# Routing Simulation System

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**Abstract** A simple definition of routing is "learning how to get from here to there." In some cases, the term *routing* is used in a very strict sense to refer *only* to the process of obtaining and distributing information, but not to the process of using that information to actually get from one place to. Since it is difficult to grasp the usefulness of information that is acquired but never used, we employ the term *routing* to refer in general to all the things that are done to discover and advertise paths from here to there and to actually move packets from here to there when necessary. The distinction between routing and forwarding is preserved in the formal discussion of the functions performed by OSI end systems and intermediate systems, in which context the distinction is meaningful.

***Keywords — Link state routing protocol, Distance vector routing protocol, Flooding, Hot-Potato.***

## I. INTRODUCTION

Routing is the act of moving information across an inter network from a source to a destination. Along the way, at least one intermediate node typically is encountered. Routing is the process of finding a path from a source to every destination in the network. It allows users in the remote part of the world to get to information and services provided by computers anywhere in the world. Routing is accomplished by means of routing protocols that establish mutually consistent routing tables in every router in the Network.

The Network carries all the information using packets.
*A packet has two parts :* The information content called the payload, and information about the payload, called the meta-data.

The meta-data consists of fields such as the source and destination addresses, data length, sequence number and data type. The introduction of meta-data is a fundamental innovation in networking technology. The Network cannot determine where samples originate, or where they are going without additional context information.
Routing Algorithms:

- Flooding
- Hot-Potato
- Source Routing
- Distance Vector (Bellman-Ford)
- RIP (Routing Information Protocol)
- Link state

## II. LITERATURE REVIEW

To satisfy the requirements of applications in large scale network, the network layer needs to provide corresponding support. Great efforts have been made to provide services over the Internet which is developing rapidly. In this paper, we propose a new hierarchical routing model - Network Tree Model, which can solve the best effort routing effectively and efficiently in large scale network. It achieves a sharp reduction in communication complexity and routing table scale with a high routing accuracy. Simulation results show that the proposed model and algorithm obtains high performance in traffic for convergence and routing accuracy as expected.
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Studying at the existed P2P network,Aiming at the issues of communication latency increasing and network costs raising which caused by mismatch between logical topology and physical topology, combining with the clustering of P2P, the thesis proposes a three-tier P2P network model based on clustering and position of nodes in IPv6. In the model, neighbor nodes in physical topology compose domains, nodes with the same property compose a group in every domain, it chooses nodes with the best capability as the intelligent nodes of groups or as therouting nodes of domains by calculating the capability of nodes, and selects routing and forwards datum according to the

 

property similarity and the resources routing table. Simulation result shows the model can shorten search latency, enhance the efficiency of resource search and recall ratio.

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***System design*****-----** A router generates packets and places them in the router buffer. It consults the routing algorithm and places the appropriate packets on the link from which packets are placed on the link and transmitted. The router at the other end of the link picks up the packets from the link and places them in its buffer. From the router's buffer packets are processed. Processing includes checking if the packet is destined to that router or not. If yes the router reads the message and sends acknowledgement else it sends it to the router buffer from which it is forwarded to the next router.

The router contains the following fields:

- Id of router
- Size of Network
- Distance matrix to every router
- Simcore object
- Buffer object
- Maximum Size of Buffer
- Current Size of Buffer;
- Routing Algorithm
- Routing Algorithm Status
- Router Status
- Checking Probability
- Threshold
- Start Delay
- Outgoing link matrix
- Incoming Links matrix

## III. IMPLEMENTATION DETAILS

Core of the Simulator acts as the project manager and is the heart of the Simulator. It takes the input from the input file and initializes the routers and links based on the Network Configuration. It manages the time constraint based on which packets are generated and lost. It consults the routing algorithm and decides the path and gives instructions to the packets in the buffers about the paths. Based on probabilities of link to be down, it downs a link and after sometimes brings it back to normal state. It checks each and every condition of every other object in the system and takes decisions accordingly. It is responsible for drawing the congestion table and Network diagram in the Panel.

*Parameters of the network include:*

- Factor for Converting Computer Time to loop-count i.e. our clock
- Frequency of generation of packets at a particular router
- Scaling factor for generating packets
- Distance between routers i & j. Set by the user
- Maximum Packet Size
- Minimum Packet Size
- Number of routers in the N/W. Set by the user
- Header Size
- Array of references to routers
- Head of linked list containing packets which are on their path on a link
- Tail of linked list containing packets which are on their path on a link
- Number of packets lost
- Number of packets sent from particular router
- History of packets which have reached their
- History of packets which have been sent
- Lost History
- When The Underlying layer will be free
- Propagation Delay between Router i & j
- Bit Rate of links between Router i & j
- No of protocol Packets from i to j
- Gross Lost - lost but duplicate of packet may have reached destination
- Net lost - no copy has reached destination
- Protocol packets lost
- Probability of Packet Loss On Link
- Maximum Link Size
- Snap Shot Interval
- Maximum fragment size

*The different issues handled by the Simulator are:*

- Throughput
- Read speed of graphical display/routing
- warning message shown for how much time

*The some of the modules in the core of the Simulator include:*

- Setting the Topology
- Drawing the Table
- Filling the Table
- Drawing the Network
- Restoring the State
- Setting the Physical distance
- Notifying the Link
- Notifying the Router
- Making the Router Status Down
- Making the Link Status Down
- Making the Router Status Up
- Making the Link Status Down



 

## IV. CONCLUSION

The Simulator takes the configurations of the subnet as Input and gives the different statistics of the routers and links. By changing the routing algorithms and the different network configurations and recording the results we obtain the optimal algorithm. The optimal algorithm for a particular network is obtained by analyzing the results obtained. Simulation helps to achieve an optimal path that reduces the cost of routing.

The smaller networks can be analyzed and the results can be employed in larger networks to make routing efficient and economic. As the Simulator has provision for the crashing of routers, it gives an idea of which path is followed when a crash occurs. It can be employed in real networks to increase the performance of routers and links. As it not feasible in real networks to test algorithms and then implement a best one, Routing Simulator can be helpful. Hence it is useful for people who provide networking services and those who design networks.

## V. FUTURE SCOPE

This Routing Simulator model can be made a more realistic one by considering the effects of most of the System parameters. Even though the mathematical model established for efficiency of Subnet yields acceptable results, I believe that an improved model can be generated. This has the potential to be used as one of the tools for experimentation on design and analysis of Subnets.

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