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ANALYZING THE QOS IN MANET USING END –TO-END MULTISERVICE

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ABSTRACT: In recent years, we have witnessed a drastic growth in demand for multimedia services such as different styles of media streams (i.e., video, voice and data streams) and different priority classes of one traffic streams which are referred to as multiple services having different quality of service (QoS) requirements in wireless networks. Given the proliferation of smart devices in distributed intelligent networks, each node is expected to be endowed with smart autonomic functions. By instinct, the individual network nodes would prefer to act selfishly rather than altruistically in distributed network. each network node should establish a distributed node-selfishness management for managing the aforementioned information on the node-selfishness, whilst improving the network performance of delivering multiservice, i.e., the reliability of the selected path and the successful probability of delivering multi-services. Many literatures have investigated the multi-service delivery in distributed wireless networks. A cross-layer resource allocation scheme was developed in for guaranteeing the QoS requirements of the voice and data traffic.
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KEYWORDS: [Distributed Networks,E2E Multi service delivery ,modules of E2E,Performance of E2E.]

1. INDRODUCTION

A distributed wireless network which consists of nodes exhibiting a selfish behavior is referred to as a distributed selfish wireless network (SeWN). In such network scenarios, the selfish behavior of network nodes, referred to as "node selfishness", may degrade the network performance, e.g., the network connectivity, the reliability of the selected path and the probability of the successful End-to-End (E2E) multiservice delivery. The node selfishness of the network node is affected by some intrinsic and extrinsic factors, such as its own energy and bandwidth resources, the QoS requirements and the employed incentive mechanisms. For improving the network performance, the node individuals need to obtain the information on the node-selfishness of the other nodes and to determine the relationship between the aforementioned factors and the node-selfishness. In such distributed network scenarios, each network node may obtain the aforementioned information, directly collected by itself and/or indirectly received from its neighboring nodes.

2. DISTRIBUTED NETWORK

A distributed wireless network which consists of nodes exhibiting a selfish behavior is referred to as a distributed selfish wireless network (SeWN). In such network scenarios, the selfish behavior of network nodes, referred to as “node selfishness”, may degrade the network performance, e.g., the network connectivity, the reliability of the selected path and the probability of the successful End-to-End (E2E) multiservice delivery. The node selfishness of the network node is affected by some intrinsic and extrinsic factors, such as its own energy and bandwidth resources, the QoS requirements and the employed incentive mechanisms. For improving the network performance, the node individuals need to obtain the information on the node-selfishness of the other nodes and to determine the relationship between the aforementioned factors and the node-selfishness. In such distributed network scenarios, each network node may obtain the aforementioned information, directly collected by itself and/or indirectly received from its neighboring nodes.

3. END TO END MULTI SERVICES DISTRIBUTED FRAMEWORK:

According to those NSI, the source selects a reliable and short path and maintains the reliability of this selected path by adjusting the incentives provided for stimulating selfish RNs under an employed incentive mechanism. The main contributions of this paper are outlined as follows:

- A distributed framework of the node-selfishness management at every RN is conceived to quantify the effects of its intrinsic and extrinsic factors on its node-selfishness, and also to obtain the other RNs’ NSI in terms of their behaviors of forwarding multi-services and/or the recommended NSI of the RNs around it.
- A path selection criterion is designed to select the most reliable and shortest path in terms of the RNs’ DeISs for delivering multi-services.
- The optimal incentives are determined for maintaining the reliability of the multi-service delivery under the influence of the node-selfishness of the RNs within the selected path.

The distributed framework of the node-selfishness management is developed to manage the RNs’ NSI. In the sources effectively and reliably deliver their multi-services under the distributed framework of the node-selfishness management. A dynamic trust management was developed in for minimizing the trust bias and maximizing the routing application performance in the presence of well behaved and selfish nodes. A group-based trust management scheme was proposed in for evaluating the trust of a node group and also for excluding selfish nodes. Additionally, some incentive mechanisms have been investigated for improving the network performance. The incentive mechanisms based on credibility was employed in to stimulate selfish nodes for forwarding traffic data.

