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A SURVEY ON END-TO-END MULTISERVICE DELIVERY

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ABSTRACT: This research investigates the multiservice delivery between the source–destination pairs in distributed selfish wireless networks (SeWN), where selfish relay nodes (RN) expose their selfish behaviors, i.e., forwarding or dropping multi services. Owing to the effect of the RNs' node-selfishness on the multi services, a distributed framework of the node-selfishness management is constructed to manage the RN's node-selfishness information (NSI) in terms of its available resources, the employed incentive mechanism and the quality-of-service (QoS) requirements, and the other RNs' NSI in terms of their historical behaviors. 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).

Keywords: [END-TO-END MULTISERVICE DELIVERY, MANET, node-selfishness , extrinsic selfishness]

1. INTRODUCTION

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.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. LITERATURE SURVEY

Cross-Layer Resource Allocation for Integrated Voice/Data Traffic in Wireless Cellular Networks

A major task in next-generation wireless cellular networks is provisioning of quality of service (QoS) over the bandwidth limited and error-prone wireless link. In this paper, we propose a cross-layer design scheme to provide QoS for voice and data traffic in wireless cellular networks with differentiated services (DiffServ) backbone. The scheme combines the transport layer protocols and link layer resource allocation to both guarantee the QoS requirements in the transport layer and achieve efficient resource utilization in the link layer. Optimal resource allocation problems for voice and data flows are formulated to guarantee pre-specified QoS with minimal required resources. For integrated voice/data traffic in a cell, a hybrid time-division/code-division medium access control (MAC) scheme is presented to achieve efficient multiplexing. Theoretical analysis and simulation results demonstrate the effectiveness of the proposed cross-layer approach. Recently, the differentiated services (DiffServ) approach has emerged as an efficient and scalable solution to ensure QoS in future IP networks. As a class-based traffic management mechanism, DiffServ does not use per-flow resource reservation and per-flow signaling in core routers, which makes DiffServ scalable. Current research on DiffServ is mainly focused on the wireline network. The bottleneck of such a network is normally assumed to be in the core network. The link from users to the edge router is assumed to have sufficient resources. However, in a hybrid wireless/wireline network, the above assumption does not hold. The bottleneck for an endto-end application across a hybrid wireless/wireline domain is usually the link between the base station (BS) and the mobile station (MS), due to the limited radio resources and the varying characteristics of the radio channel. On the other hand, current medium access control (MAC) schemes in CDMA wireless systems usually provide priority to voice users. Voice traffic flows are scheduled for transmission first, while data traffic flows use the residual system capacity and are not guaranteed with QoS satisfaction, nor are they differentiated from each other. So far, research on QoS support for data traffic is very limited. In [5], [6], two packet-switching scheduling schemes are proposed for wireless CDMA communications. Both are based on per-packet information, thus increasing the scheduling burden and system overhead. Furthermore, the QoS provisioning for data traffic in these two schemes is limited up to the link layer, i.e., only physical layer QoS and link layer QoS are considered. To the best of our knowledge, there is no proposed solution to provide data traffic with higher layer QoS, e.g., transmission rate guarantee at the transport layer, which can be a main concern from the users' point of view. To address the above issues, in this paper, we propose a cross-layer design scheme for wireless cellular networks with a DiffServ backbone to provide QoS to MSs. The proposed scheme combines the transport layer protocols and link layer resource allocation to both guarantee QoS requirements in the transport layer and achieve efficient resource utilization in the link layer. We consider a hybrid wireless/wireline IP-based network for providing multimedia traffic to MSs, where the Internet backbone is DiffServ based, and the wireless subnet is a wideband time-division/code-division multiple access (TD/CDMA) cellular system with frequency division duplexing (FDD). In the code domain, multi-code CDMA (MC-CDMA) is considered. Here, we focus on the resource management in the reverse link, as resource allocation in the multiple-access reverse link is much more complex than that in the broadcasting forward link. User Datagram Protocol (UDP) is used for voice traffic in our system, which does not use retransmissions to guarantee reliable delivery. UDP itself does not provide mechanisms to ensure timely delivery or other QoS guarantees, but relies on lower layer services to do so. When a voice user is on talk spurt, the UDP packets will be generated periodically. On the other hand, Transmission Control Protocol (TCP) can provide reliable end-to-end transmission over unreliable IP service, which is suitable for the data traffic. Each transport layer (TCP or UDP) packet is segmented into a number of link layer (LL) units for transmission over the error-prone wireless link, and then reassembled at the BS.

