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CO-OPERATIVE DOWNLOAD IN VECHICULAR ENVIRONMENT

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***Abstract*—-In this paper consider a complex (i.e., nonlinear) road scenario where users aboard vehicles equipped with communication interfaces are interested in downloading large files from road-side Access Points (APs). We investigate the possibility of exploiting opportunistic encounters among mobile nodes so to augment the transfer rate experienced by vehicular downloaders. To that end, we devise solutions for the selection of carriers and data chunks at the APs, and evaluate them in realworld road topologies, under different AP deployment strategies. Through extensive simulations, we show that carry and forward transfers can significantly increase the download rate of vehicular users in urban/suburban environments, and that such a result holds throughout diverse mobility scenarios, AP placements and network loads.**

***Index Terms*— Source, router, carry and forward, ZigBee, Destination, Medium access control(MAC),energy efficiency.**

INTRODUCTION

A wireless sensor network (WSN) is a wireless network consisting of spatially distributed autonomous devices using sensors to monitor physical or environmental conditions. A WSN system incorporates a gateway that provides wireless connectivity back to the wired world and distributed nodes. We develop a Latency Aware IPv6-packet Delivery (LAID) Scheme for BF-WSNs to reliably deliver IPv6 packets with the minimum end-to-end latency. In addition to the retransmission ACK scheme applied in the MAC layer, network coding is adopted in the LAID to further improve packet delivery reliability. Wireless sensor networks (WSNs) offer us a potential for greater awareness of our surroundings, collecting, measuring, and aggregating parameters beyond our current abilities, and provide an opportunity to enrich our experience through context-awareness. As a typical sensor node is small with limited processing power, memory, and energy resources, in particular, these WSNs must be very energy-efficient for practical deployment. Medium access control (MAC) protocols are central to the energy-efficiency objective of WSNs, as they directly control the most energy consuming part of a sensor node: communications over the shared medium.

A gateway, which is located at the boundary of the IP network and our BF-WSN, is responsible for breaking IPv6 packet into small pieces with each suitable for a single MAC frame carried by BF-WSN nodes. We classify the packets passing through the gateway into two categories: down-going Packets, which traverse from the IP network to the BF-WSN, and up-going packets, which move in the opposite direction. Down-going packets usually contain commands to control BF-WSN nodes while up-going ones carry data sensed by BFWSN nodes. Noticing that the up-going packets are small and can be carried within one IPv6 packet, i.e., it is not needed to break them up, we only consider delivering the down-going packets.

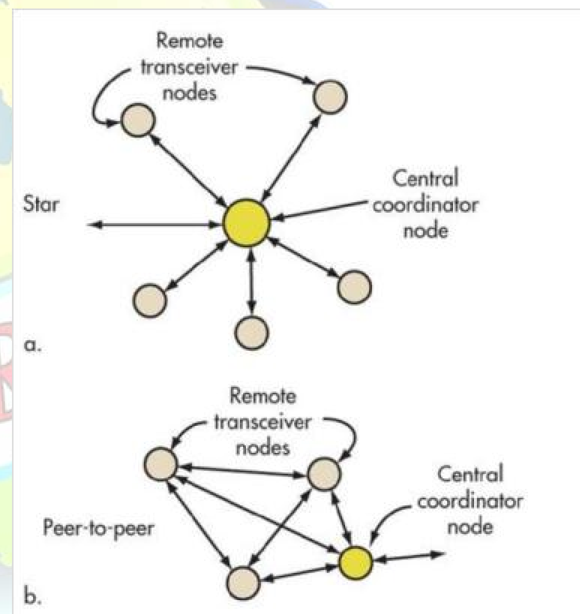

Fig: (a) & (b) star & peer-to-peer network

The rest of this paper is organized as follows. Section II Reviews related work

I. RELATED WORK

Network latency is an expression of how much time it takes for a packet of data to get from one designated point to another. In some environments (for example, AT&T), latency is measured by sending a packet that is returned to the sender; the round-trip time is considered the latency. Hence improve the network capacity and download the larded sized files.

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A. ZigBee

ZigBee is an open global standard for wireless technology designed to use low-power digital radio signals for personal area networks. ZigBee operates on the IEEE 802.15.4 specification and is used to create networks that require a low data transfer rate, energy efficiency and secure networking. ZigBee operates in the industrial, scientific and medical (ISM) radio bands: 2.4 GHz in most jurisdictions worldwide; 784 MHz in China, 868 MHz in Europe and 915 MHz in the USA and Australia. Data rates vary from 20 Kbit/s (868 MHz band) to 250 Kbit/s (2.4 GHz band).

