Resource Allocation QOS Based On Wireless Mesh Network

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Abstract

Many next generation applications (such as video flows) are likely to have associated minimum data rate requirements in order to ensure satisfactory quality as perceived by end-users. In this paper, we develop a framework to address the problem of maximizing the aggregate utility of traffic flows in a multi-hop wireless network, with constraints imposed both due to self-interference and minimum rate requirements. The parameters that are tuned in order to maximize the utility are (i) transmission powers of individual nodes and (ii) the channels assigned to the different communication links. Our framework is based on using a cross-decomposition technique that takes both inter-flow interference and self-interference into account. The output of our framework is a schedule that dictates what links are to be activated in each slot and the parameters associated with each of those links. If the minimum rate constraint cannot be satisfied for all of the flows, the framework intelligently rejects a subset of the flows and recomputed a schedule for the remaining flows. It is also design an admission control module that determines if new flows can be admitted without violating the rate requirements of the existing flows in the network. In this paper it is provided the numerical results to demonstrate the framework.

KEYWORDS: Resource Allocation, QoS, wireless channel, self-interference
1 INTRODUCTION:

For many applications such as video, a minimum rate requirement has to be met in order to ensure satisfactory end-to-end quality. In a shared wireless mesh network, ensuring that application demands are met requires the following interdependent functionalities: (a) rate or congestion control: control the rates at which the various traffic sources sharing the network inject traffic and (b) resource allocation: allocate resources to the different connections such that the minimum rate requirements of each connection are met and (c) admission control: ensure that newly admitted connections do not cause a violation of the minimum rate requirements of existing flows. Our goal in this work is to design a framework towards jointly facilitating these functionalities.

The problem of resource allocation and congestion control in wired networks has received a lot of attention. In their seminal work, Kelly have modeled the problem of flow control as an optimization problem where the objective is to maximize the aggregate utility of elastic traffic sources subject to capacity constraints on the links that compose the network. Inspired by Kelly’s work, there has been follow up work, where TCP congestion control is modeled a convex optimization problem, the objective being the maximization of an aggregate user utility; in these efforts distributed primal dual solutions to the problem are proposed. There have been more recent efforts on extending the above congestion control framework to wireless network.

In contrast with wire line networks, the capacity of a wireless link is not dependent on other flows in the network but on other flows that use links on the same channel (and
that are close enough) and external interference. The dependencies between flows are regulated by the protocols at both the link and transport layers. However, these prior efforts do not consider the provision of quality-of-service in terms of supporting minimum rates to the flows that share the network. More importantly, the QoS needs to be provided under conditions of self-interference, where the packets of a flow interfere with other packets that belong to the same flow along a multi-hop path. Our framework addresses the above two important factors.

2. Related Work

Design is concerned with identifying software components specifying relationships among components. Specifying software structure and providing blue print for the document phase. Design will explain software components in detail. This will help the implementation of the system. Moreover, this will guide the further changes in the system to satisfy the future requirements. Modularity is one of the desirable properties of large systems. It implies that the system is divided into several parts. In such a manner, the interaction between parts is minimal clearly specified.

The basic building blocks in UML are things and relationships; these are combined in different ways following different rules to create different types of diagrams. In UML there are nine types of diagrams, below is a list and brief description of them. The more in depth descriptions in the document, will focus on the first five diagrams in the list, which can be seen as the most general, sometimes also referred to as the UML core diagrams.

Use case diagrams: shows a set of use cases, and how actors can use them.

Class diagrams: describes the structure of the system, divided in classes with different connections and relationships.
Sequence diagrams: shows the interaction between a set of objects, through the messages that may be dispatched between them.

State chart diagrams: state machines, consisting of states, transitions, events and activities.

Activity diagrams: shows the flow through a program from an defined start point to an end point.

Object diagrams: A set of objects and their relationships, this is an snapshot of instances of the things found in the class objects.