Correlation-Aware QoS Routing With Differential Coding for Wireless Video Sensor Networks

The spatial correlation of visual information retrieved from distributed camera sensors leads to considerable data redundancy in wireless video sensor networks, resulting in significant performance degradation in energy efficiency and quality-of-service (QoS) satisfaction. In this paper, a correlation-aware QoS routing algorithm (CAQR) is proposed to efficiently deliver visual information under QoS constraints by exploiting the correlation of visual information observed by different camera sensors. First, a correlation-aware inter-node differential coding scheme is designed to reduce the amount of traffic in the network. Then, a correlation-aware load balancing scheme is proposed to prevent network congestion by splitting the Correlated flows that cannot be reduced to different paths. Finally, the correlation-aware schemes are integrated into an optimization QoS routing framework with an objective to minimize energy consumption subject to delay and reliability constraints. Simulation results demonstrate that the proposed routing algorithm achieves efficient delivery of visual information under QoS constraints in wireless video sensor networks. Many recent works have been proposed for providing QoS support at different layers of the communication stack, including QoS routing algorithms [9], QoS MAC protocols [19], and cross-layer QoS solutions [21]. These works, however, only try to meet QoS requirements by properly regulating the network traffic, while the total amount of data injected into the network cannot be reduced. Therefore, It is still resource-demanding to deliver large amounts of visual information in WVSNs. To encounter this problem, collaborative multimedia in-network processing [2] is suggested to reduce the traffic volume by allowing sensor nodes tofilter out uninteresting events locally or coordinate with each other to aggregate correlated data. In WVSNs, correlation exists among the observations of video sensors with overlappedfield of views (FoVs) [6], leading to considerable data redundancy. It is highly desirable to remove such redundancy to improve the performance of WVSNs [2]. To enhance energy efficiency, the joint compression/aggregation and routing approach has been studied for sensor networks that deal with scalar data. This approach can be classified into three categories [22]: distributed source coding (DSC), routing driven compression (RDC), and compression driven routing (CDR). DSC aims to allocate the optimal coding rates to minimize the total communication cost of transporting correlated information over shortest paths. In RDC, sensors send data along the preferred paths to the sink while allowing for opportunistic aggregation wherever the paths overlap. In contrast, CDR let nodes select the paths that allow for the maximum possible aggregation at each hop. These works cannot provide QoS supports such as timeliness and reliability, and thus are not applicable to WVSNs. In this paper, we propose a correlation-aware QoS routing algorithm (CAQR) for the efficient delivery of visual information in WVSNs.

First, based on the spatial correlation of visual information in our previous work [6], a correlation-aware inter-node differential coding scheme is proposed to reduce the amount of traffic in the network, where differential coding is performed between intra coded frames generated by correlated sensors. Then, a correlation-aware load balancing scheme is proposed to prevent network congestion by splitting the correlated flows that cannot be reduced to different paths. By integrating these correlation-aware schemes, an optimization QoS routing framework is proposed with an objective to minimize sensors' energy consumption under delay and reliability constraints. It is shown that by integrating the corrrelation-aware schemes, the proposed algorithm can achieve energy efficient QoS communication in WVSNs.