Bluetooth is based on standard 802.15.1 and ZigBee is based on standard 802.15.4 for low rate devices (LR-WPAN). They can automatically form ad hoc networks as devices within range are detected. They only address devices in their own networks and do not currently connect to the internet.

Figure: IEEE802.15.4

Bluetooth is based on standard 802.15.1 and ZigBee is based on standard 802.15.4 for low rate devices (LR-WPAN). They can automatically form ad hoc networks as devices within range are detected. They only address devices in their own networks and do not currently connect to the internet.

B. Energy Gain

Each node uses the probabilities in to determine its cluster head status at the beginning of each round, and we tracked the rate at which the data packets are transferred to the BS and the amount of energy required to get the data to the BS. When the nodes use up their limited energy during the course of the simulation, they can no longer transmit or receive data. For these simulations, energy is consumed whenever a node transmits or receives data or performs data aggregation. Using spread-spectrum increases the number of bits transmitted, thereby increasing the amount of energy dissipated in the electronics of the radio. We do not assume any static energy dissipation nor do we assume energy is consumed during carrier-sense operations; hence, the results here do not account for the potential energy benefits of using TDMA in LEACH compared with CSMA in MTE.

C. Medium Access Control

The medium access control (MAC) is especially important for improving communication energy-efficiency, as it is the protocol entity directly controlling the communication block. The communication block consists of the wireless transceiver and it defines many of the communications constraints apart from the actual energy source. Data rate, legislated duty cycle (according to the frequency band used), transmit: receive: sleep energy consumption ratios, bit error ratio, and communications range among others are the characteristics that influence MAC layer protocol design. The problem of deciding the MAC protocol to use relates to what type of MAC provides the most energy-efficient communications method for the scope of the sensor network's intended purpose. Two major types of MAC protocols are contentionbased and scheduled channel access. Contention-based MAC protocols can scale relatively easily for the hundreds to thousands of nodes envisioned to be used with sensor applications. The drawback is that the channel access is contention-based, implying collisions can occur and collisionless full channel utilization is not likely. Scheduled MAC protocols can, in theory, reach collision-less full channel utilization at the expense of control overhead, but when the channel is lightly loaded, they perform no better than contention-based protocols.

Scheduled WSN MAC protocols

With proper scheduling, in theory, optimal channel access can be achieved. In reality, the most difficult parts in performing optimal scheduling are: (1) that the computation of such allocation becomes a non-deterministic polynomial (NP) complete problem, and (2) achieving precise network-wide synchronization required by optimal allocation is not feasible with modern WSN nodes. Scalability of scheduled WSN MAC protocols is also a challenge. In the context of this thesis, a protocol is considered as 'solitary scheduled' if data frames are only communicated using a scheduling mechanism. The control frames for more than one node channel scheduling may be communicated in a contention environment. It should be noted that a CSMA/CA protocol schedules the channel for one node for a single data transaction. Hence, it is not considered as a scheduling protocol in the context of this work. Solitary protocols are addressed first, followed by crosslayer solutions.

Access point MAC protocol

The AP cluster MAC protocol has also two sets of PHY technologies: one for access point to sensor node communications and the other for intra-cluster communications. The first set uses exactly the same PHY as a sensor node, but it has no energy limitations due to being mains operated. The second set uses real-time Ethernet or some other highly reliable and predictable high-rate MAC protocol.Aclusterisaspatiallylimitedsetofaccesspointsthatworki nunison. The purpose of a cluster is to provide the moving sensor nodes an area that is much larger than the span of a single AP.

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The APs may have variable transmission power and they alternate beacon transmissions in such a way that the area to be covered has a minimal amount of overlap and gaps.

II. EXISTING SOLUTION

The cooperative download of contents from users aboard vehicles that introduced SPAWN, a protocol for the retrieval and sharing of contents vehicular environments. SPAWN is designed for unidirectional traffic over a highway, and is built on the assumption that all on-road vehicles are active downloader's of a same content. Packet delivery suffers from loss due to unreliable wireless links because the nodes are usually not able to transmit with high power level so that wireless links between the nodes prone to being broken. End to-end packet latency may be intolerable, which may cause packets unable to reach the destination on time

III. PROPOSED SYSTEM

In this paper, we focus on one of the latter tasks, namely the download of large sized files. We identified and proposed solutions to the problems of carrier's selection and chunk scheduling, and extensively evaluated them. The main contribution of this work lies in the demonstration that vehicular cooperative download in urban environments can bring significant download rate improvements to users traveling on trafficked roads in particular.

