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Congestion Control and Routing Optimization by using on Demand Routing Protocol of Second Order Approach

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ABSTRACT

Now a days the main problem is routing optimization and distributed joint congestioncontrol. The Routing optimization has received a significant role recently. Most of the existing methods follow idea called back pressure algorithm(BPA) which results in slowconvergence and poor delay performance. To overcome slow convergence, poor delay and to achieve perfect routing optimization by using On Demand routing protocol that offers utility-optimality, fast convergence and low delay. Our contribution in this paper isto overcome the drawbacks in the second order distributed approach, they are:

1) On-demand routing protocol to decrease time delay.

2) Only the efficient or needed nodes are covered avoiding unnecessary nodes.

3) Improper optimization is avoided in this method.

***Keywords*--** On Demand Routing Protocol, delay Performance, second order distribution Approach

I. INTRODUCTION

Distributed joint congestion control and routing optimization has received asignificant amount of attention recently. To date, however, most of the existingschemes follow a key idea called the back-pressure algorithm. Despite having many salient features, the first-order sub-gradient nature of the back-pressurebased schemes results in slow convergence and poor delay performance. Toovercome these limitations, in this paper, we make a first attempt at developing asecond-order joint congestion control and routing optimization framework thatoffers utility-optimality, queue-stability, fast convergence, and low delay. Ourcontributions in this paper are three-fold: i) propose a new second-order jointcongestion control and routing framework based on a primal-dual interior-point approach; ii) establish utility-optimality and queue-stability of the proposed secondorder method; and iii) show how to implement the proposed second-order methodin a distributed fashion.with the rapid integration of new applications and technologies, recent years have witnessed a growing challenge in making communication networks work more efficiently. To date, while there exists a large body of work on optimization baseddynamic joint congestion control and routing policy for both wireline and wireless networks (see, e.g., [1]–[5]), most of these schemes follow a key idea called the "back-pressure algorithm," which traces its roots to the celebrated paper[6].The enduring popularity of the back-pressure algorithm is primarily due to: 1) aprovable throughputoptimality,2)elegantcross-layerextensions,and3) a distributed dynamic queue-length differential based routing policy that stabilizes all queues inthe network. Researchers have also uncovered a fundamental connectionbetween the back-pressure based congestion control and the language dual decomposition framework plus the sub-gradient method in classical nonlinear optimization theory [1], [3], where (scaled) queue-lengths play the role of languagedual variables and the queue-length updates correspond to sub-gradient directions. This enlightening insight has unified techniques that originated independently from control and optimization theory.

II. EXISTING SYSTEM

In that Existing system we can use the First Order Approach of On Demand Routing Protocol in this approachtime delay performance is good but comparing second order delay is little bit lesser than of Second order approach.

III. PRIVACY ISSUES

Personal privacy has always been a major concern in this country. In recent years,with the widespread use of Internet, the concerns about privacy have increasetremendously. Because of the privacy issues, some people do not shop onInternet. They are afraid that somebody may have access to their personalinformation and then use that information in an unethical way; thus causing themharm.Although it is against the law to sell or trade personal information between differentorganizations, selling personal information have occurred. For example, of the Washing Post, in 1998, CVS had sold their patient's prescription purchases to adifferent company. In addition, American Express also sold their customers' creditcard purchases to another company. What CVS and American Express did clearlyviolate privacy law because they were selling personal information without theconsent of their customers. The selling of personal information may also bringharm to these customers because you do not know what the other companies areplanning to do with the personal information that they have purchased.

SECURITY ISSUES

Although companies have a lot of personal information about us available online,they do not have sufficient security systems in place to protect that information.For example, recently the Ford Motor credit company had to inform 13,000 of theconsumers that their personal information including Social Security number,address, account number and payment history were accessed by hackers whobroke into a database belonging to the Experian credit reporting agency. This incidence illustrated that companies are willing to disclose and share yourpersonal information, but they are not taking care of the information properly. Withso much personal information available, identity theft could become a realproblem.

MISUSE OF INFORMATION/INACCURATE INFORMATION

Trends obtain through data mining intended to be used for marketing purpose orfor some other ethical purposes, may be misused. Unethical businesses or peoplemay used the information obtained through mining to take advantage of vulnerablepeople or discriminated against a certain group of people. In addition, data miningtechnique is not a 100 percent accurate; thus mistakes do happen which can have serious consequence.