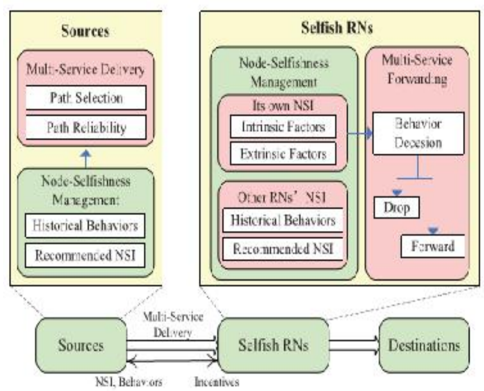


Figure 3: E2E multi-service delivery in the distributed SeWNs

3.1. ADVANTAGES OF E2E MULTI SERVICE

This framework effectively manages the RNs’ NSI, and the optimal strategies of both the path selection and the incentives are determined.According to those NSI, the source selects a reliable and short path and maintains the reliability of this selected path by adjusting the incentives provided for stimulating selfish RNs under an employed incentive mechanism.

- Achieve good scalability.
- Long network lifetime and low data collection latency.
- Reduced increased energy consumption.
- Energy balanced and high energy efficient.

4. MODULES OF E2E:

Here we having three frameworks in modules there are

1. System Model

A. Network Model

B. RN's Profit and Cost of Forwarding Multi services

C. RN's Node-Selfishness Information

2. Node-selfishness Management

A. Management of RN's Node-Selfishness

B. Management of Other RNs' NSI

3. E2E Multiservice Delivery

A. Path Selection

B. Multi-Service Delivery With RNs' NSI

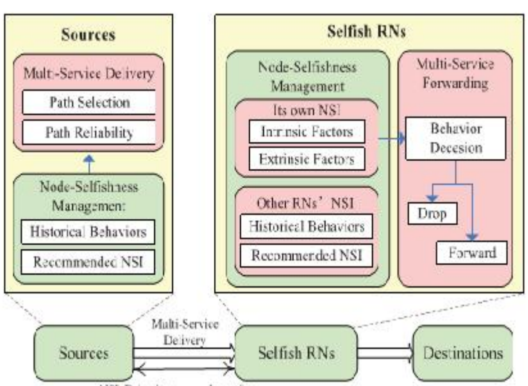


Figure 4: E2E multi-service delivery in the distributed SeWNs

Meanwhile, since the multi-services have different impact factors, the RNs have different resource consumption amounts for satisfying their QoS requirements, which may lead to different selfish behaviors of these RNs. Nevertheless, for successfully delivering multi-services, the source employs an incentive mechanism to depress the node-selfishness of these RNs, and different incentives have different stimulating levels for the selfish behaviors of these RNs. Accordingly, the selfish behavior of each R Ni (∀i ∈V)are affected by its intrinsic factors, i.e., its residual energy Ei and available bandwidth Wi, and its extrinsic factors, i.e., the incentive ρi received by it and the impact factor λh of the received service. Due to the effect of the RNs' selfishness on the E2E multiservice delivery, every source in the SeWNs should obtain the NSI of all RNs for determining the reliability of all path existing between this source-destination pair.

4.1. RN'S PROFIT AND COST OF FORWARDING MULTI SERVICES

When the multi-services are successfully forwarded, RN i (i ∈V) obtains the revenue of forwarding multi-services, denoted by Pi. Since the multi-services have different bit-error rate (BER) requirements, via the adaptive modulation, the transmission rate of RNi to RN j for service his expressed as.

