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## Introduction:

The transport layer is responsible for facilitating interaction between processes on various hosts. The network layer, which facilitates data transfer between computers, is essential to the operation of the transport layer. To be more specific, the network layer is responsible for the transfer of transport layer packets between hosts. The transmitting host hands off the transport layer segment to the network layer. This can only be achieved by the concerted efforts of all hosts and routers in the network, which is the responsibility of the network layer. If we had to explain what "Routing" is in layman's words, we can say that it's the process by which we choose the route a segment will take from the sending host to the receiving host. Several routers and connections are interconnected along this route. In practice, however, routing is a tricky and involved notion.

Truthfulness: Packets should reach their intended destination because of accurate routing.

The routing should be kept as basic as possible to reduce unnecessary processing load. The overhead grows along with the complexity of the routing methods.

Reliability: once a sizable network is up and running, it should function reliably for years without any maintenance. It is important that routing algorithms be resilient enough to tolerate hardware and software failures, as well as changes in topology and traffic, without needing a network reset every time a router fails.

Routing methods must be robust, meaning they won't break under any circumstance.

Each node on the network should have an equal opportunity to send data packets. It's usually a first-come, first-served basis for this.

The routing algorithms should maximize throughput while also reducing average packet delays to a minimum. In this case, one must choose a trade-off based on his own needs.

Routing services are required by networks of all kinds and sizes, from the classic telephone network (circuit switching) to modern electronic data networks (the Internet) and even transportation networks. This article discusses routing in packet-switched electronic data networks. Routing is the process of steering packet forwarding (the transfer of logically addressed network packets from their origin to their destination) in packet switching networks. The majority of network infrastructure components, such as routers, bridges, gateways, firewalls, and switches, are classified as intermediate nodes. Even while general purpose computers are not specialized hardware, they can nonetheless forward packets and conduct routing. Routing tables keep track of the paths to different network destinations and are often used to guide forwarding as part of the routing process. In order to achieve effective routing, it is crucial to build routing tables that are stored in the router's memory. Most routing algorithms take use of just a single possible network route. By using several possible routes, multipath routing allows for more flexibility. When selecting which routes, in order of priority, to add to the routing table in the event of route overlap or equality, algorithms.

## Common Routing Algorithms:

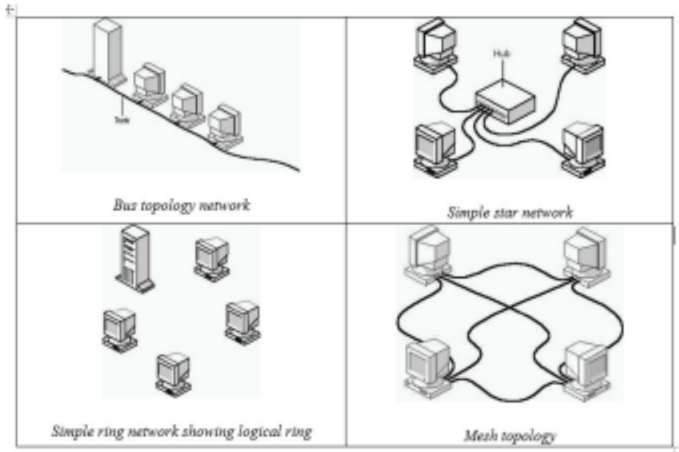
We apply appropriate algorithms to the graph representations of the networks to determine the shortest pathways. Let there be 'N' nodes in the network, and describe them using the graph G (V, E). Link costs are considered to be positive in all algorithms presented here. Relative to itself, a node incurs no cost. Further, it is assumed that all linkages are symmetric, such that if $d_{i,j}$ = cost of link from node I to node j, then $d_{i,j} = d_{j,i}$. It is assumed that the whole graph exists. An infinitely expensive connection is assumed when there is no edge between two nodes. For a given node, the methods shown below compute the costs of all possible pathways to that node, which is the same as calculating the costs of routes from a given origin to every possible destination.

## Results and findings:

### Performance metrics for comparison:

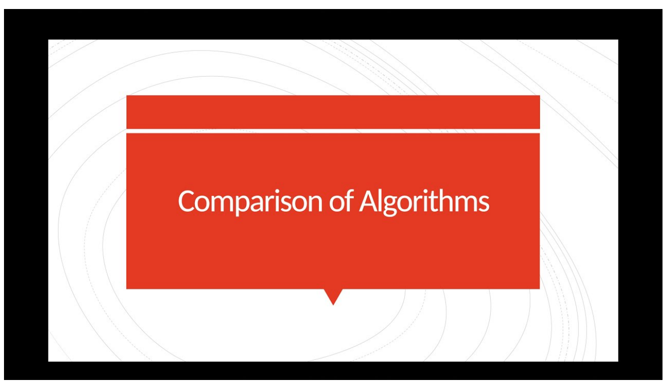
Metrics collected by a router for use in making judgments about where data should be sent. Normally, it is only one of several fields in a routing table. One route's relative merits are measured against those of others. The routing table keeps track of potential paths, while additional data, such as link-state or topological networks, may be kept in separate databases. Hop count (the number of intermediate hops) is used by protocols like Routing Information Protocol to find the optimal path. If there's a choice between two gateways, the route will go toward the one with the lower metric. As a rule of thumb, the route with the lowest metrics can serve as the default entry point. Metrics collected by a router can take on any number of values, each of which contributes to the device's ability to select the optimal path from among several possible ones. Measured by factors such as path length, bandwidth, load, hop count, path cost, delay, Maximum Transmission Unit (MTU), reliability, and communications cost, among others, a router's performance can be evaluated using this metric.

When we talk about throughput, we mean the rate at which something is generated or processed. In the context of computer networking, throughput, also known as network throughput, is the rate at which messages are successfully delivered across a communication channel. These communications can be sent through a physical or logical link, or they can be routed through a network node or router. The conventional units for measuring throughput are bits per second (bps), however, data packets per second (p/s) are sometimes used. The aggregate throughput or system throughput is the sum of all data rates received by all network nodes. The queuing theory may be applied to provide a mathematical analysis of the scenario, where throughput is measured in packets per unit of time. The maximum throughput of a digital communication system's logical or physical communication line is known as the link capacity, sometimes known as the net bit rate (or Peak bit rate, information rate, or physical layer usable bit rate). Bandwidth tests, for instance, determine an internet connection's top speed. Congestion or heavy traffic at any one point in a network is called a bottleneck. The greater the number of bottlenecks, the more often one occurs along the network connection. The traffic intensity of a digital network is calculated by dividing the average packet length by the pace at which new packets are arriving. where an is the typical packet arrival rate (expressed as a number of packets per second), L is the typical packet size (expressed in bits), and R is the typical data transfer rate (e.g. Bits per second).




Git Hub: [https://github.com/Dilpunjab/comparing_algorithm](https://github.com/Dilpunjab/comparing_algorithm)

YouTube :

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