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Reactive Network Monitoring Optimization System

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ABSTRACT

Reactive network monitoring consists of measuring the properties of the network to ensure that the system operates with desirable parameters. The management station queries the state of the network in order to react to alarm conditions that may develop in the network. Information about the network state can be collected using two different techniques: event reporting and polling. In event reporting, network elements distributed across the network push alarms and detailed event reports to the station. In polling, the station sends requests to obtain the status of network elements. Typically, polling is done periodically with a fixed frequency, determined by a critical time window within which the alarm condition has to be detected. A framework for minimizing the communication overhead of monitoring global system parameters in IP networks and sensor networks. A global system predicate is defined as a conjunction of the local properties of different network elements. A typical example is to identify the time windows when the outbound traffic from each network element exceeds a predefined threshold. Our main idea is to optimize the scheduling of local event reporting across network elements for a given network traffic load and local event frequencies.Each network element monitors a set of local properties and the central station is responsible for identifying the status of global parameters registered in the system.

Keywords : Network Monitoring, Compressive Sensing, Network Tomography.

I. INTRODUCTION

1.1 Overview of Monitoring Network

Reactive network monitoring consists of measuring the properties of the network to ensure that the system operates with desirable parameters. The management station queries the state of the network in order to react to alarm conditions that may develop in the network. Information about the network state can be collected using two different techniques: Event reporting Polling.

In event reporting, network elements distributed across the network push alarms and detailed event reports to the station. In polling, the station sends requests to obtain the status of network elements. Typically, polling is done periodically with a fixed frequency, determined by a critical time window within which the alarm condition has to be detected. Among various network-monitoring algorithms, distributed network monitoring has a wide range of applications. In this category, all network entities need to periodically monitor the status of the entire network. Many works have been devoted to finding techniques that can accurately monitor large-scale networks with low communication overhead. The numerous numbers of entities to be monitored, lack of direct access to the entire network, and limited communication power of nodes in WSNs

1.2 Problem Statement

Monitoring large-scale networks is a critical yet challenging task. Enormous number of nodes and links, limited power, and lack of direct access to the entire network are the most important difficulties. In applications such as 1 network routing, where all nodes need to monitor the status of the entire network, the situation is even worse. The problem of providing an accurate global view of the entire network for all the nodes/hosts in a large-scale network, by using the CS theory. We propose an Efficient distributed method in which all the nodes cooperate with each other in order to monitor the entire network. In this context, the measurements are done by using a few end-to-end independent additive probes.

1.3 Objective of Project

The objective of the project is to optimize the scheduling of local event reporting across network elements for a given network traffic load and local event frequencies. The system architecture consists of N distributed network elements coordinated by a central monitoring station. Each network element monitors a set of local properties and the central station is responsible for identifying the status of global parameters registered in the system.

1.4 Scope of Project

The scope of the project is to design an optimal algorithm, the Partition and Rank (PAR) scheme, when the local events are independent; whereas, when they are dependent, we show that the problem is NP-complete. Here the development of two efficient heuristics: the PAR for dependent events (PAR-D) and Adaptive (Ada) algorithms, which adapt well to changing network conditions.

II. SYSTEM ANALYSIS

System study is the first and foremost step in understanding the existing system. Once the existing systems operation, problem and shortcomings are known the next steps know as system design is easy. Various methods are available for gathering the necessary information about the existing system like, observation, document and discussion

2.1 Existing System

In many situations, there is a need to monitor a global system parameter, which is defined as a conjunctive predicate on the local properties of different network elements. In such cases, after detecting local changes, each network element has to continuously emit alarms in order to ensure that global parameters are not violated. In sensor networks, a typical example is a monitoring system that determines whether the temperature of each sensor belonging to a particular subset (or a sample) of nodes in a certain region exceeds a predefined threshold.

2.2 Disadvantages of Existing System

- Time consuming,
- Missing of nodes due to decentralization

III. PROPOSED SYSTEM

We design an optimal algorithm, the Partition and Rank (PAR) scheme, when the local events are independent; whereas, when they are dependent, we show that the problem is NP-complete and develop two efficient heuristics: the PAR for dependent events (PAR-D) and Adaptive (Ada) algorithms, which adapt well to changing network conditions, and outperform the current state of the art techniques in terms of communication cost.

