

5

Data centres and security

STARTER

LOCATION, LOCATION, LOCATION

Look at the pictures. Write down one advantage and one disadvantage of each place as the location for a Tier 4 (most secure) data centre. Compare your answers with a partner.



Peshawar, on the Pakistan/Afghanistan border



Industrial development zone, New Orleans



Business park, near Heathrow airport, London



Remote farmland, Ireland

DATA CENTRES

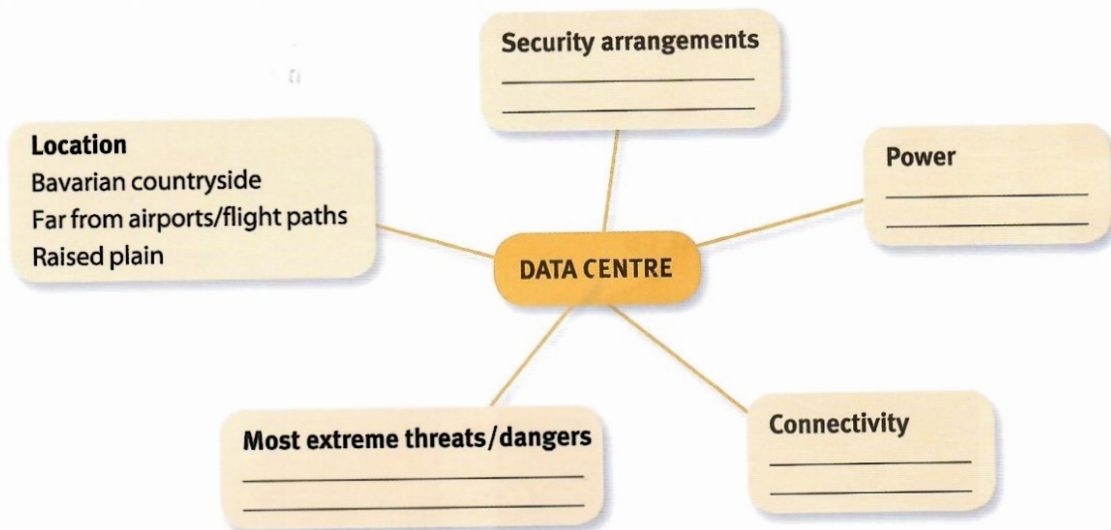


- 1** Rupert Wilson, CIO of a small investment bank, is visiting a German data centre to find out about the services they offer. Helmut Schwartz is taking him on a tour of the data centre. Listen to the first part of Helmut's tour and say if the following statements are TRUE (T) or FALSE (F).

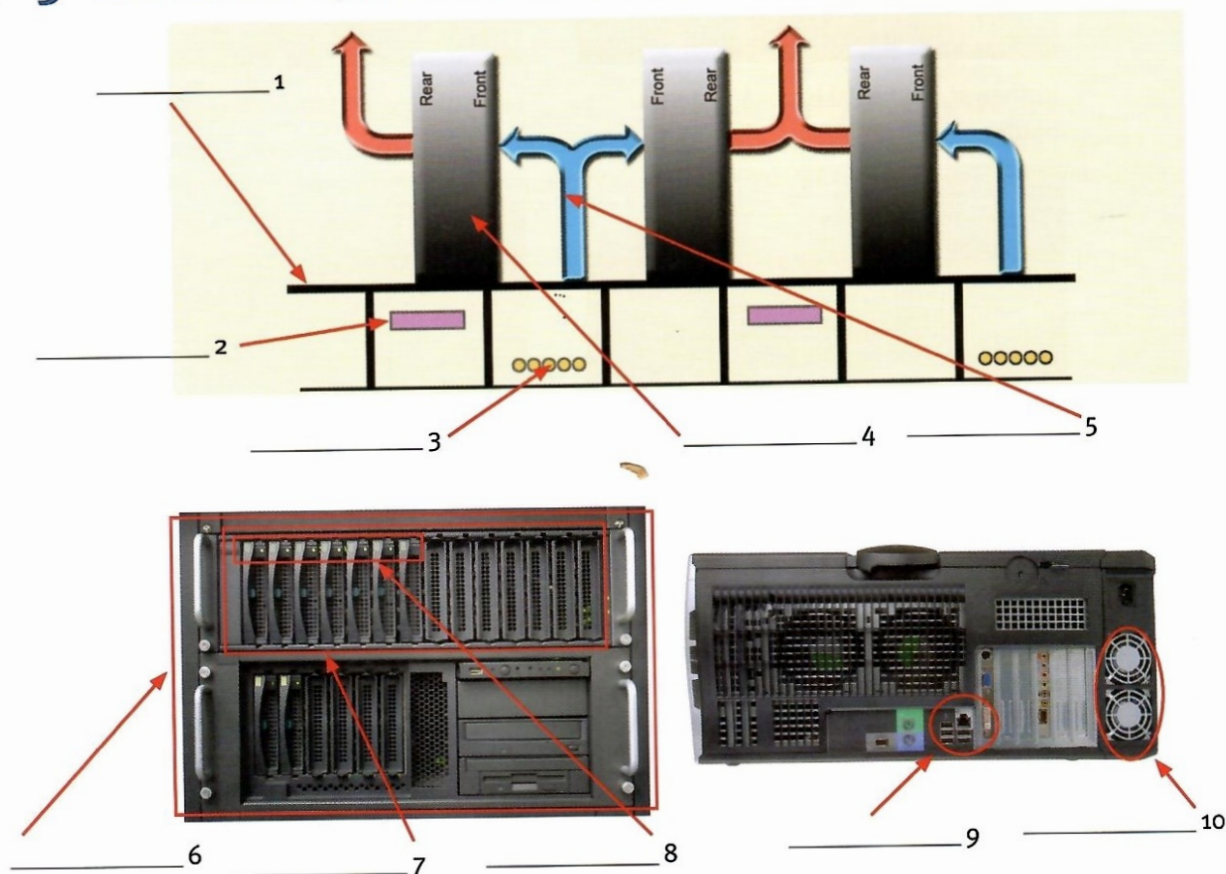
- 1 The data centre is in a German city.
- 2 The centre is closed for four days a year.
- 3 Security at the centre is extremely tight.
- 4 Senior managers do not need to follow all the security rules.
- 5 The data centre is connected to two different network POPs.
- 6 The centre always uses its own independent power supply.