Our proposed system, we develop a Latency Aware IPv6packet Delivery (LAID) Scheme for BF-WSNs to reliably deliver IPv6 packets with the minimum end-to-end latency. In addition to the retransmission ACK scheme applied in the MAC layer, network coding is adopted in the LAID to further improve packet delivery reliability.

A gateway, which is located at the boundary of the IP network and our BF-WSN, is responsible for breaking IPv6 packet into small pieces with each suitable for a single MAC frame carried by BF-WSN nodes. We classify the packets passing through the gateway into two categories: down-going packets, which traverse from the IP network to the BF-WSN, and up-going packets, which move in the opposite direction. Down-going packets usually contain commands to control BF-WSN nodes while up-going ones carry data sensed by BFWSN nodes. Noticing that the up-going packets are small and can be carried within one IPv6 packet, i.e., it is not needed to break them up, we only consider delivering the down-going packets.

Implementation

FEASIBILITY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general

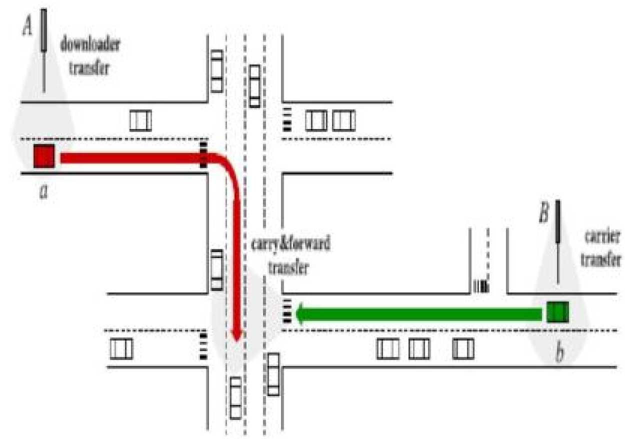

Fig: System architecture

Plan for the project and some cost estimates. During system analysis feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a

Burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ECONOMICAL FEASIBILITY
- TECHNICAL FEASIBILITY
- SOCIAL FEASIBILITY

ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

SOCIAL FEASIBILITY

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. [4] discussed about a system,the effective incentive scheme is proposed to stimulate the forwarding cooperation of nodes in VANETs. In a coalitional game model, every relevant node cooperates in forwarding messages as required by the routing protocol. This scheme is extended with constrained storage space. A lightweight approach is also proposed to stimulate the cooperation.

IV. System Description

A. Cooperative Download

Let us first point out which are the major challenges in the realization of a Vehicular cooperative download system within complex urban road environments.

The selection of the carrier(s): contacts between cars in urban/suburban environments are not easily predictable. Idle APs cannot randomly or inaccurately select vehicles to carry data chunks, or the latter risks to be never delivered to their destinations.

Choosing the right carrier(s) for the right downloader vehicle is a key issue in the scenarios we target,, The scheduling of the data chunks: determining which parts of the content should be assigned to one or multiple carriers, and choosing in particular the level of redundancy in this assignment, plays a major role in reducing the probability that destination vehicles never receive portions of their files.

B. Chunk Scheduling

Upon selection of a destination for the carry & forward transfer, jointly with the associated local carriers, an AP must decide on which portion of the data the downloader is interested in is to be transferred to the carriers. To that end, we assume that each content is divided into chunks, i.e., small portions of data that can be transferred as a single block from the AP to the carriers, and then from the latter to the destination. Since a same chunk can be transferred by one or multiple APs to one or more carriers, the chunk scheduling problem yields a tradeoff between the reliability (i.e., the probability that a downloader will receive at least one copy of a chunk) and the redundancy (i.e., how many copies of a same chunk are carried around the road topology) of the data transfer.

1. *Global*

The Global chunk scheduling assumes that APs maintain per vehicle distributed chunk databases, similar to the time databases introduced before. These databases store information on which chunks have already been scheduled for either direct or carry & forward delivery to each downloader. 2. *Hybrid*

The Hybrid chunk scheduling allows overlapping between carry & forward transfers scheduled by different APs.

3. *Local*

The Local chunk scheduling is similar to the Hybrid scheme, since different APs can schedule the same chunks when delegating data to carriers.