Collaboration diagrams: collaboration diagram emphasize structural ordering of objects that send and receive messages.

Component diagrams: shows organizations and dependencies among a set of components. These diagrams address static implementation view of the system.

Deployment diagrams: show the configuration of run-time processing nodes and components that live on them.

Fig 3: Source node encryption and forward Selection

To form Nodes based on the Mesh Topological way. Encrypted the Original data’s from source side with RSA data encryption and decryption based. Data’s forward to the Path Analyzer. To selected a Destination Nodes within the Network.

Fig 4: Energy Initialization and Allocation
Bandwidth and path analyze to the network settings based. Provided Energy to intermediate nodes. Packet segmentation and divided based on TDMA techniques. Next to forward a channel assignment block. Monitor a traffic or rate in the mesh network.

3 Test Cases AND Validation

UNIT TESTING:

This is the first level of testing. In this different modules are tested against the specification produces during the design of the modules. Unit testing is done during the coding phase and to test the internal logic of the modules. It refers to the modules. It refers to the verification of single program module in an isolated environment. Unit testing first focuses on the modules independently of one another to locate errors. After coding each dialogue is tested and run individually. All necessary coding were removed and it was ensured that all the modules are worked, as the programmer would expect. The logical errors found were corrected. So, by working all the modules independently and verifying the outputs of each module in the presence of staff, I observed that the program was functioning as expected.

INTEGRATION TESTING:

Data can be lost across an interface. One module can be adversely affected on another; sub functions when combine may not produce the desired major functions. Integration testing is a systematic testing for constructing the program structure. Conducting the tests is to uncover errors associated within the interface. The objective is to take unit tested to modules and build a program structure. All the modules are combined and tested as a whole.

VALIDATION TESTING:

This provides final assurance that the software meets all the functional, behavioral and performance requirements. The software is completely assembled as a package. Validation succeeds when the software functions in a manner in which user wishes. Validation refers to the developed satisfied all the requirements of the user. This dummy data is known as test case. During the course of validation the system failure may occur and sometimes the coding has to be hanged according to the requirement. Thus the feedback from
the validation phase generally produces changes in software. Once the application was made of all logical and interface errors, inputting dummy data ensure that the software

OUTPUT TESTING:

After performing the validation testing, the next step is output testing of the proposed system since no system could be useful if it does not produce the required output in a specific format. Asking the users about the format required by them, tests the output generated are considered into two ways. One is on screen and another is printed format. The output format on the screen found to be correct as the format was designed in the system design phase according to the user needs. For the hard copy also, the output comes out as the specified requirement by the user. Hence output testing does not result in any correction in the system.

USER ACCEPTANCE TESTING:

Acceptance test refers to the acceptance of data into the system for processing. The acceptance test contributes to the consistency and smooth working of the system. The system under consideration is tested for users at a time for developing and making changes whenever required.

4 RESULTS AND DISCUSSIONS

Screen shot 1: Screen shot for available power

The above Screen shot shows available power and loss power.
Screen shot 2: Screen shot for Available root power Details

The above screen shot shows that node name and available energy.

Screen shot 3: Screen shot for providing power details

The above Screen shot shows that node name and available energy

5 CONCLUSIONS:

In this paper, we develop a resource allocation framework for wireless mesh networks. The framework maximizes the aggregate utility of flows taking into account constraints that arise due to self-interference (wireless channel imposed constraints) and minimum rate requirements of sources (QoS requirements). If a solution is not feasible, the framework selectively drops a few of the sources and redistributes the resources among the others in a way that their QoS requirements are met. The proposed framework readily leads to a simple and effective admission control mechanism. In this paper it is clearly demonstrate the approach with numerical results. It is also theoretically compute performance bounds with the network, as
compared with an optimal strategy. In this paper, it is clearly focused on the throughput performance, and the delay and scalability issues are omitted for the future research.

6 REFERENCES:


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