FEASIBILITY STUDY

Preliminary investigation examine project feasibility, the likelihood thesystem will be useful to the organization. The main objective of the feasibility studyis to test the Technical, Operational and Economical feasibility for adding new modules and debugging old running system. All system is feasible if they areunlimited resources and infinite time. There are aspects in the feasibility study portion of the preliminary investigation:

- Technical Feasibility
- Operational Feasibility
- Economical Feasibility

ECONOMIC FEASIBILITYA

system can be developed technically and that will be used if installed must still be a good investment for the organization. In the economical feasibility, the development cost in creating the system is evaluated against the ultimate benefit derived from the new systems. Financial benefits must equal or exceed the costs.The system is economically feasible. It does not require any addition hardware or software. Since the interface for this system is developed using the existing resources and technologies available at NIC, There is nominal expenditure and economical feasibility for certain.

OPERATIONAL FEASIBILITY

Proposed projects are beneficial only if they can be turned out intoinformation system. That will meet the organization's operating requirements.Operational feasibility aspects of the project are to be taken as an important part of the project implementation. Some of the important issues raised are to test theoperational feasibility of a project includes the following: -

- Is there sufficient support for the management from the users
- Will the system be used and work properly if it is being developed and implemented?
- Will there be any resistance from the user that will undermine the possible application benefits

This system is targeted to be in accordance with the above-mentionedissues. Beforehand, the management issues and user requirements have beentaken into consideration. So there is no question of resistance from the users thatcan undermine the possible application benefits.The well-planned design would ensure the optimal utilization of the computer resources and would help in the improvement of performance status.

TECHNICAL FEASIBILITY

Earlier no system existed to cater to the needs of 'Secure InfrastructureImplementation System'. The current system developed is technically feasible. It isa web based user interface for audit workflow at NIC-CSD. Thus it provides an easy access to the users. The database's purpose is to create, establish andmaintain a workflow among various entities in order to facilitate all concernedusers in their various capacities or roles. Permission to the users would be granted based on the roles specified. Therefore, it provides the technical guarantee of accuracy, reliability and security. The software and hard requirements for the development of this project are not many and are already available in-house at NIC or are available as free as open source

Switching

In the Switching main advantage is switching this is mainly used for Data transmission by the other traffic in the conductive network. The traditionally in telecommunications systems are mainly using of switching method. The meaning of the Conducted switching is that allocation of a limited bandwidth from the full throughput of the communication medium and the bandwidth will be allocated completely. The allocated bandwidth is the main advantage of data exchange for the time taking of path set, which is the allocation of bandwidth from convinced place. Generally, this type of throughput utilizing the wired networks and interchanging the required data from different stages, counting connection formation, of the data, closing of the linking.In the real world, this type of a switching is one type of the OSI protocol stack layer , this is called as data link layer. During this text kind of a switching is viewed as layer 2 switching. Actually, layer 2 switching can simply be well-thought-out bridging and in this logic, layer 3 switching is routing purpose of the path setting .

IV. PROPOSED SYSTEM

Developing a dynamic distributed second-order congestion control androuting policy is highly challenging and results in this area remain scarce. First,unlike the relatively obvious queue-length connection between the back-pressure based algorithms, it remains unclear how one can utilize the insights from existingsecond-order network optimization algorithms to guide the design of an optimaldynamic congestion control and routing policy. The main challenge is that theexisting work in are “static” schemes that operate with average rates and only yieldfixed allocation solutions, rather than dynamic policies that are able to evolve withtime instants to dynamically allocate resources. Also, their connection to observable network state information is still missing. Second, after constructing a second-order scheme, it remains a difficult task to prove its utility-optimality and queue-stability. This is because the incorporation of the second-order Hessian information significantly complicates the computational schemes and necessitates new theoretical approaches in performance analysis. Lastly, how to implement the developed second-order scheme in a distributed fashion is still an open question.Similar to the second-order optimization algorithms in, one would have to face thechallenges arising from decentralizing the Hessian and Laplacian matrix inverse computations.

ADVANTAGES:

1. Increasing utility
2. Reduces delay time.
3. Updating queue length dynamically.
4. Faster transmission results.
5. Increasing throughput.
6. Numbers of iterations are reduced.

