

Why star topology is best



1. 0 SYNOPSIS

This study focused on a star network topology. A star network is a local area network in which all devices are directly linked to a central point called a hub. Star topology looks like a star but not exactly a star.

The findings from the study revealed that in star topology every computer is connected to a central node called a hub or a switch. A hub is a device where the entire linking standards come together. The data that is transmitted between the network nodes passes across the central hub.

The project further goes on to explain the advantages, disadvantages and usage of star network topology. The centralized nature of a star network provides ease while also achieving isolation of each device in the network. However, the disadvantage of a star topology is that the network transmission is largely reliant on the central hub. If the central hub falls short then the whole network is out of action.

Star networks are one of the most common computer network topologies that are used in homes and offices. In a Star Network Topology it is possible to have all the important data backups on the hub in a private folder and this way if the computer fails you can still use your data using the next computer in the network and accessing the backup files on the hub. It has come to realization that this type of network offers more privacy than any other network.

2. 0 INTRODUCTION

The main objective of this project is to discuss the advantages, disadvantages and usage of star network topology. A topology is a physical

<https://assignbuster.com/why-star-topology-is-best/>

structure of a network. Star topology is a network structure comprising a central node to which all other devices are attached directly and through which all other devices intercommunicate (<http://www.yourdictionary.com/telecom/star-topology>). The hub, leaf nodes and the transmission lines between them form a graph with the topology of a star.

Star is one of the most and oldest common topologies in the local area network. The design of star topology comes from telecommunication systems. In telephone systems all telephone calls are managed by the central switching station. Just like in star topology each workstation of the network is connected to a central node, which is known as a hub. A hub is a device where the whole linking mediums come together. It is responsible for running all activities of the network. It also acts as a repeater for the data flow. Generally when building a network using two or more computers, you need a hub. It is possible to connect two computers to each other directly without the need of a hub but when adding a third computer in the network, we need a hub to allow a proper data communication within the network. In a Star Network the whole network is reliant on the hub. (<http://www.buzzle.com/editorials/2-6-2005-65413.asp>)

Devices such as file server, workstation and peripheral are all linked to a hub. All the data passes through the hub. When a packet comes to the hub it moves that packet to all the nodes linked through the hub but only one node at a time successfully transmits it. Data on a star network exceeds through the hub before continuing to its target. Different types of cables are used to link computers such as twisted pair, coaxial cable and fiber optics. The most common cable media in use for star topologies is unshielded or shielded

<https://assignbuster.com/why-star-topology-is-best/>

twisted pair copper cabling. One end of the cable is plugged in local area network card while the other side is connected with the hub.

Due to the centralization in star topology it is easy to monitor and handle the network making it more advantageous. Since the whole network is reliant on the hub, if the whole network is not working then there could be a problem with the hub. The hub makes it easy to troubleshoot by offering a single point for error connection at the same time the reliance is also very high on that single point. The central function is cost effective and easier to maintain.

Star topology also has some draw backs. If the hub encounters a problem then the whole network falls short. In a Star Network Topology it is possible to have all the important data backups on the hub in a private folder and this way if the computer fails you can still use your data using the next computer in the network and accessing the backup files on the hub.

3. 0 BACKGROUND STUDY

In this section the researcher has clarified and explained in details some of the advantages, disadvantages and usage of star topology. These three concepts are the main core of this project.

3. 1 ADVANTAGES OF STAR NETWORK

3. 1. 1 Isolation of devices: each device is isolated by the link that connects it to the hub. By so doing it makes the isolation of the individual devices simple. This isolation nature also prevents any non centralized failure from affecting the network. In a star network, a cable failure will isolate the workstation that it links to the central computer, but only that workstation

will be isolated. All the other workstations will continue to function normally, except that they will not be able to communicate with the isolated workstation. (http://en.wikipedia.org/wiki/Star_network)

3. 1. 2 Simplicity: The topology is easy to understand, establish, and navigate. The simple topology obviates the need for complex routing or message passing protocols. As noted earlier, the isolation and centralization simplifies fault detection, as each link or device can be probed individually. Due to its centralized nature, the topology offers simplicity of operation. (http://en.wikipedia.org/wiki/Star_network)

