



3.2.3 Local Area Networks (LAN)

Oct/NOV 2003.P1

7. A college has a number of stand-alone machines. The decision is taken to turn them into a LAN.

- (a) State two items of hardware and one of software which will be necessary for the conversion. [3]

May/June 2004.P3

8. Explain the part played in network systems by

- (i) switches;
- (ii) routers;
- (iii) bridges;
- (iv) modems. [8]

May/June 2005.P3

5. (b) LANs are used to help communication around the company. Explain the purpose of

- (i) routers,
- (ii) bridges,
- (iii) modems

as parts of the company computer networks. [6]

May/June 2006.P1

4. (a) State two ways in which a local area network (LAN) differs from a wide area network (WAN). [2]

Oct/NOV 2006.P1

Authors send books to a publishing company. At this stage books are text documents with any illustrations being added at the end of the publishing process.

6. When a book is sent to the company by an author, it is sent in hard copy form as well as on a disk. It is read and, if accepted, is then sent electronically to a person called a copy editor. The copy editor reformats the text to make it suitable for publication.

(c) All copy editors are expected to have a stand-alone computer.

Copy editors need to communicate with head office. State what extra hardware and software the company would have to supply to each copy editor to allow this communication. Give reasons for your answers. [4]

May/June 2007.P1

Some computers are used in the offices for clerical tasks like word processing and accounting. Some are in the showroom so that customers can see details of cars and videos of them being driven. The computers used at the garage are networked and all data is stored on a central server.

10. (a) State a difference between a local area network (LAN) and a wide area network (WAN). [1]





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Oct/NOV 2007.P3

13. A mail order company employs a number of computer operators who take orders by telephone.

There is also a warehouse department from which orders are dispatched. The management staff interrogate the data to inform their decisions. The computers in all three areas are networked with a central storage facility.

(a) Discuss, the different topologies and media available for transmitting data around the network, with reference to suitability for this example. [8]

Oct/NOV 2008.P1

6. (a) State two extra pieces of hardware and one piece of software which would be necessary to create the network. [3]

Oct/NOV 2008.P3

5. A company introduces a new computer system in its headquarters building.

Each of the offices has a network of computers. The individual networks are joined together to allow communication throughout the building.

(a) Explain the purpose of the following network components and how they would be used in the company's offices.

- (i) Bridges
- (ii) Routers
- (iii) Modems

[6]

Oct/NOV 2009. P12

4. (b) Describe the additional hardware required when a LAN is connected to a WAN. [4]

May/June 2010. P13

1. (b) (i) Explain why a NIC is used when a computer is to communicate with other computers. [2]

(ii) State one other piece of hardware which is needed for successful communication to take place. Justify your answer. [2]

May/June 2010. P32

5. A new school is being built on a single site. The computers will be networked with a central storage facility.

Discuss different topologies and the media available for transmitting data around the network. [6]





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May/June 2010. P33

5. The management of a new hospital have decided to install a network of computers.

The computers will be placed in the wards and in the doctors' examination rooms so that the medical personnel can have access to the patients' records. They will also be networked in the administration offices so that hospital records can be kept.

Discuss different topologies and the media available for transmitting data around the network.

[6]

Oct/NOV 2010. P11/P12/P13

6. (a) State two items of hardware and one item of software used to create a local area network (LAN) with a number of computers.

[3]

Oct/NOV 2010. P31

1. A company employs five sales assistants in an office. The sales assistants all use stand-alone computers. The company decides to network the computers in a local area network (LAN).

(a) The data which is held about customers can all be kept together in a single file on the network. When each assistant used their own computer they had their own copy of the file.

Describe one advantage and one disadvantage of holding the customer file on the network.

[4]

(b) The accounts department is in an office on a different floor of the building. It has a star network to allow access to the data required by the workers in the accounts department. It is decided to link the two networks so that there can be communication between them.

The chief accountant also needs access to the Internet.

Describe how each of the following network components would be used in this example:

- (i) switch
- (ii) bridge
- (iii) modem

[2]

[2]

[2]

Oct/NOV 2010. P32

1. A company employs five sales assistants in an office. The sales assistants all use stand-alone computers. The company decides to network the computers in a local area network (LAN).

(b) The accounts department is in an office on a different floor of the building. It has a star network to allow access to the data required by the workers in the accounts department. It is decided to link the two networks so that there can be communication between them.