$$R_{i,h} = W_i \log_2\left(1 - \frac{1.5}{\ln(5\eta_h)} \frac{P_{i,h}|g_{i,j}|^2}{N_0 W_i}\right)$$

where Pi,h is the transmit power of RNi for service h, N0is the thermal noise power, gi,j is the channel gain from RNi to RN j, Wi is the available bandwidth possessed by RNi, ηhis the target BER of forwarding service h. The transmission time of RN i for service his expressed as Lh Ri,h, where L his the service length. The resource consumption of RNi for service h with target BER ηh is given by

$$E_{i,h} = P_{i,h}\frac{L_h}{R_{i,h}} = \frac{(1 - 2^{\frac{R_{i,h}}{W_i}})\ln(5\eta_h)L_h N_0 W_i}{1.5|g_{i,j}|^2 R_{i,h}}.$$

Accordingly, the resource cost of RNi for forwarding service h depends on the corresponding resource consumption Ei, h, expressed as

$$\mathcal{C}_{i,h} = \pi E_{i,h}.$$

Where, π is the energy price, which is a constant and is the same for all RNs.

4.2. RN'S NODE-SELFISHNESS INFORMATION

Definition 1 (DeNS, DeIS and DeES): The RN's DeISS I is defined as the degree reflecting the effects of intrinsic factors on its selfish behavior, while the RN's DeESS E is defined as the degree reflecting the effects of extrinsic factors on its selfish behavior. The RN's DeNS is defined as the degree reflecting the effects of all impact factors on its selfish behavior, denoted byS. The DeIS, DeES and DeNS, which are referred to as the RN's NSI, vary from 0 (altruistic) to 1 (completely selfish) via a normalization.

From Definition 1, the contributions of DeIS and DeES to DeNS are decoupled, since DeIS and DeES are uncorrelated. Furthermore, the RN's DeNS is a comprehensive formulation of both DeIS and DeES, expressed as

$$S = f(S^I, S^E),$$

which is a non-decreasing function with respect to (w.r.t.) its DeIS and DeES. When the RN's DeIS SI =0 or its DeESS E=0, its DeNS S=0, meaning that the RN having either the infinite available resources or the infinite incentive is altruistic. While the RN's DeIS SI =1 and its DeESS E=1, its DeNSS=1, meaning that this RN of no available resources and no incentive for the service of the high impact factor is completely selfish. Naturally, it is more common that 0<S I <1 and 0<S E<1, yielding the RN's De NS 0<S<1.

4.3. NODE-SELFISHNESS MANAGEMENT

Under the distributed framework of the node-selfishness management, the node-selfishness management of each RN consists of two parts: the management of its NSI and the management of the other RNs' NSI. For the management of the RN's node-selfishness, the models of the intrinsic and extrinsic selfishness are designed for computing its DeIS and DeES in terms of its intrinsic and extrinsic factors, respectively. Additionally, for the management of the other RNs' NSI, their DeISs, DeESs and DeNSs are obtained in terms of their historical behaviors and the NSI of these RNs recommended by the RNs around it.

Accordingly, the framework of the RN's node-selfishness management is illustrated in Nevertheless, since the sources have no selfishness, the node-selfishness management of every source has no management of its node-selfishness, and only manages the NSI of the RNs in terms of their historical behaviors and the recommended NSI, which is similar to the second part of the node-selfishness management of every RN. Accordingly, in this section, we just analyze the node-selfishness management of one RN

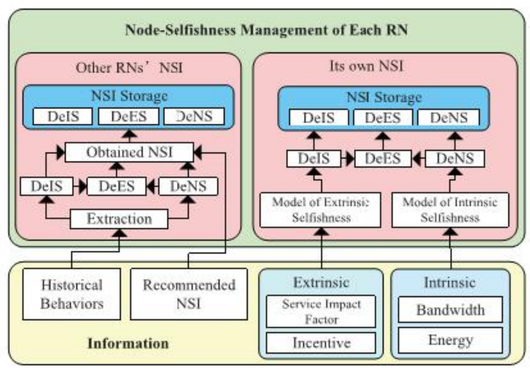


Figure 4.3-The framework of the node-selfishness management

5. E2E MULTISERVICE DELIVERY

In this section, in terms of the obtained NSI under the distributed framework of the node-selfishness management, every source selects the most reliable and shortest path and provides the optimal incentives to the RNs within the selected path for the multi-service delivery, as illustrated in Fig. 4.6.3