C. AP deployment

1. Random

Under the Random AP positioning scheme, each point of the road topology has the same probability of being selected for the deployment of an AP. The resulting placement may be considered of a completely unplanned infrastructure.

2. *Density based*

The Density based AP deployment technique aims at maximizing the probability of direct data transfers from APs to downloader vehicles. To that end, this technique places the APs at those crossroads where the traffic is denser.

3. *Cross volume-based*

The Cross volume-based AP placement is designed to favor carry & forward transfers, by increasing the potential for collaboration among vehicles. This technique exploits the predictability of large-scale urban vehicular traffic flows, which are known to follow common mobility patterns over a road topology.

ALOGRITHM

1. Start the program
2. Open the client page
3. Request for data from the server
4. If Check the data from the server

```
{
Retrieve the data from the server Update the client page
}
Else
{
Alert message to the client
}
```

5. End the program

V. Conclusion

Cooperative download in vehicular environment is used to download the large sized file in road side. In this paper we improve the network capacity to download the files. Due to the huge number of envisioned communications devices connected to future Internet, IPv6 have to be used in the future. Unfortunately, IPv6 packets tend to have large size, and an IPv6 packet may not be fitted in an MAC frame for most wireless sensor networks, including BF-WSNs, without fragmentation. In fact, the 6LoWPAN protocol, which is standardized by the Internet Engineering Task Force (IETF) to deliver IPv6 packets over IEEE 802.15.4 standard based WSNs, adopts fragmentation technique. Unfortunately, with the 6LoWPAN protocol, end to-end packet latency may be intolerable, which may cause IPv6 packets unable to reach the destination on time. So we consider on that IPv4 address and browse the file. The possible factors affecting end-to-end packet latency in BF-WSNs are as follows. Firstly, packet delivery has to proceed in intermittent way. Harvesting ambient energy for sensors is studied for some time and is becoming more popular. Therefore, we provided a generic model for the energy storage capacity for harvesting enabled sensors. This is because the nodes have to enter low power mode to save and harvest energy when their residual energy are below threshold, which temporarily terminates the packet delivery, and wake up when they have sufficient energy for transmitting, which resumes the packet delivery. Secondly, packet delivery suffers from loss due to unreliable wireless links because the nodes are usually not able to transmit with high power level so that wireless links between the nodes prone to being broken, which may cause a fragment of the ongoing IPv6 packet unable to be delivered to a neighboring node even when the fragment is retransmitted with the greatest allowed parameter of maximum number of transmission retrials set in the MAC layer, thus preventing the destination from reassembling the original IPv6 packet. Therefore, how to efficiently deliver large-sized IPv6 packets over BF-WSNs suitable for small-sized packets is important and challenging, and should be carefully investigated. In this paper, we have addressed this important problem and have designed a Latency Aware IPv6 Packet Delivery (LAID) scheme to be implemented at the gateway nodes, which are located at the boundaries of the Internet and the BF-WSNs, and the nodes in the BF-WSNs in order to deliver IPv6 packets over the BFWSNs in lowest latency. Through extensive evaluation, we have demonstrated that our LAID can considerably reduce the end-to-end packet latency over BF-WSNs by tuning the data rate and the MNTT in the MAC layer in BF-WSNs while maintaining high packet delivery ratio and consuming low harvested energy. We owe the high reliability, measured by PDR, to the network coding applied in the LAID, which encodes all fragments of an IPv6 packet into multiple packets so that loss of some encoded packets does not affect the recipient to recover the original IPv6 packet. We can apply long distance communication and download the large sized files. Increase the speed and does not occur collision in data files. In traffic we can easy to download the files and improve network capacity. They have better carry and forward transfer increase the download rate. The energy storage is very efficient.

VI. FUTURE ENHANCEMENT

In addition to IEEE 802.15.4 standard based BF-WSNs, the proposed LAID may be applicable in other kinds of battery free wireless networks. The key to the LAID is in solving the OP so as to find the optimal pairing of the data rate and the MNTT. Surely, it consumes energy to solve the OP. Hence, in practice, we should carefully consider when and where to solve the OP. The hint is to let the nodes solve the OP at a fixed interval, and the duration of the fixed interval depends on how much energy the nodes can harvest. In the extreme case when the energy consumed in solving the OP is considerably greater, compared to the harvested energy, we can let the gateway solve the OP and then piggyback the pairing of the optimal date rate and MNTT to the respective nodes.

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