QoS Aware Geographic Opportunistic Routing in Wireless Sensor Networks

QoS routing is an important research issue in wireless sensor networks(WSNs), especially for mission-critical monitoring and surveillance systems which requires timely and reliable data delivery. Existing work exploits multipath routing to guarantee both reliability and delay QoS constraints in WSNs. However, the multipath routing approach suffers from a significant energy cost. In this work, we exploit the geographic opportunistic routing(GOR) for QoS provisioning with both end-to-end reliability and delay constraints in WSNs. Existing GOR protocols are not efficient for QoS provisioning in WSNs, in terms of the energy efficiency and computation delay at each hop. To improve the efficiency of QoS routing in WSNs, we define the problem of efficient GOR for multi constrained QoS provisioning in WSNs, which can be formulated as a multi objective multi constraint optimization problem. Based on the analysis and observations of different routing metrics in GOR, we then propose an Efficient QoS-aware GOR(EQGOR) protocol for QoS provisioning in WSNs. EQGOR selects and prioritizes the forwarding candidate set in an efficient manner, which is suitable for WSNs in respect of energy efficiency, latency, and time complexity. We comprehensively evaluate EQGOR by comparing it with the multipath routing approach and other baseline protocols through ns-2 simulation and evaluate its time complexity through measurement on the MicaZ node. Evaluation results demonstrate the effectiveness of the GOR approach for QoS provisioning in WSNs. EQGOR significantly improves both the end-to-end energy efficiency and latency, and it is characterized by the low time complexity. We argue that multipath routing approach may not be suitable to guarantee both reliability and delay QoS constraints in WSNs. Correspondingly, we propose to exploit the opportunistic routing approach for multi constrained QoS provisioning in WSNs. We find that existing GOR protocol cannot be directly applied for QoS provisioning in WSNs. Therefore, we investigate the problem of efficient GOR for multi constrained QoS provisioning (EGQP) in WSNs, which is formulated as a multi objective multi constraint optimization problem. We provide insight into the properties of multiple routing metrics in GOR. Based on the theoretical analysis and observations, we propose an Efficient QoS aware GOR(EQGOR) algorithm for QoS provisioning in WSNs.

- Through comprehensive performance comparisons, we demonstrate the low time complexity and effectiveness of EQGOR for multi constrained QoS provisioning in WSNs.

Hierarchical Trust Management for Wireless Sensor Networks and its Applications to Trust-Based Routing and Intrusion Detection

We propose a highly scalable cluster-based hierarchical trust management protocol for wireless sensor networks (WSNs) to effectively deal with selfish or malicious nodes. Unlike prior work, we consider multidimensional trust attributes derived from communication and social networks to evaluate the overall trust of a sensor node. By means of a novel probability model, we describe a heterogeneous WSN comprising a large number of sensor nodes with vastly different social and quality of service (QoS) behaviors with the objective to yield “ground truth” node status. This serves as a basis for validating our protocol design by comparing subjective trust generated as a result of protocol execution at runtime against objective trust obtained from actual node status. To demonstrate the utility of our hierarchical trust management protocol, we apply it to trust-based geographic routing and trust-based intrusion detection. For each application, we identify the best trust composition and formation to maximize application performance. Our results indicate that trust-based geographic routing approaches the ideal performance level achievable by flooding-based routing in message delivery ratio and message delay without incurring substantial message overhead. For trust-based intrusion detection, we discover that there exists an optimal trust threshold for minimizing false positives and false negatives. Furthermore, trust-based intrusion detection outperforms traditional anomaly-based intrusion detection approaches in both the detection probability and the false positive probability.

Dynamic Trust Management for Delay Tolerant Networks and Its Application to Secure Routing

Delay tolerant networks (DTNs) are characterized by high end-to-end latency, frequent disconnection, and opportunistic communication over unreliable wireless links. In this paper, we design and validate a dynamic trust management protocol for secure routing optimization in DTN environments in the presence of well-behaved, selfish and malicious nodes. We develop a novel model-based methodology for the analysis of our trust protocol and validate it via extensive simulation. Moreover, we address dynamic trust management, i.e., determining and applying the best operational settings at runtime in response to dynamically changing network conditions to minimize trust bias and to maximize the routing application performance. We perform a comparative analysis of our proposed routing protocol against Bayesian trust-based and non-trust based (PROPHET and epidemic) routing protocols. The results demonstrate that our protocol is able to deal with selfish behaviors and is resilient against trust-related attacks. Furthermore, our trust-based routing protocol can effectively trade off message overhead and message delay for a significant gain in delivery ratio. Our trust based routing protocol operating under identified best settings outperforms Bayesian trust-based routing and PROPHET, and approaches the ideal performance of epidemic routing in delivery ratio and message delay without incurring high message or protocol maintenance overhead.