3.5 NETWORK MODEL CONSTRUCTION

We consider a time-slotted communication network system with time slot units. We represent the communication network by a directed graph, where and are the sets of nodes and links, with and, respectively. We assume that is connected. There are end-to-end sessions in the network, indexed by. Each session has a source node and a destination node. Congestion control: We assume that the source node has a continuously-backlogged transport layer reservoir that contains session 's data. Similar to a valve, in each time-slot , a transport layer congestion controller determines the amount of data to be released from this reservoir into a network layer source queue, where the data awaits to be routed to node through the network. In other words, acts as the arrival process to the source queue. Routing: We denote the capacity of link as and assume that it is fixed, which is an appropriate model for wire line networks or wireless networks with orthogonal channels and fixed transmission power. As in, we define the network capacity region as the largest set of congestion control rates such that there exists a routing policy for which the time-average routing rates. Queue Stability: We assume that each node maintains a separate queue for each session. Since data leave the network upon reaching destinations. We adopt the following notion of queue-stability : Under a congestion control and routing scheme, we say that the network is stable if the norm of steady-state queue-lengths remains finite. Joint congestion and routing scheme:

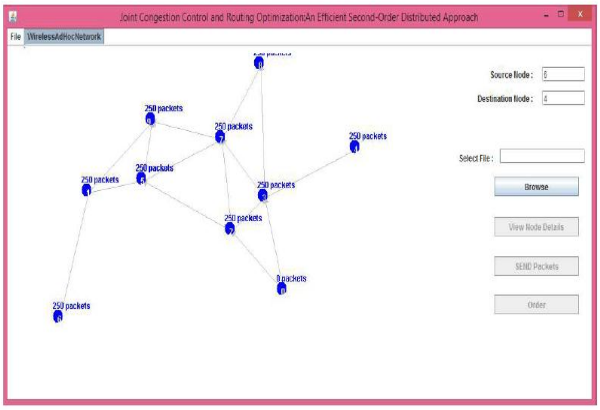
Several first-order schemes based on the back-pressure idea have been proposed to solve Problem JCCR. However, the convergence of these first order schemes is slow, which could lead to poor performance in practice. Second order joint congestion control: The “change of queue-length” in our second-order method compared to the “queue-length value itself” in first-order backpressure methods can be viewed as one-order higher in the queue length variation sense, hence providing another perspective to interpret the name “second-order.” Lastly, the step-size control is used to ensure the utility-optimality result. The parameter could be set to some upper bound of the average source session rate to reduce the burstiness.

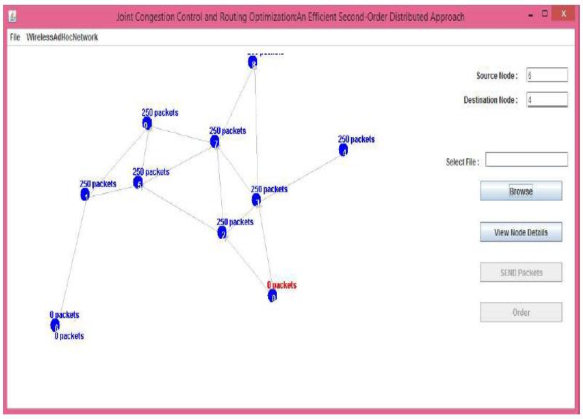
Pseudo code:

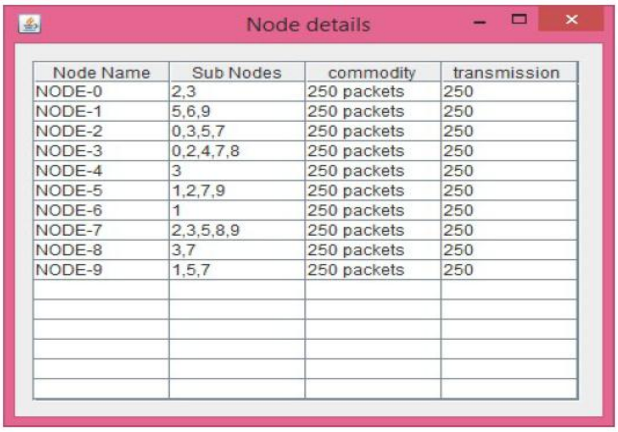
1. Source node received the data. Data divides into packets.
2. Data packets maintained in source node as a queue data
3. Source node have some neighbor nodes
4. From source node to neighbor nodes there is a link (example: 1->2 , 1->3 : transmission rate, allocation of packets capacity based on resources dynamic (maximum updating limit).
5. Updating link capacity and transmission rate(speed)
6. Two links are not handling the total queue data. 7. We can transfer the data, one iteration is complete in first time slot

To establish a fast-converging second-order joint congestion control and routingframework based on a primal dual interior point approach with a simple step-sizecontrol strategy, such that the resultant scheme iswell-suited for implementation in practice. Our primal-dual approach exposes a deep connection betweenobservable network state information and the primal-dual interior-pointoptimization theory, which itself is an active research field in operations researchtoday.Then establish the utility-optimality and queue-stability of the proposed second order framework. Our theoretical analysis unveils the fundamental reason behind the fast convergence in the proposed second-order framework. Interestingly, our analytical results naturally lead to a utility-optimality and queue-length tradeoff relationship governed by the barrier parameter of the interior-point method. We compare this tradeoff relationship to those in first-order methods and contrast their similarities and differences, thus further advancing our understanding of both firstand second-order methods in network optimization theory.