3. 1. 3 If any cable is not working then the whole network will not be affected: in a star topology, each network device has a home run of cabling back to a network hub, giving each device a separate connection to the network. If there is a problem with a cable, it will generally not affect the rest of the network. The most common cable media in use for star topologies is unshielded twisted pair copper cabling. If small numbers of devices are utilized in this topology the data rate will be high. It is best for short distance (<http://fallsconnect.com/topology.htm#a>)

3. 1. 4 You can easily add new computers or devices to the network without interrupting other nodes: The star network topology works well when computers are at scattered points. It is easy to add or remove computers. New devices or nodes can easily be added to the Star Network by just extending a cable from the hub. If the hub adds a device for example a printer or a fax machine, all the other computers on the network can access the new device by simply accessing the hub. The device need not be

installed on all the computers in the network. The central function is cost effective and easier to maintain. If the computers are reasonably close to the vertices of a convex polygon and the system requirements are modest. And also when one computer falls short then it won't affect the whole communication. (<http://searchnetworking.techtarget.com/dictionary/definition/what-is-star-network.html#>)

3. 1. 5 Centralization: the star topologies ease the chance of a network failure by linking all of the computers to a central node. All computers may therefore communicate with all others by transmitting to and receiving from the central node only. Benefits from centralization: As the central hub is the bottleneck, increasing capacity of the central hub or adding additional devices to the star, can help scale the network very easily. The central nature also allows the check up of traffic through the network. This helps evaluate all the traffic in the network and establish apprehensive behavior (<http://www.buzzle.com/articles/advantages-and-disadvantages-of-different-network-topologies.html>).

3. 1. 6 Easy to troubleshoot: in a star network the whole network is reliant on the hub so if the entire network is not working then there could be a problem with the hub. This feature makes it easy to troubleshoot by offering a single point for error connection and at the same time the dependency is also very high on that single point

3. 1. 7 Better performance: star network prevents unnecessary passing of the data packet through nodes. At most 3 devices and 2 links are involved in any communication between any two devices which are part of this topology.

<https://assignbuster.com/why-star-topology-is-best/>

This topology encourage a huge overhead on the central hub, however if the central hub has plenty of capacity, then very high network used by one device in the network does not affect the other devices in the network. Data Packets are sent quickly as they do not have to travel through any unnecessary. The big advantage of the star network is that it is fast. This is because each computer terminal is attached directly to the central computer (http://en.wikipedia.org/wiki/Star_network).

3. 1. 8 EASY INSTALLATION: Installation is simple, inexpensive, and fast because of the flexible cable and the modular connector.

3. 2 DISADVANTAGES OF STAR NETWORK

3. 2. 1 If the hub or concentrator fails, nodes attached are disabled: The primary disadvantage of a star topology is the high dependence of the system on the functioning of the central hub. While the failure of an individual link only results in the isolation of a single node, the failure of the central hub renders the network inoperable, immediately isolating all nodes. (<http://www.buzzle.com/articles/advantages-and-disadvantages-of-different-network-topologies.html>)

3. 2. 2 The performance and scalability of the network also depend on the capabilities of the hub. Network size is limited by the number of connections that can be made to the hub, and performance for the whole network is limited by its throughput. While in theory traffic between the hub and a node is isolated from other nodes on the network, other nodes may see a performance drop if traffic to another node occupies a significant portion of

the central node's processing capability or throughput (http://en.wikipedia.org/wiki/Star_network).

Furthermore, wiring up of the system can be very complex.

3. 2. 3 The primary disadvantage of the star topology is the hub is a single point of failure: If the hub were to fall short the whole network would fail as a result of the hub being connected to every computer on the network. There will be communication break down between the computers when the hub fails.

3. 2. 4 Star topology requires more cable length: When the network is being extended then there will be the need of more cables and this result in intricate installation.