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- 2 Listen to the talk again. Complete the notes about what Helmut says, adding at least two items for each section of the diagram. See the example.



- 3 Listen to the second part of the tour. Match the words in the box with items 1–10 in the diagrams.



19-inch rack • alarm LED • blades • telecom cable trays • cold aisle • cabinets
 • raised, perforated tiles • power cables • Ethernet port • fans

4 Match the words 1–11 from the listening with the definitions a–k.

- | | |
|----------------------------|---|
| 1 mission critical | a sections of a centre sealed off from other sections |
| 2 redundancy | b using physical characteristics (e.g. fingerprints) for ID |
| 3 downtime | c one weakness that could stop an entire system |
| 4 compartments | d time when the equipment is not functioning |
| 5 resilience | e duplication of equipment in case one part fails |
| 6 separacy | f extremely important |
| 7 network outages | g ability to withstand unexpected problems or setbacks |
| 8 power feeds | h lack of electricity |
| 9 power cuts | i sources of electricity |
| 10 single point of failure | j having different and unconnected cables to a network |
| 11 biometrics | k times when a network is not functioning |

Now work with a partner. Ask and answer questions using some of the words above.

- In your work, what sort of data is mission-critical?
- How important is redundancy for the protection of data?
- What elements do you think are important for the resilience of a Tier 4 data centre?
- How might a Tier 1 data centre differ from a more secure one?

5 Listen to the discussion Helmut and Rupert have after the tour. For questions 1–5, choose the correct alternative (A or B).

- Rupert says he:
 - is keen to start outsourcing as soon as possible.
 - has concerns about making such a big decision.
- Rupert wants to know:
 - what would happen if there was downtime during a trading period.
 - if it is possible to avoid downtime completely.
- Helmut tells Rupert that:
 - they have never had any management problems.
 - they have never had a comms outage.
- According to Helmut, a power outage:
 - would not cause any disruption.
 - could be fixed in a matter of minutes.
- The mirror site in Switzerland:
 - has a copy of all the data at the centre.
 - would warn the centre about an earthquake.

TALKING ABOUT IMAGINARY SITUATIONS

We often use the second conditional to talk about possible situations.

*If there **was** a comms outage, we **would switch** to the backup service.*

*If we **lost** power, our own back up power systems **would start**.*

We can also use other structures to talk about imaginary situations.

***In the event of** one of your servers going down ...*

***Supposing** there was an earthquake or you got hit by a plane, what would happen then?*

***Should** anything terrible **occur**, you would need to have standby communications links.*

***If that were to happen**, you would switch over to the hot standby site.*

6 Match scenarios in A with solutions in B to make second conditional sentences.

A Scenarios

- 1 If one power feed failed,
- 2 If both power feeds failed,
- 3 If anyone unauthorized tried to gain access,
- 4 If one telecoms service lost connectivity,
- 5 If the air conditioning went wrong,
- 6 If there was a problem with one of the servers,
- 7 If there was a complete catastrophe like an earthquake or a plane crash,

B Solutions

use / other network POP
 temperature alarm / go off
 isolate / change / straight away
 be stopped / security guards
 switch / mirror site / Switzerland
 use / other power feed / grid
 UPS system / generator

Now, work with a partner. Ask and answer questions about the scenarios.