Group-Based Trust Management Scheme for Clustered Wireless Sensor Networks

Traditional trust management schemes developed for wired and wireless ad hoc networks are not well suited for sensor networks due to their higher consumption of resources such as memory and power. In this work, we propose a new lightweight Group based Trust Management Scheme (GTMS) for wireless sensor networks, which employs clustering. Our approach reduces the cost of trust evaluation. Also, theoretical as well as simulation results show that our scheme demands less memory, energy, table for large-scale sensor networks. 1. Trust solves the problem of providing corresponding access control based on judging the quality of SNs and their services. This problem cannot be solved through traditional security mechanisms.

2. Trust solves the problem of providing reliable routing paths that do not contain any malicious, selfish, or faulty node(s).

3. Trust makes the traditional security services more robust and reliable by ensuring that all the communicating nodes are trusted during authentication, authorization, or key management A number of trust management schemes have been proposed for peer-to-peer networks, and ad hoc networks. To the best of our knowledge, very few comprehensive trust management schemes (e.g., Reputation-based Framework for Sensor Networks (RFSN), Agent-based Trust and Reputation Management (ATRM), and Parameterized and Localized trust management Scheme have been proposed for sensor networks. Although, there are some other works available in the literature and so forth, that discuss trust but not in much detail. Within such comprehensive works, only ATRM scheme is specifically developed for the clustered WSNs. However, this and other schemes suffer from various limitations such as these schemes do not meet the resource constraint requirements of the WSNs and, more specifically, for the large-scale WSNs. Also, these schemes suffer from higher cost associated with trust evaluation specially of distant nodes. Furthermore, existing schemes have some other limitations such as dependence on specific routing scheme, like PLUS works on the top of the PLUS_R routing scheme; dependence on specific platform, like the ATRM scheme requires.

3. EXISTING SYSTEM

A major task in next-generation wireless cellular networks is provisioning of quality of service (QoS) over the bandwidth limited and error-prone wireless link. In this paper, we propose a cross-layer design scheme to provide QoS for voice and data traffic in wireless cellular networks with differentiated services (DiffServ) backbone. The scheme combines the transport layer protocols and link layer resource allocation to both guarantee the QoS requirements in the transport layer and achieve efficient resource utilization in the link layer. Optimal resource allocation problems for voice and data flows are formulated to guarantee pre-specified QoS with minimal required resources. For integrated voice/data traffic in a cell, a hybrid time-division/code-division medium access control (MAC) scheme is presented to achieve efficient multiplexing.

3.1 PROBLEMS IN EXISTING SYSTEM

- This framework neglect the deep analysis of the node-selfishness from the perspectives of all impact factors, i.e., the nodes' available resources, the QoS requirements of the multi-services and the factor of the employed incentive mechanism
- It does not provide specific security architecture for a network communication process.
- This algorithm has less energy consumption.

Here we want to achieve High energy consumption. And more energy efficiency

3.2 OVERVIEW OF PROJECT

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.

CONCLUSION

In this paper, we have constructed a distributed framework of the node-selfishness management, where every RN manages its NSI and other nodes' NSI and every source manages the RNs' NSI in distributed SeWNs. In this framework, the RN's models of intrinsic and extrinsic selfishness have been developed to manage its DeIS and DeES, and the other RNs' NSI has been obtained in terms of the RNs' historical behaviors and their recommended NSI. Under this distributed framework of the node-selfishness management, the path selection criterion has been designed to select the most reliable and shortest path for the multi-service delivery. Additionally, the optimal incentives have been adjusted by the source for maintaining the path reliability of the E2E multi-service delivery.

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