3. 2. 5 More Expensive than other topologies: it is expensive due to cost of the hub. Star topology uses a lot of cables thus making it the most costly network to set up as you also have to trunk to keep the cables out of harm way. Every computer requires a separate cable to form the network. . A common cable that is used in Star Network is the UTP or the unshielded twisted pair cable. Another common cable that is used in star networks is the RJ45 or the Ethernet cables

3. 3 USAGES OF STAR NETWORK

Star topology is a networking setup used with 10BASE-T cabling (also called UTP or twisted-pair) and a hub. Each item on the network is connected to the hub like points of a star. The protocols used with star configurations are

usually Ethernet or local-talk. Token Ring uses a similar topology, called the star-wired ring (<http://fallsconnect.com/topology.htm#a>).

Star Topology is the most common type of network topology that is used in homes and offices. In the Star Topology there is a central connection point called the hub which is a computer hub or sometimes just a switch. In a Star Network the best advantage is when there is a failure in cable then only one computer might get affected and not the entire network.

Star topology is used to ease the probabilities of network failure by connecting all of the systems to a central node. This central hub rebroadcasts all transmissions received from any peripheral node to all peripheral nodes on the network, sometimes including the originating node. All peripheral nodes may thus communicate with all others by transmitting to, and receiving from, the central node only (From Wikipedia, the free encyclopedia).

Star network is used to transmit data across the central hub between the network nodes. When a packet comes to the hub it transfers that packet to all nodes connected through a hub but only one node at a time successfully transmits it.

In local area networks where the star topology is used, each machine is connected to a central hub. In contrast to the bus topology, the star topology allows each machine on the network to have a point to point connection to the central hub and there is no single point of failure. All of the traffic which transverses the network passes through the central hub. The hub acts as a

signal booster or repeater which in turn allows the signal to travel greater distances.

When it is important that your network have increased stability and speed, the star topology should be considered. When you use a hub, you get centralized administration and security control, low configuration costs and easy troubleshooting. When one node or workstation goes down, the rest of your network will still be functional.

4. 0 APPENDIX

As the name suggests, this layout is similar to a star. The illustration shows a star network with five workstations or six, if the central computer acts as a workstation. Each workstation is shown as a sphere, the central computer is shown as a larger sphere and it is a hub, and connections are shown as a thin flexible cable. The connections can be wired or wireless links. The hub is a central to a star topology and the network cannot function without it. It connects to each separate node directly through a thin flexible cable (10BASE-T cable). One end of the cable is plugged into the connector on the network adapter card (either internal or external to the computer) and the other end connects directly to the hub. The number of nodes you can connect to a hub is determined by the hub.

5. 0 CONCLUSION

A star network is a local area network in which all computers are directly connected to a common central computer. Every workstation is indirectly connected to every other through the central computer. In some star networks, the central computer can also operate as a workstation

A Star Network Topology is best suited for smaller networks and works efficiently when there is limited number of nodes. One has to ensure that the hub or the central node is always working and extra security features should be added to the hub because it s the heart of the network. To expand a star topology network, you'll need to add another hub and go to a “ star of stars” topology.

In a Star Network Topology it is possible to have all the important data backups on the hub in a private folder and this way if the computer fails you can still use your data using the next computer in the network and accessing the backup files on the hub.

6. 0 REFERENCES

1. Available on http://en.wikipedia.org/wiki/Star_network

2. Available on http://en.wikipedia.org/wiki/Very_small_aperture_terminal

http://en.wikipedia.org/wiki/Very_small_aperture_terminal

Available on <http://fallsconnect.com/topology.htm#a>

3. Available on [http://searchnetworking.techtarget.com/dictionary/definition/what-is-star-network.html#\(above\)](http://searchnetworking.techtarget.com/dictionary/definition/what-is-star-network.html#(above))

[http://searchnetworking.techtarget.com/dictionary/definition/what-is-star-network.html#\(above\)](http://searchnetworking.techtarget.com/dictionary/definition/what-is-star-network.html#(above))

4. Available on http://www.answers.com/topic/star_network

5. Available on <http://www.buzzle.com/articles/advantages-and-disadvantages-of-different-network-topologies.html>

<http://www.buzzle.com/articles/advantages-and-disadvantages-of-different-network-topologies.html>

6. Available on <http://www.buzzle.com/editorials/2-6-2005-65413.asp>

7. Available on <http://www.blurtit.com/q826101.html>