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Describe how each of the following network components would be used in this example:

- (i) switch

[2]



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- (ii) bridge [2]
(iii) modem [2]

May/June 2011. P11/P12/P13

8 (a) State two differences between a local area network (LAN) and a wide area network (WAN). [2]

Oct/NOV 2011. P11

8 The computers in a school classroom are networked. It is decided that this network should be linked to the Internet.

(a) State two items of hardware and one type of software which would be necessary to connect this network to the Internet. [3]

Oct/NOV 2011. P12

8 A building firm has a main office with stand-alone computers for the workers to use.

It is decided to link these stand-alone computers to make a network.

(a) State two items of hardware and one type of software which would be necessary to create the network. [3]

Oct/NOV 2011. P13

8 A factory specialises in making components for cars.

The offices of the factory have a number of stand-alone computers. The decision is taken to link these machines in a network.

(a) (i) State two items of hardware which would be necessary to network the computers. [2]

(ii) State one extra item of hardware which would be required if the network was to be linked to the Internet. [1]

May/June 2012. P11/12

8 (a) The manager of a firm has been advised to link all the firm's computers to form a Local Area Network (LAN).

(i) Explain to the manager two benefits of connecting the computers in a LAN. [2]

Oct/NOV 2012. P31

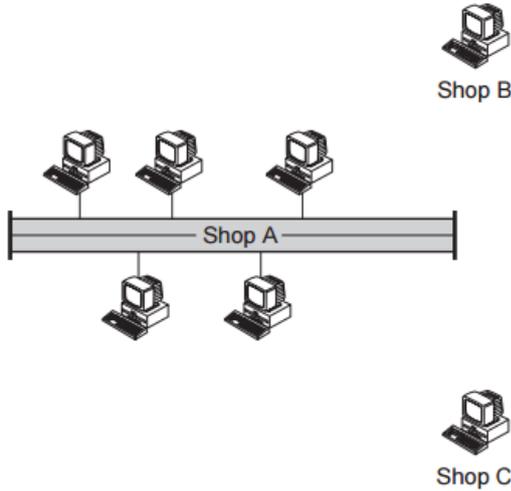
7 (b) A company has three retail shops – Shop A, Shop B and Shop C – located in different towns.

- Shop A has a Local Area Network (LAN) consisting of five computers.
 - A file server on this network (ServerX) contains all the administration and order processing data for all three shops.
 - A second file server (ServerY) authenticates all logons.
- Shop B and Shop C each have a single computer which connect to the network of Shop A. The shops are connected over a Wide Area Network (WAN) using a star topology. Complete the diagram showing the additional hardware needed for this LAN and WAN.





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[4]

(c) The LAN in Shop A is to be expanded to 40 computers. The computers are to be organised as two network segments.

What additional hardware is required? Explain its purpose.

[2]

Oct/NOV 2012. P32

7 (b) A library has a central computer at its Head Office. There are libraries in three towns:

Town A, Town B and Town C. Each has a single computer connected to the Head Office computer over a Wide Area Network (WAN) using a star topology.

(ii) Draw a labelled diagram showing this star network.

[3]

(iii) Describe two benefits of a star network.

[2]

Oct/NOV 2012. P33

7 (a) Describe two different media used for the transmission of data across a Local Area Network (LAN).

[4]

(b) A retail shop has a Local Area Network of four computers and a fifth computer which acts as a print server.

The network is arranged as a bus topology.

(i) Draw a labelled diagram showing this Local Area Network.

[3]





3.2.3 Local Area Networks (LAN)

Oct/Nov 2013.P11

7 (b) Discuss the different types of hardware needed to operate a local area network (LAN) and a wide area network (WAN). [3]

Oct/Nov 2013.P13

6 (a) There are 3 network topologies on the left and 7 statements about networks on the right.

Draw a line connecting each statement to the appropriate network topology.

Bus	If the central hubs fails, the whole network fails
	Works well under heavy loading
	Poor performance under heavy loading
Star	If one connection fails, the other terminals are not affected
	Less cabling required
Ring	Different communication media can be used for different nodes
	Can be used for wide area networks

[7]

Oct/Nov 2013.P33

7 (a) Below are some terms and definitions for devices used for networking.

(i) Match up each device on the left with its definition. Draw a line connecting each description to the appropriate network device.

(ii) Complete the missing component name.





