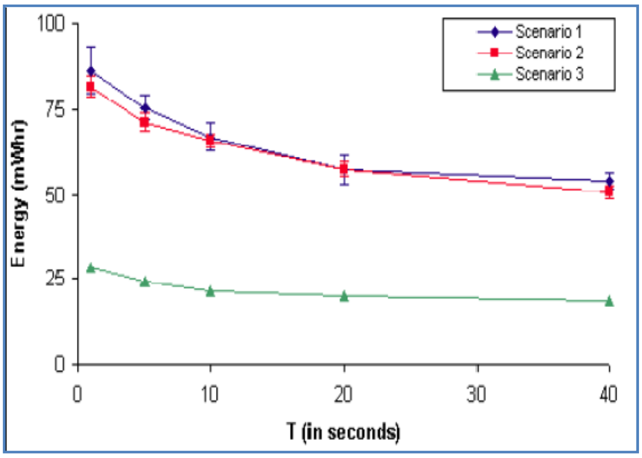

Fig.2. Effect of the T parameter on the Energy Consumption per node for ESDPMANT.

However, altering the broadcast period by smaller values, the nodes may slowly reach the optimal broad casting interval based on existing conditions. In case of wrong calculation by nodes, before the change begins to have an effect on in undesired ways the current service sessions in the network, the nodes are given the chance to get used to the broad casting intervals. In the case that Transaction has large values this is more difficult to happen; since increasing the broadcast intervals a lot may strictly impact routes by a node can act in response to correct the situation, and also smaller Transaction means that more fine-grained version can take place. Also it is value mentioning that as the ratio of clients to servers decreases the service success ratio increases since there are more available servers, perhaps located closer to the requesting clients. In addition, when the number of clients is low, there is less congestion in the network since the data traffic due to service chant is less and also localized around nodes.

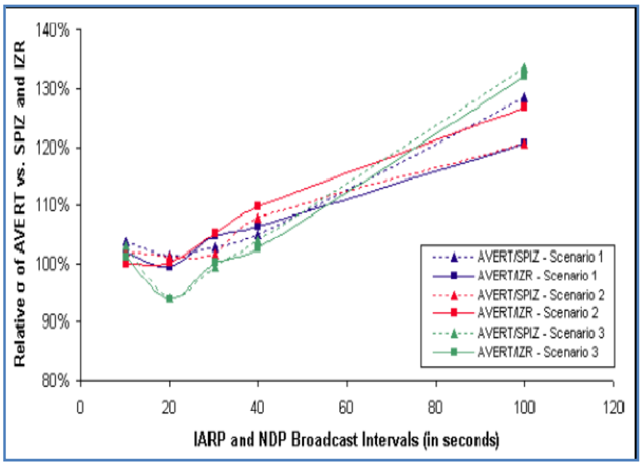

Fig.3. Performance gains of ESDPMANT against IZR and SPIZ.

A series of activities the comparison of ESDPMANT against SPIZ and IZR, and compare the protocols based on the achieve cost ratios. In above figure the y-axis represents the relative gains in the performance achieved by ESDPMANT against the cost of the other protocols, while the x-axis represents different broad cast intervals for IARP and NDP in the range of 10 to 100 seconds. Though, this value cannot achieve the maximum performance under all MAHNET scenarios, or even within the same scenario assuming that network conditions change radically during the lifetime of the MAHNET. It is obvious from the figure that as the service usage frequency increases; the performance is optimized using shorter broadcast intervals.

A second set of research, the two service discovery schemes are tested in a mobile background. It is important to note that for constancy reasons the density is kept fixed when varying the number of nodes by resizing the terrain in which they are allowed to move. Every node in the simulated scenarios uses the random waypoint model with the following parameters:

Minimum Speed = 0meters/second (m/s)

Pause Time = 30 seconds.

