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Opinion Article

A Comprehensive and Deterministic Recognition of Data-Driven Methods in Network Topology

Stefan Markus*

Department of Information and Software Engineering, The University of Newcastle, Callaghan, Australia

DESCRIPTION

Network topology is the configuration of a network made up of nodes and connecting lines through sender and receiver. A network's functionality is greatly influenced by its topology. The physical and logical organization of a network's nodes and links is known as topology. Devices such as switches, routers, and software with switch and router functionality are typically contained within nodes. A graph is a common way to represent network topologies. An IT administrator can divide or assemble a particular set of network devices or interfaces using a network topology mapper. The grouping may be done according to location, criticality, interface type, floor number, department name, or any other predefined category. A network topology known as a fully connected network, complete topology, or full mesh topology has a direct connection between every pair of nodes. Physical network topology and logical network topology are two types of network topologies. The physical arrangement of nodes and links forms the physical topology of the network. Examples of graph line connections that connect nodes such as Ethernet or digital subscriber lines, fiber optics, and microwaves.

Logical network topologies specify a network's configuration, including the nodes that connect and how they do so, as well as the way that data is transferred. Bus, ring, star, and mesh topologies are a few of the most common network topologies.

It is a graph theory application where connecting devices are depicted as links or lines between the nodes and communicating devices are modeled as nodes. Even if two networks may have different node distances, physical connections, transmission speeds, or signal kinds, their logical topologies might be the same. The physical layer of the Open Systems Interconnection (OSI) model is particularly interesting in the physical topology of a network. LANs have utilized a wide range of physical topologies, including ring, bus, mesh, and star. Contrarily, logical topology refers to how signals interact with network media or how data flows through a network from one device to the next without taking into account how the devices are physically connected. A network topology describes how a network is structured and where traffic flows are related to each other. Network topology diagrams can be used by administrators to decide where each node should be located and the best path for traffic flow. With a well-defined and well-planned network topology, organizations can more easily identify and resolve problems and increase the efficiency of data transfer.

Optical add/drop multiplexers build logical optical links because the Application Data Management (ADM) hops are hidden from the end-point nodes of the optical network. Virtual circuit or tunnel-based networks have a physical topology that is based on the actual connection media. The arrangement of network nodes in a network is referred to as its topology. Every configuration for how the network nodes are arranged has benefits and drawbacks of its own. The user's perception of the topology may be referred to as the logical topology. Ethernet networks and Internet Protocol (IP) networks are two prevalent examples. Since each user can connect with any other user, they are completely interconnected at the connection level. The best-suited topology for tiny, inexpensive networks is one that is simple to set up, manage, and use. The topology enables ease of operation because it is centralized. Moreover, it achieves network device isolation for every device. It is simple to add or remove network nodes without affecting the network completely. The centralized nature makes it simple to find problems with the network devices. There are many different types of network topology tools available, such as setup and administration tools, network performance software, and network mapping software. The most widely used network topology in enterprises today is the star topology.

All of the workstations in a bus topology are connected to a single cable. Of all the topologies, point-to-point topology is the fastest in which there are just two connected devices. High data transfer speeds are possible with this topology since communication can utilize the entire bandwidth. In the set, trivial topologies are the weakest and discrete topologies are the strongest.

Correspondence to: Stefan Markus, Department of Information and Software Engineering, The University of Newcastle, Callaghan, Australia, E-mail: markstefan@edu.au

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