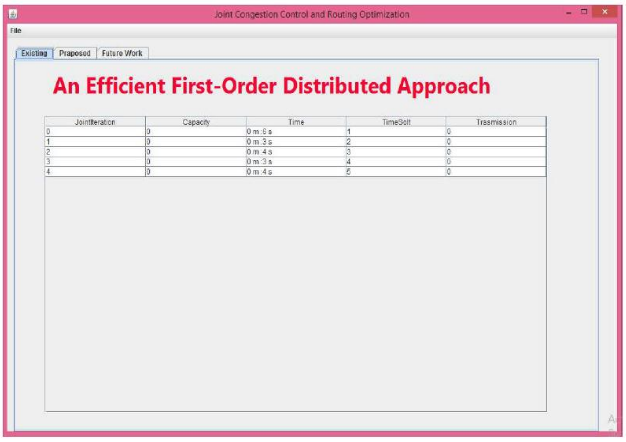
V. RESULTS

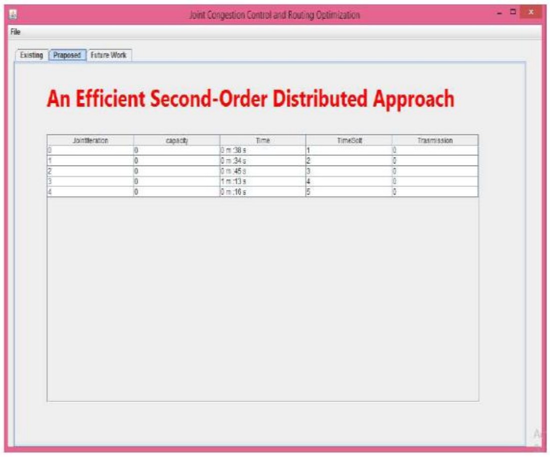


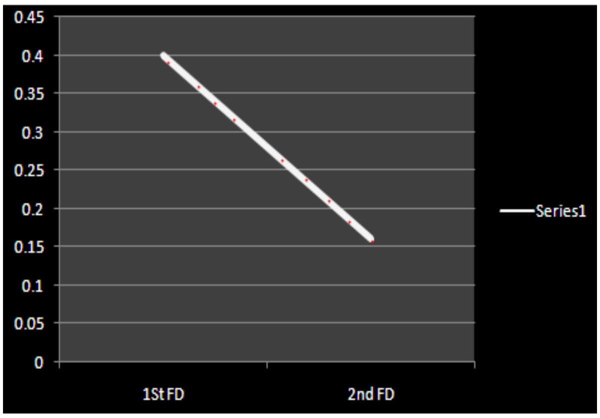




Node Name	Sub Nodes	commodity	transmission
NODE-0	2,3	250 packets	250
NODE-1	5,6,9	250 packets	250
NODE-2	0,3,5,7	250 packets	250
NODE-3	0,2,4,7,8	250 packets	250
NODE-4	3	250 packets	250
NODE-5	1,2,7,9	250 packets	250
NODE-6	1	250 packets	250
NODE-7	2,3,5,8,9	250 packets	250
NODE-8	3,7	250 packets	250
NODE-9	1,5,7	250 packets	250







VI. CONCLUSION

Our main contributions in this paper are three-fold: 1) we have proposed a second order joint congestioncontrol and routing framework based on a primal-dual interior-point approach that is well-suited for implementation in practice; 2) we haverigorously established theutility-optimality and queue-stability of the proposed second-order joint congestion control and routing framework; and 3) we have proposed several novelapproaches for the distributed implementation of our second-order joint congestioncontrol and routing optimization algorithm. Collectively, these results serve as an exciting first step toward an analytical foundation for a second-order jointcongestion control and optimization theory that offers fast convergenceperformance. Second-order cross-layer optimization for network systems is animportant and yet under-explored area. Future research topics may include extending and generalizing our proposed second-order algorithmic framework toapplications in other network systems, such as wireless networks with stochastic channel models, cloud computing resource allocations, and energy productionscheduling in the smart electric power grid.

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