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Router	Hardware or software to control unauthorised access to a private network
Bridge	Hardware used to convert analogue signals to digital signals (and vice versa)
Firewall	Hardware used to connect nodes in a circuit switching network
Switch	Circuit board which connects the computer to a network
Modem	Device to direct packets across a packet switched network
.....	Device used to connect two bus network segments to allow communication between all nodes

[6]

May/June 2014.P11/P12

2 Describe one key difference between each of the following:

(iii) ring and star network topologies

[2]

May/June 2014.P31/P32

6 A business has a customer services section. The business is considering a new Local Area Network (LAN) for this section.

(a) Describe what is meant by a Local Area Network.

[2]

(d) "Many customer enquiries will be dealt with over the World Wide Web; so each computer in the LAN needs access to the Internet".

Name the additional hardware needed to provide access to the Internet.

[1]

(e) "With the Internet connection, I am concerned that we will get unauthorised access to our LAN."

Name the hardware and/or software needed to prevent unauthorised access.

[1]

(f) "Customer Services staff must be able to get access to a centralised store of customer data. Our business deals with thousands of customers. They produce millions of transactions."

Explain what hardware and software will be needed to enable this.

[3]





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May/June 2014.P33

6 A firm of insurance brokers provides quotations. The firm uses two stand-alone computers. Some customers come in person to the office and are given a printed quotation to take away. Other customers enquire through the firm's website over the Internet.

Each computer creates a file at the start of each day to log and save the quotations issued from that computer.

There has been a large increase in enquiries, so the firm is to employ three more staff to provide quotations. The firm will design and implement a Local Area Network (LAN) of five computers. The LAN must provide all computers with access to the Internet.

(a) The network is to have a bus topology.

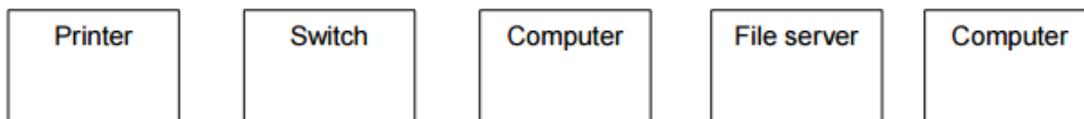
Sketch the topology of the LAN. Clearly label all items of hardware.

[5]

Oct/Nov2014.P12

8 (b) (i) The following components are to be wired as a star network.

Draw the wired connections to complete this star network topology



[3]

(ii) Give one advantage of a star network topology over a bus network topology.

[1]

May/June 2015.P13

5 (a) A local area network has four computers.

Star, ring and bus are network topologies.

Complete the diagrams to show how the computers are connected in each of these topologies:





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[4]

(b) Describe two benefits of each of these network topologies:

(i) Star

[2]

(iii) Bus

[2]

May/June 2015.P31/P32

7 (b) A company has three retail shops, Shop A, Shop B and Shop C, located in different towns.

- Shop A and Shop B each have a single computer. They connect to the network of Shop C.
- Shop C has a Local Area Network (LAN) consisting of:
 - three computers (C1, C2 and C3)
 - a fourth computer (C4) which acts as a print server for a laser printer
 - a file server (ServerY) contains all the order processing data for all three shops and authenticates all logons