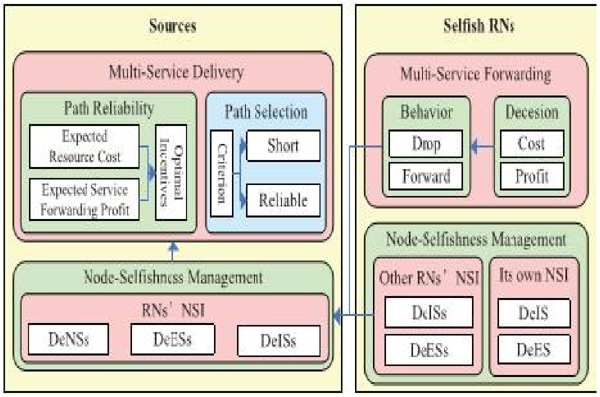


Figure 4.5: multi-service delivery

5.1. PATH SELECTION

For delivering multi-services, the sources find some paths by virtue of the traditional routing protocol. Nevertheless, these paths may not be all reliable for successfully forwarding multi services due to the node-selfishness of the RNs within thes paths. Although the RN's DeNS represents its behavior of forwarding multi-services, the DeNS information is not the best option to select the most reliable path. When the RNs of a few available resources have high DeIS, their historical behaviors may be the ones of forwarding the multi-services owing to the large incentives, thus leading to their low DeNSs. If these RNs of high DeISs are selected within the path of delivering multi-services in terms of the RNs' DeNSs, the sources should provide large incentives for stimulating the multi-service forwarding of these RNs and maintaining the reliability of the selected path.

Definition 2 (Path Selection Criterion):In order to select the most reliable and shortest one from the obtained paths (-) , every source selects one path, which has the maximum path reliability among all path (-), which is formulated as

$$\theta^* = \arg\max_{\theta}\{\Phi_\theta|\theta \in \Theta\}.$$

Note that, under the path selection criterion, the path reliability of pathθ is related to the number of the RNs within pathθ and their extracted DeISs ˜ Sii (∀θi ∈Rθ). The path reliability of pathθ increases as the DeIS of each RN within this path decreases. Accordingly, the path with the maximum path reliability is the most reliable one. Meanwhile, the path reliability of pathθ increases as the RN number within this path decreases. The path with the maximum path reliability may be the shortest one. Therefore, by using the path selection criterion, every source obtains the most reliable and shortest one from the obtained paths.

5.2. MULTI-SERVICE DELIVERY WITH RNS' NSI

After selecting the shortest and most reliable path θ∗={θ∗1,...,θ∗|θ∗|}for the multi-service delivery by using the path selection criterion, the source should maintain the reliability of path θ∗ for delivering multi-services by adjusting the incentives for depressing the RNs' node-selfishness. Nevertheless, the incentives provided by the source are the cost of delivering multi-services, thus the source should minimize such incentive costs. Therefore, for maintaining the path reliability, the source should minimize the incentive costs subject to the successful multi-service forwarding of each RN within the selected path θ∗. Before analyzing the problem of the multi-service delivery, we should analyze the effect of the node-selfishness on the multi-service forwarding of each RNs within path θ∗. Since the RN's behavior of forwarding multi-service is affected by its available resources, it has the expected value of the resource consumption cost affected by its DeIS. The RN of high DeIS cares its lack available resource and conserve its available resource, thus the resource cost of forwarding multi-services is regarded as a large value