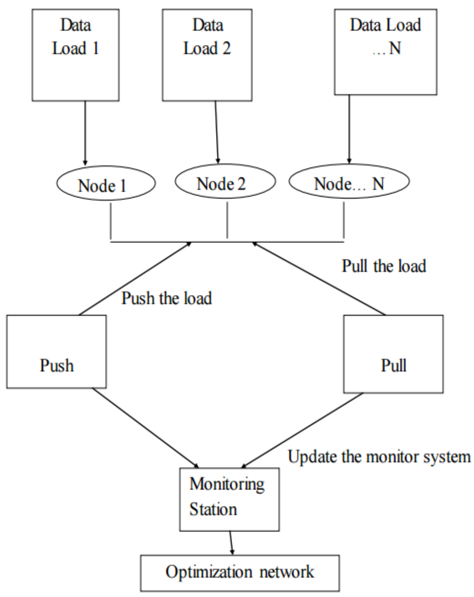
3.1 Advantages of Proposed System

- Less time consumption while monitoring the large network.
- Accuracy and feasibility are high.
- The network is been centralized.

IV. SYSTEM IMPLEMENTATION

4.1 System Flow Diagram

Describes that the server optimizes the load of the client in the connected network.



4.2 List of Modules

The project consists of the following modules

- User Interface

- Server Acknowledgement
- Network Monitoring
- Event Data Correlation
- Optimization Process
- Solution Generation

Module Description

4.2.1 User Interface:

The Service requestors are called clients and the one who provides the resources or service is called servers. In server the clients register their details for access to the server. The client and the server are connected with the sockets.The Registration Details include details such as the name, user id, and password for the verification. The database in the server stores all the details of the clients and their IP address. The server maintains a record of clients that are active and inactive which are connected to it. The clients can log in the server with their user id and password. The server checks for the valid user and provide access to the clients.

4.2.2 Server Acknowledgement

The Server Acknowledgement is given to the client for the valid entry of the user. The server acknowledges the respective client for the connectivity between them. The connection establishment is made to communicate with the server for every client in the network. The server maintains the collective record of IP address connected to it.

4.2.3 Network Monitoring

Network monitoring is the use of a system that constantly monitors a computer network for slow or failing components and that notifies the network administrator (via email, SMS or other alarms) in case of outages(Files open or not,slow speed). It is part of network management. Often clients and servers operate over a computer network on separate hardware. A server machine is a high-performance host that is running one or more server programs which share its resources with clients. A client also shares any of its resources; Clients therefore initiate communication sessions with servers which await (listen to) incoming requests. The term network monitoring describes the use of a system that constantly monitors a computer network for slow or failing components and that notifies the network administrator in case of outages via email, pager or other alarms.

4.2.4 Event Data Correlation

It is the process of monitoring what is happening in a network. The process involves the fixing of the problem in the network . The problems in the network are detected and it is rectified by the questionnaire raised from the server. The client responds the answers to the server. 22 The server fixes the problem of load by identifying the IP address of the each client. This process is done in parallel for every clients connected to the server. The answers from the client are taken to the server and the server receives it by its IP address. Then the answers are processed in the server. It includes the problem type:

- Slow speed
- File do not open

4.2.5 Optimisation Process

In optimization there are two processes mainly involved they are push and pull. The push and pull process reduces the load in the node which may cause the network performance low. The optimization process consists of push and pull operation based on the work load and is been identified with its unique IP address. All-push scheme. If a router detects an event, it immediately reports the event to the monitoring station. All- Push scheme generates better performance than the rest of the techniques. The network element can either push the event to the station incurring a performance of C1. The monitoring station can also poll (pull) a network element for the existence of an event incurring of performance C2. If the event has occurred, the network element replies back incurring a performance of C3. Therefore, we use different performance for generality and to study trade-offs. We assume reliable communication and global time synchronization.