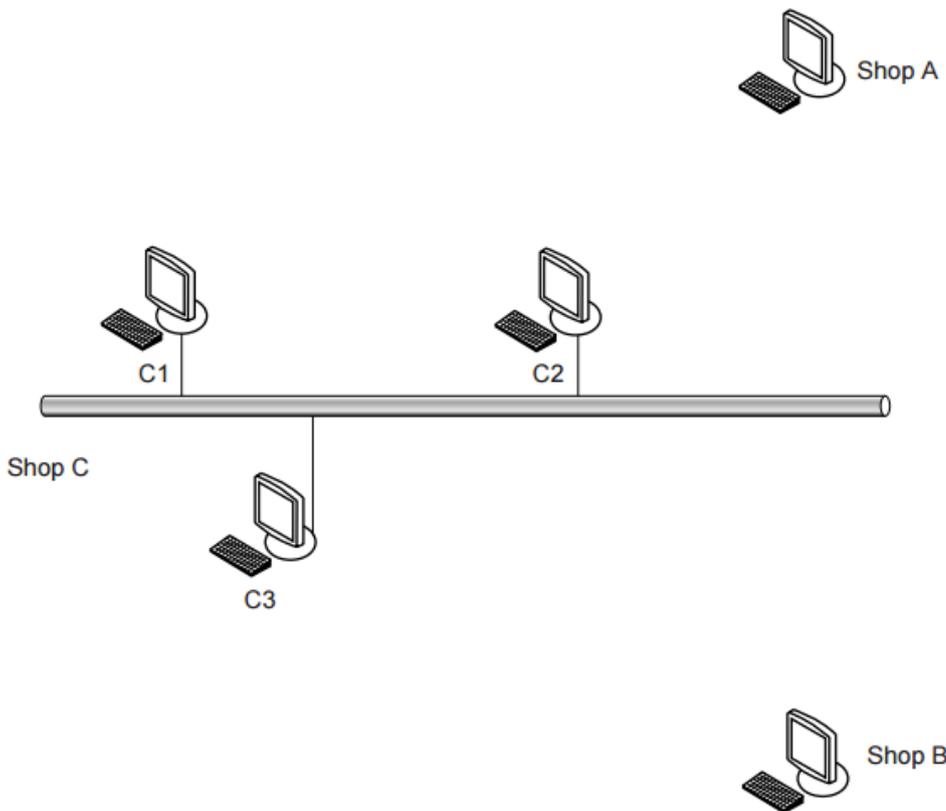




3.2.3 Local Area Networks (LAN)

The shops are connected over a Wide Area Network (WAN) using a star topology.

Complete the diagram showing the additional hardware needed for both the LAN and the WAN.



[4]

May/June 2015.P33

7 A small building company employs three staff in its office. They each work at a stand-alone computer and each member of staff deals with a specific operation of the business:

- Computer A – Ordering of materials
- Computer B – Recording enquiries about jobs and producing quotations
- Computer C – Managing the accounts

At present, only Computer A has access to the Internet. Computer C has a laser printer attached.

The company is considering the introduction of a Local Area Network (LAN).

(a) The network is to have a bus topology.

Consider what additional hardware will be needed. This is to include a fourth computer which acts as a print server.

Sketch the layout of the LAN. Clearly label all items of hardware.

[5]





3.2.3 Local Area Networks (LAN)

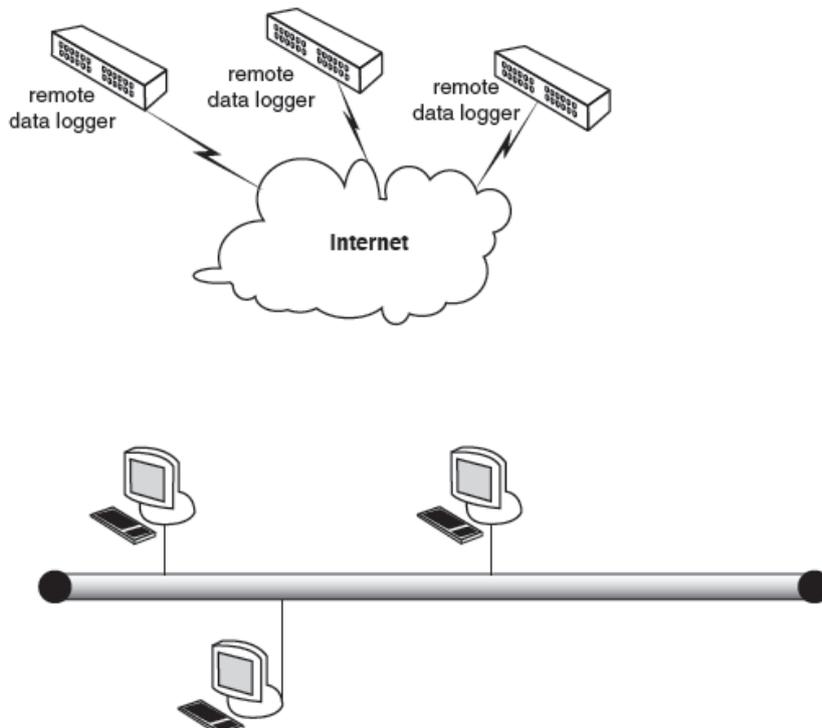
Oct/Nov 2015.P11/P13

5 (b) Name and describe four items of hardware which will be found on the company's LAN. [4]

Oct/Nov 2015.P31/P33

8 A team of scientists collect data from three data loggers situated at three different locations in the world. The data is sent over the Internet to the scientists' local area network (LAN). Each day millions of data values are stored. At the end of each day the data is used to produce predictions in the form of a printed report.

