A black background with white text

Description automatically generatedTopologies

# Star topology .

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|  | A **star topology** has one **central** node with all of the other nodes connected to it. The central node would typically be a **hub** or a **switch** that could transfer data between nodes.  If a **hub** is the central node, then it will broadcast the data to all nodes connected to it. If a **switch** is the central node, then it will transfer the data to the required location. |

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| **Advantages** | **Disadvantages** |
| * A damaged link only affects the attached node * You can easily add new devices (so long as there are sufficient free ports on the central device) * It performs well under heavy load if using a switch for the central node | * The central node is a single point of failure * It requires a central device such as a hub or a switch |

# Mesh topology .

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|  | In this arrangement, there are **multiple routes** for data to transfer from one node to another. Each node is connected to at least one other node.  In a **mesh network**, typically the most efficient route is calculated before the required data is transferred. |



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| **Advantages** | **Disadvantages** |
| * There is no central node, so there is no single point of failure * The data uses the most efficient route, making data transfer faster * It works well under heavy load * If a node fails, a new route can be found for the data * New nodes can be added without shutting down the network | * A fully connected mesh network is difficult and more expensive to install. This is not an issue for wireless mesh networks. |

# Tree topology

In this arrangement, groups of star networks are connected over a linear bus backbone topology. This combines the benefits of the star and bus topologies.

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| **Advantages** | **Disadvantages** |
| * There is point-to-point cabling for individual sections of the network * New devices can be added easily (so long as there are sufficient free ports on the central device) by expanding the star network at each branch * If a node fails, it does not affect the whole network | * The network is dependent on the main bus (backbone) cable * Finding the source of performance problems can be difficult, especially when the network gets bigger and has multiple nodes |

# Scenario 1 .

Sonia has set up a small business providing custom holiday packages. She has rented an office that is large enough for her and her three members of staff. It is anticipated that each member of staff will work with a few individual clients to design a holiday that will meet their specific requirements. Each member of staff will have their own personal computer, but they will share access to a laser printer. They will also share access to a NAS, which will be used to store their files. Because the business is new, Sonia wants to minimise the upfront costs of setting up the network.

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| **Underline the most suitable topology for this scenario:**  Star Mesh Tree |
| **Justify your chosen topology in the space below:** |

# Scenario 2 .

Anil has a high-tech home that is full of smart devices. Every room has smart lighting and blinds that can be controlled remotely. The heating system has smart thermostats on all of the radiators. There are sensors throughout the house that trigger some devices automatically. There is a home cinema system in the basement and several smart TVs. Unsurprisingly the whole family has a range of mobile devices. In the evening when everyone is home, there is a lot of contention for bandwidth. Anil wants the network to be predominantly wireless, as he does not want to have a lot of cables on view around the home.

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| **Underline the most suitable topology for this scenario:**  Star Mesh Tree |
| **Justify your chosen topology in the space below:** |

# Scenario 3

Adah runs a legal practice. She has 100 employees that work across different areas of the business, such as conveyancing and wills. There is also an HR (human resources) group and a finance group. Adah has taken advice from an IT business who have proposed creating a separate network segment for each area of the business. This will improve the performance and security of the network.

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| **Underline the most suitable topology for this scenario:**  Star Mesh Tree |
| **Justify your chosen topology in the space below:** |

# Explorer task .

Determine which hardware components might be required for the network topologies that you have chosen. You can draw or list them.

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| **Scenario 1** |
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| **Scenario 2** |
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| **Scenario 3** |
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