4.2.6 Solution Generation

In this data base model data in Routers that are at widely dispersed locations generate possibly independent events. In order to capture this environment characteristic, we used randomization in data generation for 23 determining which half of the series gets the most number of data points. The suggestion is given to the client according to the problem of the client from the server. Then the problem of load is reduced from the server by periodic monitoring

V. SNAPSHOTS

5.1 Optimization Register

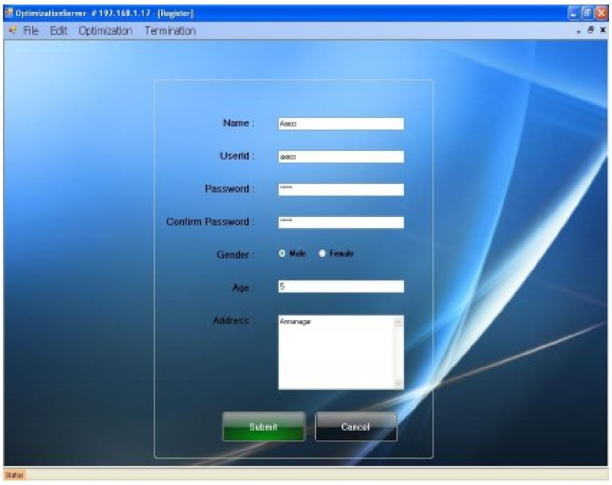


Figure 1. The registration page for the client with the username and password.

5.2 Pull Data

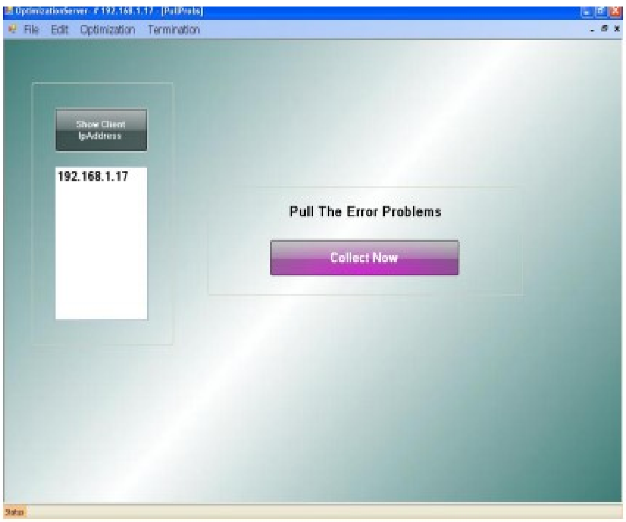


Figure 5. The server can pull the IP address from the clients based on the events.

4.3transmit Problem

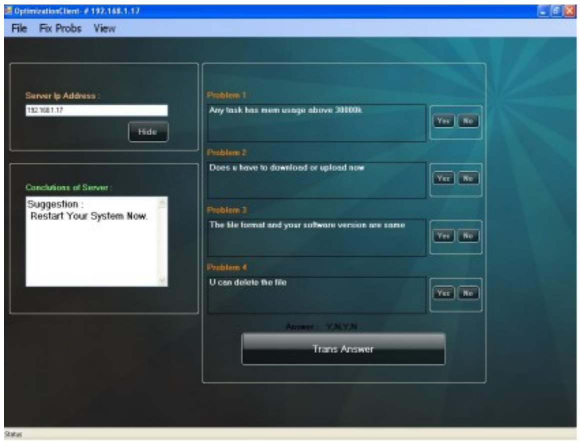


Figure 3. The server can send the solution or the events to the client.

4.4 Server Responses

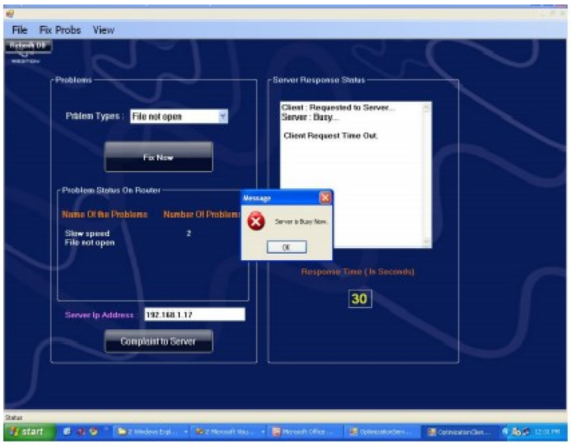


Figure 4. The client is connected to the server by using socket programming.