(a) Complete the diagram showing the essential hardware which will be needed for the data collection, storage and processing of the results.



[4]

Oct/Nov 2015.P32

7 A company is considering a new local area network (LAN) for the order processing operation of its business. It intends to use the existing four computers to form a wired bus topology LAN.

(a) Define what is meant by a Local Area Network. [2]

(b) The following are extracts from conversations between the Order Processing Manager and the IT Manager. [1]

(i) "The computers may need to be fitted with additional hardware"

State what hardware this is. [1]

(ii) "It is important that only the order processing staff have access to the LAN and access to the Internet is restricted".

State what authentication technique will be used for this.

Name the hardware needed to restrict access to the Internet. [2]

[2]





3.2.3 Local Area Networks (LAN)

Computer Science (9608)

May/June 2015.P33

2 (a) Four descriptions and three types of local area network (LAN) are shown below. Draw a line to connect each description to the type of LAN it applies to.

Description	Type of LAN
Any packet the listening computer receives may be part of a message for itself	Bus with terminators at each end
Connection provided through an access point	Star
A process for handling collisions has to be implemented	Wireless
Listening computer only receives packets that are addressed to itself	

[4]

Oct/Nov 2015.P31/P33

3 An email is sent from one email server to another using packet switching.

(b) Explain the role of routers in sending an email from one email server to another.

[3]

May/ June 2016. P31/ P32/ P33

1 A Local Area Network (LAN) consists of four computers and one server. The LAN uses a bus topology.

(a) Complete the diagram below to show how the computers and the File server could be connected.





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[2]

(b) Computer C sends a data packet to Computer A.
Three statements are given below.
Tick (✓) to show whether each statement is true or false.

Statement	True	False
Computer C uses the IP address of Computer A to indicate that the packet is for Computer A.		
Computer B can read the packet sent from Computer C to Computer A.		
The File server routes the packet to Computer A.		

[3]

(c) Computer A starts transmitting a packet to Computer C. At exactly the same time, the File server starts transmitting a packet to Computer D. This causes a problem.

(i) State the name given to this problem.

[1]

(ii) Give **three** steps taken by both Computer A and the File server to allow them to transmit their packets successfully.

[3]

(d) Adding a switch to the LAN changes its topology. Explain how the use of a switch removes the problem identified in part (c)(i).

[4]

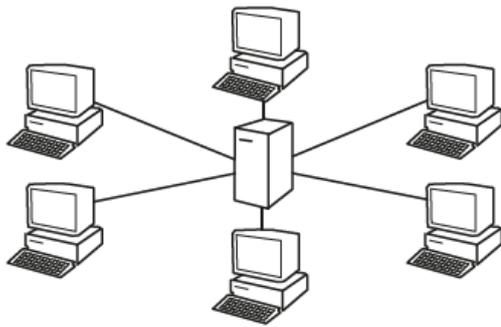




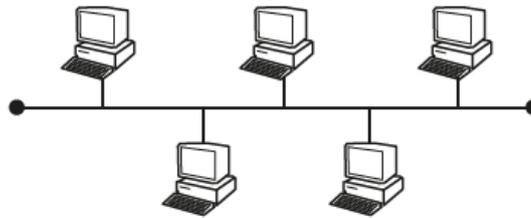
3.2.3 Local Area Networks (LAN)

May/June 2018.P31/P33

3 Star and bus are two types of topology that can be used in a Local Area Network (LAN).



Star topology



Bus topology

- (a) (i) State **one** benefit and **one** drawback of the star topology. [2]
 (ii) State **one** benefit and **one** drawback of the bus topology. [2]
- (b) The sequence of steps 1 to 7 describes what happens when the LAN transmits data from Computer X to Computer Y using circuit switching. Four statements (4 to 7) are missing from the sequence.

A	Computer X sends the data.
B	The sender signals node to deallocate resources.
C	Computer Y sends a receipt signal.
D	If available, Computer X sets up path between nodes.

Write **one** letter (**A** to **D**) in the appropriate space to complete the sequence.

- 1 Computer X sends a connection request to Computer Y.
- 2 Computer Y sends ready or busy signal.
- 3 If busy, Computer X waits and then resends the connection request to Computer Y.
- 4
- 5
- 6
- 7

[3]

