The Internet, DNS, hosting and the cloud

Computer systems (Paper 1) · revision notes

The Internet as a worldwide collection of computer networks, how DNS turns a domain name into an IP address, what hosting and the cloud are, and how web servers and clients work together. Expect short definitions, a 3 to 4 mark 'describe how DNS works' question and evaluation of the cloud, sometimes as an 8-mark discussion.

Key facts

- Internet = worldwide collection of interconnected computer networks
- Web server: stores web pages and sends them to clients when requested
- Hosting = storing files or services on a server connected to the Internet
- Cloud +: access anywhere, no hardware to maintain, provider backs up, easy to scale
- DNS = Domain Name System: converts domain names into IP addresses
- Web client (browser): requests pages and displays them
- Cloud = remote storage, software or processing accessed over the Internet
- Cloud −: needs Internet, third party holds data, ongoing cost, less control

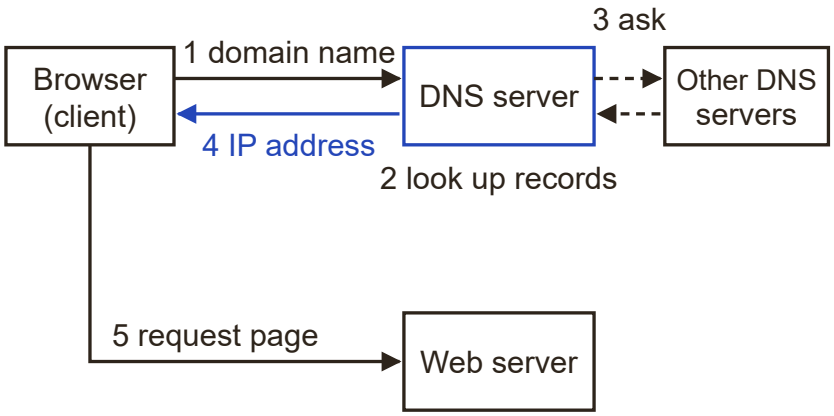
Notes

The Internet, web servers and clients

- The **Internet** is a worldwide collection of interconnected computer networks. It is the largest WAN.
- Data travels across it from router to router, using IP addresses.
- Web pages are stored on **web servers**. A **web client** (a browser) requests a page using HTTP or HTTPS; the server sends back the page's files; the browser displays (renders) them.

DNS (Domain Name System)

- Every web server has an **IP address**, but people use easy-to-remember **domain names** such as example.com.
- **DNS** converts (resolves) the domain name in a URL into its IP address. DNS is made up of many **domain name servers** spread across the Internet.
- 1. The browser sends the domain name to a **DNS server**. 2. The DNS server looks it up in its records. 3. If it has no record, it asks other DNS servers. 4. The IP address is sent back to the browser. 5. The browser uses the IP address to request the page from the web server.



DNS turns the domain name into an IP address; the browser then contacts the web server

- DNS servers keep a copy (cache) of recent answers for a while, so repeated requests for the same domain name are answered more quickly. Grade 7+ only

Hosting and the cloud

- **Hosting**: storing a website's files (or other services) on a server that is connected to the Internet. Many organisations pay a **hosting company** to do this.
- **The cloud**: storage, software or processing power provided remotely on servers in data centres and accessed over the Internet.
- Advantages: access from anywhere on any device; no hardware to buy or maintain; the provider handles backups and security; storage is easy to increase; files are easy to share and work on together.
- Disadvantages: needs an Internet connection; data is held by a third party (security and privacy concerns); ongoing subscription costs; less control if the provider has an outage or changes its terms.

How to answer each type of question

Describe how DNS works

3 to 4 marks **Grade 5**

1. Start with the user typing a domain name (URL) into the browser.
2. The browser sends the domain name to a DNS server, which looks up the IP address.
3. Mention passing the request on if the DNS server has no record.
4. Finish with the IP address being returned and used to contact the web server.