4.5 Network Monitoring

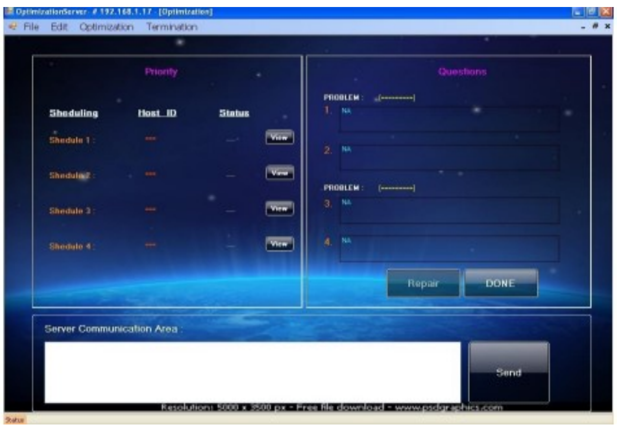


Figure 6. The details of the system based on the priority schedule

4.6 Optimization Process

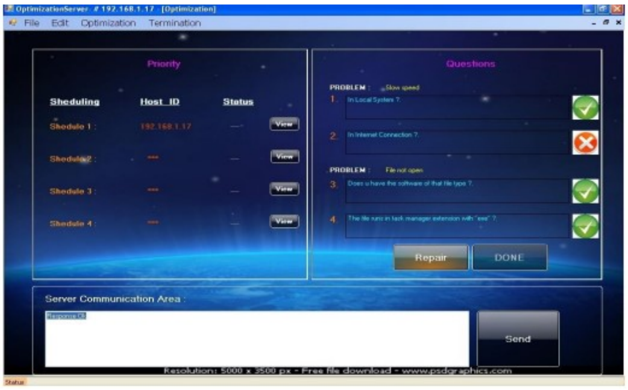


Figure 7. The communication is been established between the client and the server

4.7 Solution Generation

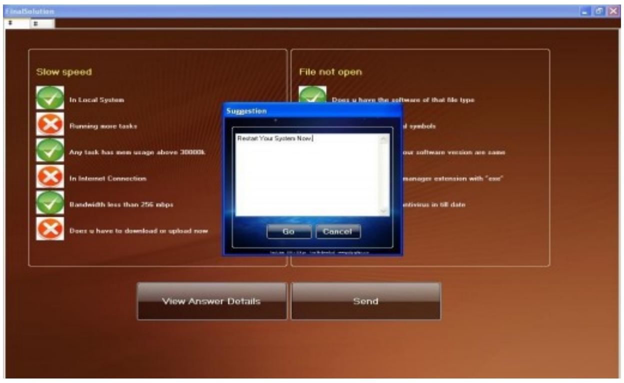


Figure 8. The suggestion delivered to the client from the server.

VI. CONCLUSION AND FUTURE WORK

We presented a framework for monitoring global system parameters as a conjunction of local properties of network elements. We considered the scheduling of network elements for a given probability of occurrence of events such that the monitoring performance in terms of message exchanges is minimal. We designed an optimal algorithm, the PAR scheme, when the events are independent. The PAR scheme partitions the schedule space into disjoint classes, identifies the schedule with the minimum cost in each class, and then finds the optimal over all classes. The PAR-D algorithm replaces the independent event probabilities input to the PAR scheme with the conditional probabilities of the events computed. Most of the network parameters such as link delay are, in fact, non-negative numbers, and by using this information, it would be better to estimate links' statuses. There are some works in the literature to recover non-negative signals, and one of our future work is to apply these theories to delay estimation.

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