In contrast, the RN of low DeIS does not care the resource consumption of forwarding multi services and has high willingness of forwarding multi-services, thus the resource consumption cost is regarded as a small value. Here, the expected resource cost of each RN within pathθ∗ for forwarding multi-services is expressed as

$$\tilde{\mathcal{C}}_{i,h} = \tilde{S}_i^I \mathcal{C}_{i,h}, \forall \theta_i^* \in \theta^*, \forall h \in \{1, \ldots, H\}.$$

Additionally, we study the relationship between the RN's DeES and its profit of forwarding multi-services. From Eq. (7), the RN's DeES decreases as the provided incentive increases for forwarding service eh. The RN of low DeES, for which the larger incentive is provided by the source, appreciates service h from this source and has high willingness of forwarding service h. In contrast, the RN of high DeES has the smaller incentive from the source and may drop serviceh. Here, the expected service forwarding profit of the RN within pathθ ∗ for forwarding multi-services in terms of its DeES, expressed as

$$\tilde{\mathcal{P}}_{i,h} = \frac{\mathcal{P}_i}{\tilde{S}_{i,h}^E}, \forall \theta_i^* \in \theta^*, \forall h \in \{1, \ldots, H\}.$$

In this distributed SeWN, the source and every RN obtain the other RNs' NSI, i.e., their DeISs and DeESs, under the distributed framework of the node-selfishness management. According to Eqs. together with the NSI of the RNs within pathθ ∗ , the problem of the multi-service delivery of the source is expressed as

$$\min_{\rho_{i,h}, \forall \theta_i^* \in \theta^*} \sum_{\theta_i^* \in \theta^*} \rho_{i,h}$$

$$\text{s.t.} \quad \frac{\mathcal{P}_i}{\tilde{S}_{i,h}^E} \geq \tilde{S}_i^I \pi E_{i,h}, \forall \theta_i^* \in \theta^*.$$

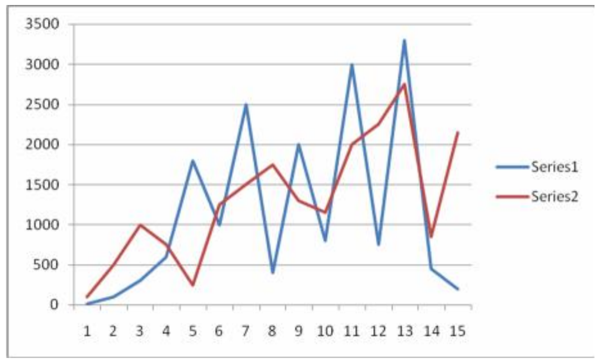
the optimal incentive ∗ i,h increases as the DeIS of each RN within pahtθ ∗ decreases.

In this section, our simulation results are provided for characterizing the RN's node-selfishness management and effectively demonstrating both the path selection and the path reliability of delivering multi-services.

6. E2E MULTISERVICES PERFORMANCE:

In this section discuss about performance of our proposed process of Delay ratio, jitter ratio, Bandwidth ratio, energy efficiency rate are comparing to existing and proposed work.

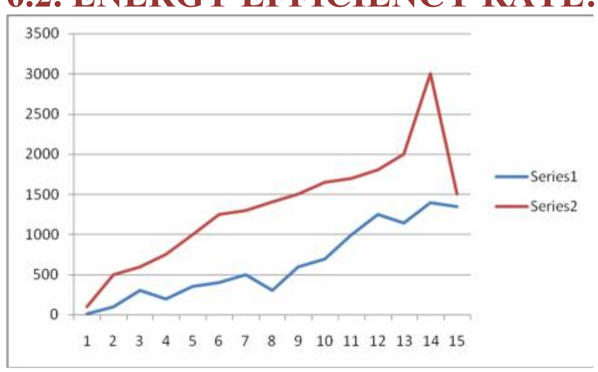
6.1. DELAY RATIO:



Above figure mention delay ratio of our proposed and existing comparison.

