A black background with white text

Description automatically generatedTopologies

# 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:**  A star topology will provide a cost-effective solution to allow the 4 PCs to access the laser printer and the NAS. A mesh topology is unnecessary in an environment with just a few users who will not be generating large volumes of network traffic. This small business will not need multiple network segments for performance or security reasons, so a tree topology is not required unless the business grows much bigger. |

# 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:**  A wireless mesh network topology will reduce or eliminate dead zones in the home (where the wireless signal cannot reach). This topology will ensure that there are alternate routes for traffic to travel; if one route is being heavily used, another route can be found. This will result in a high-performance network that will allow all of the devices to operate effectively.  A simple star topology is unlikely to be suitable, as there are a lot of devices and there will almost certainly be parts of the home that are not within reach of a single access point.  A tree topology could be used, because the home could be split into separate zones, each with its own segment on the network. In this instance, using a fibre-optic cable for the backbone of the tree would offer very high performance. However, it would be more costly to set up and could require adaptations to the structure of the building to accommodate the cables. |

# 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:**  A tree topology will allow the distinct areas of the business to have their own network segment, each of which will use a star topology. In this way there will be a single network to manage, and data will be able to flow across the whole network, but the network performance will be better, and security will be easier to manage.  A simple star topology would not meet the performance and security requirements of the business. A mesh network could be used; however, a physical mesh network is complex to install and a wireless mesh network may introduce new security vulnerabilities. |

# 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** |
| Each of the devices would be attached by **copper (Ethernet) cable** to a **hub or a switch**, which would be the central node in the star. Each device would need a suitable **network interface card** (to support a wired connection). |

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| **Scenario 2** |
| A number of **mesh devices** would be required. Each of these would attach to the **main wireless access point**, or to each other, so that every device (at any location within the home) was within reach of the network. Each device would need a suitable **network interface card** (to support a wireless connection). |

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| **Scenario 3** |
| Each area of the business would have a **switch** to which all of the devices within the area would be attached using **copper (Ethernet) cables**. The switches would be attached using **copper or fibre-optic cables**. Each device would need a suitable **network interface card** (to support a wired connection). |