Example. A user types www.example.com into a web browser. Describe how DNS is used to find the website. [4]

Model answer. The browser sends the domain name to a DNS server (1). The DNS server looks up the domain name to find the matching IP address (1); if it does not have a record, it passes the request on to another DNS server (1). The IP address is returned to the browser, which uses it to request the web page from the web server (1).

Advantages and disadvantages of the cloud

2 to 4 marks **Grade 6**

1. Give separate advantages and disadvantages if both are asked for.
2. Make each point specific: 'access files from any device with an Internet connection', not just 'easy to use'.
3. Link each point to the user in the question.

Example. A student saves coursework to cloud storage instead of a USB flash drive. Give **two** advantages and **one** disadvantage of this. [3]

Model answer. Advantage: the files can be accessed from any device with an Internet connection, e.g. at home and at school (1). Advantage: the provider backs up the files, so they are not lost if a device is lost or broken (1). Disadvantage: the student cannot open the files without an Internet connection (1).

8-mark: discuss moving to the cloud 8 marks (marked in levels) **Grade 8**

1. Plan both sides: benefits and risks, each applied to the organisation.
2. Use the context: what data does it hold, how many staff, where do they work?
3. Develop each point (point → because → effect) rather than listing many short points.
4. Finish with a conclusion that follows from your points.

Example. A vet's practice keeps its animal and owner records on a server in its building. It is considering moving the records to the cloud. Discuss the benefits and risks of this move. [8]

Model answer.

Benefits: vets could see records from any computer with an Internet connection, e.g. when visiting farms. The practice would not need to buy, maintain or replace its own server, and the provider would back up the records, so they could be recovered after a fire or hardware failure. Storage can easily be increased as the practice grows.
Risks: if the Internet connection fails, staff cannot see appointments or records, so the practice may struggle to work. Owners' names and addresses are personal data held by a third party, so a breach at the provider could expose them, and the practice must still protect the data under the Data Protection Act 2018. Subscription costs continue every month.
Conclusion: the move is worthwhile if the practice has a reliable connection with a backup option and chooses a provider that encrypts the data.
Top band (6–8 marks): covers both benefits and risks, applies every point to the vet's practice and reaches a supported conclusion.

Don’t lose marks

- Saying DNS 'finds the website'. It finds the IP address; the browser then contacts the web server.
- Mixing up the Internet (the networks) with the World Wide Web (the web pages accessed over the Internet).
- Writing that the cloud is always safe or never loses data. Providers can have outages and data breaches.
- Giving vague cloud advantages such as 'it is quicker' or 'it is better'.

More tips

Memory tricks

- DNS is the Internet's phone book: look up a name, get a number (the IP address).
- The cloud is 'someone else's computer that you reach over the Internet'.
- Test for 'the cloud': is the data or software on a remote server reached over the Internet? If yes, it is the cloud.

Exam technique

- DNS answers are a sequence: write the steps in order.
- In 8-mark discussions, a one-sided answer cannot reach the top band: include benefits and risks.
- Mention the Data Protection Act 2018 when personal data is moved to the cloud.

What each grade needs

What you need to be able to do, from the first marks up to the top grade.

Grade 3

Define the Internet

The Internet is a worldwide collection of interconnected computer networks.

Grade 4

Explain why DNS is needed

People remember domain names easily, but computers need IP addresses to send data to the right server.

Grade 4

Explain what web hosting is

Storing a website's files on a server connected to the Internet so that users can access the website.

Grade 5

Describe the steps of a DNS lookup

The browser sends the domain name to a DNS server, which finds the IP address (asking other servers if needed) and returns it.

Grade 5

Describe the roles of web servers and clients

The browser requests a page; the web server sends the page's files back; the browser displays it.

Grade 6

Give advantages and disadvantages of the cloud

Access from anywhere and no hardware to maintain, but it needs an Internet connection and a third party holds the data.

Grade 8

Evaluate moving an organisation to the cloud

Weigh the benefits against the risks for the organisation described and reach a supported conclusion.

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