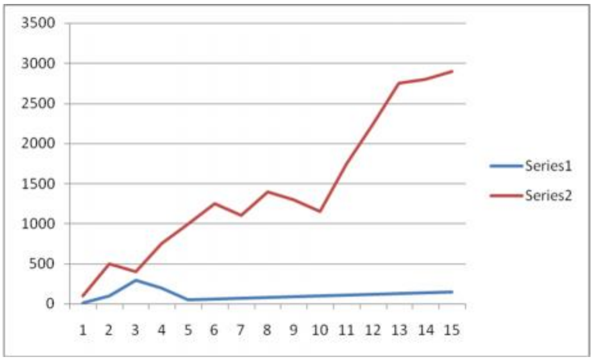
In this work compare previous and present process of delay ratio, here red line mention proposed delay ratio and green line is existing delay ratio, in our proposed work reduces the delay compared to existing process.

6.2. ENERGY EFFICIENCY RATE:



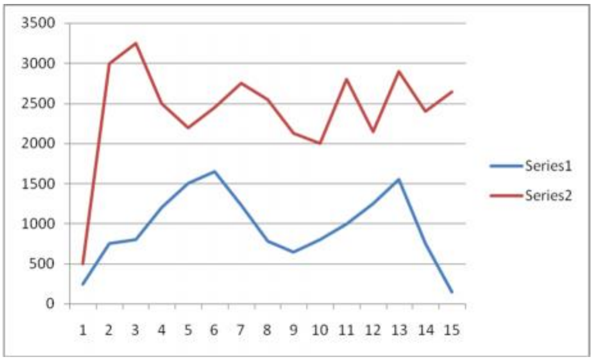
Above figure mention energy efficiency ratio of our proposed and existing comparison.In this work compare previous and present process of energy efficiency rate, here green line mention proposed energy ratio and red line is existing energy ratio, in our proposed work improves efficiency of energy compared to existing process.

6.3. TRANSMISSION COST



Above figure mention Transmission cost of our proposed and existing comparison.In this work compare previous and present process of Transmission cost rate, here red line mention proposed Transmission cost and green line is existing Transmission cost, in our proposed work reduced of Transmission cost compared to existing process.

4. THROUGHPUT RATIO:



Above figure mention Throughput ratio of our proposed and existing comparison.In this work compare previous and present process of Throughput ratio, here red line mention proposed Jitter ratio and green line is existing Throughput ratio, in our proposed work improves efficiency of Throughput ratio compared to existing process.

In NS2 implementation we want to calculate all neighbor node distance for sending and receiving messages in network. Then only we can give request and get ACK from other nodes, this process is common for all nodes. First send hello packet for all nodes from source node and then calculate the travelling distance for request then we can calculate the distance of each neighbor node using distance formula

Distance formula $\sqrt{(x2-x1)^2 + (y2-y1)^2}$

Using above distance formula we can get the distance of all nodes in network. And in code we give table for store that calculating node distance data, above mentioned table is distance values stored table.We discuss the parameters are, Network Lifetime, Data transmission speed, Throughput ratio, End-to-End transmission delay, and Packet Delivery Ratio.We compare Proposed E2E multi-service delivery with more than one previous framework processes, Network lifetime is improved comparing to other previous process.Data transmission speed is very high compared to existing works, then our process improved throughput ratio.End-to-End transmission delay reduced in that level between previous process, we get only slightly delay in our proposed framework.Increased packet delivery ration compared to existing work, we received more rate of data because of only slight level of delay and data drops, So improved data delivery.

CONCLUSION

In this framework, the RNs' NSI includes the degree of node-selfishness (DeNS), the degree of intrinsic selfishness (DeIS) and the degree of extrinsic selfishness (DeES). Under the distributed node-selfishness management, a path selection criterion is designed to select the most reliable and shortest path in terms of RNs' DeISs affected by their available resources, and the optimal incentives are determined by the source to stimulate forwarding multi services of the RNs in the selected path. Our simulation results demonstrate that this framework effectively manages the RNs' NSI, and the optimal strategies of both the path selection and the incentives are determined.

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