Maximum Speed takes the following values: 0.5m/s, 1m/s, 2m/s, 5m/s, 7.5m/s,

10m/s and 12.5m/s

In order to test service discovery and energy consumption under different speeds the results for service discovery and energy use respectively in this mobile context. Each spot in the diagrams represents an average value obtained by running the experiment over 8 different randomly chosen node populations. Recurring to the results shown in the performance of ESDPMANT is presented to be slightly not as good as than that of SPIZ and IZR. In this scenario the BFO mechanism of ESDPMANT does not have adequate feedback from data traffic and hence cannot tune the broadcasting frequency optimally. This is reflected especially when comparing ESDPMANT with IZR and SPIZ when the latter protocols use relatively low broadcasting intervals.

IV. CONCLUSIONS

Taking into consideration bout the result we conclude that choosing a small value of T is more effective, allowing flat version of the NDP and IARP broadcast a period of time separating parts of a theatrical to current network conditions. Comparing ESDPMANT to the non adaptive protocols IZR and SPIZ shows that employing a method for formative the optimal NDP and IARP broadcast intervals in real time can lead to important performance enhancement both in terms of successful service invocations and energy utilization. In our future work we plan to extend our performance evaluation of AVERT, by considering scenarios of higher mobility and also of higher density.

REFERENCES

[1] J. Antonio Garcia Macias and Dante Arias Torres, " Service Discovery in Mobile Ad hoc Networks: Better at the Network Layer?," Proc. IEEE Intl. Workshop on Wireless and Sensor Networks (WSNET'05), Oslo,Norway, June 2005, pp. 452-457.

[2] D. Doval and D. O'Mahony, "Nom: Resource Location and Discovery for Ad hoc Mobile Networks," Proc. 1st Annual Mediterranean Ad hoc Networking Workshop, Med-hoc-Net 2002, Sardegna, Italy, Sept 4

[3] L. Li and L. Lamont, "A Lightweight Service Discovery Mechanism for Mobile Ad Hoc Pervasive Environment Using Cross-Layer Design," Proc. 3rd IEEE International Conference on Pervasive Computing and communications Workshops, March2005, pp.55-59.

[4] Christopher N. Ververidis, George C. Polyzos, "Service Discovery for Mobile Ad Hoc Networks: A Survey of Issues and Techniques," to appear in IEEE Communications Surveys and Tutorials (2008).

[5] Engelstad, P.E., Zheng, Y., Koodli, R., Perkins, C.E., *"Service Discovery Architectures for On-Demand Ad Hoc Networks"*, International Journal of Ad Hoc and Sensor Wireless Networks, Old City Publishing (OCP Science), Vol. 2. Number 1, March 2006, pp. 27-58

[6] J. L. Jodra, M. Vara, J. M. Cabero, J. Bagazgoitia and J. L. Jodra, "Service Discovery Mechanism Over OLSR for Mobile Ad hoc Networks," Proc. 20th International Conference on Advanced Information Networking and Applications - Volume 2 (AINA'06), 2006,pp. 534-542.

[7] Chang-Seok Oh, Young-Bae Ko and Young-Sung Roh, "An Integrated Approach for Efficient Routing and Service Discovery in Mobile Ad Hoc Networks," Proc. IEEE Consumer Communications and Networking Conference (CCNC'05), Las Vegas, Nevada, Jan. 2005.

[8] R. Harbird, S.Halies and C.Mascolo, "Adaptive resource discovery for ubiquitous computing," Proc. 2nd Workshop on Middleware for Pervasive and Ad hoc Computing, Toronto, Canada, October 2004, pp.155-160.

[9] D. Noh and H. Shin, "SPIZ: An Effective Service Discovery Protocol for Mobile Ad Hoc Networks," EURASIP Journal on Wireless Communications and Networking, vol. 2007, Article ID 25167, 13pages, 2007, doi: 10.1155/2007/25167.

[10] P. Samar, M. Pearlman, and Z.J. Hass, "Independent Zone Routing: An Adaptive Hybrid Routing Framework for Ad Hoc Wireless Networks," IEEE/ACM Transactions on Networking, 12(4), 2004,pp. 595-608.

[11] M. Pearlman and Z.J. Hass, "Determining the Optimal Configuration for the Zone Routing Protocol," IEEE Journal on Selected Areas in Communications, 17(8), 1999, pp. 1395-1414.