Example:

A *What would happen if there was a long power outage?*

B *If we had a long power cut, we would use our own generators.*

7 Work with a partner. One of you is an IT manager looking for a secure data centre, the other is a representative of a data centre. Role play the meeting.



PARTNER FILES

Partner A File 6, p.76
 Partner B File 6, p.78

BANKING SECURITY

- 8** You are going to hear Jon, a bank security officer, answer some questions about his job. Before you listen try to complete the sentences about bank security.

spear • white-hat • worms • ping sweep • TCP/IP • certificates

- 1 A _____ hacker is a hacker who helps organizations protect themselves against criminal hackers.
- 2 A _____ is a process to check to see who is connected to a network.
- 3 _____ fingerprinting gives information about what operating system people are using.
- 4 128bit SSL _____ encrypt data.
- 5 Anti-virus software can protect against viruses and _____.
- 6 _____ phishing is a more targeted form of phishing.

Now listen to Jon and check your answers.

- 9** These were the questions that the interviewer asked Jon. Listen again and match the questions 1–6 to Jon's answers A–E on the CD. There is one question that was not asked.

- 1 What can people do to stay secure online? _____
- 2 Is there anything else that people should be aware of? _____
- 3 How do you go about that? _____
- 4 Is it safe to use credit cards online? _____
- 5 So, Jon, what sort of work do you do for the bank? _____
- 6 What's the difference between you and a normal hacker? _____

- 10** Read this short article about a computer infection.

Conficker has been in the news a lot recently. It is a _____¹, which unlike a virus does not need to be attached to an existing program to infect a machine, and which seems to receive regularly updated instructions from its controllers. It has created a _____² – a network of infected machines. Once infected, these machines are known as _____³. At this point no one knows what the purpose of Conficker is. At present it has infected ten million computers. These could be used for a _____⁴ attack where all the infected computers attempt to access one site simultaneously.

It is probably controlled by criminals who want to steal users' personal information, i.e. _____⁵. There are a number of ways of doing this: a _____⁶ records information entered via a keyboard, _____⁷ literally means harvesting users' information while they are online. We will probably soon see if Conficker consists of this type of passive monitoring _____⁸ or whether it will mount a more active attack once it receives a new set of instructions.

- 11** Work with a partner. Use the information in your Partner File to complete the text.

PARTNER FILES

Partner A File 7, p.76
Partner B File 7, p.78

INFORMATION SECURITY

12 Read the introduction to an email and answer the questions.

- 1 Who is this email from (i.e. an employee, IT specialist, customer etc)?
- 2 Who is the email to?
- 3 What is the basic problem being discussed?
- 4 What will the rest of the email be about?
- 5 What kind of ideas might be in the rest of the email?

From: Rupert Hills-Jones  To: All employees

Subject: Data Security

Dear All,

Unfortunately there have been several instances recently of data falling into the wrong hands. I have been a victim of ID theft and we have lost a few company laptops and memory sticks containing sensitive trading information. The following rules around data and data security are mandatory and failure to abide by these will result in disciplinary action up to and including dismissal. I am sorry for the stern tone but this is a very serious issue for us all.

13 Read the rest of the email from Rupert Wilson, CIO of London Investments. Some sentences have been removed from the email. Read the text and complete the gaps 1–6 with the sentences a–f below.

- a Ideally this should contain both letters and numbers.
- b Only company-provided and approved software may be used.
- c At the end of each day, ensure that your desks are clear and all documentation or storage devices are in locked drawers.
- d Do not leave them where they can be seen on the back seat of a car.
- e IT will be running a webcast on how to do this next Tuesday 25th.
- f Any documentation found lying around after the trading day will be destroyed. You have been warned.



Clear Your Desk
With immediate effect we will be running a Clear Desk Policy in the office.
_____ 1.

Shred
All unwanted printouts, photocopies, notes etc. must be put into the shredders that have been installed in each office. _____ 2.

Use Passwords
All systems must be accessed using a password. _____ 3. This password is secret to you and should not be shared with any other individuals.

Change Passwords

All passwords must now be changed on a monthly basis. If you think that your password has been compromised, call the IT Helpdesk immediately.

Don't Download

All laptops are to be scanned on a monthly basis by IT to check for spyware or malware. Under no circumstances should any programs be downloaded from the internet onto company laptops. _____ 4.

Emails

Do not open email attachments unless you know the originator of the mail personally and you are expecting an attachment of that type and name.

Keep Secure

All laptops taken out of the office either to clients' offices or to work from home must be kept secure at all times. _____ 5.

Memory Sticks

All memory sticks are now numbered. The IT Department will keep a list of memory sticks and who is responsible for them.

Encrypt

All data stored on memory sticks must be encrypted. _____ 6.

And on a personal note if anybody sees my wallet, could you please pop it into my office.
Regards
Rupert

Confidential. Internet communications are not secure and therefore London Investments does not accept legal responsibility for the contents of this message. This email and any attachments may be confidential. They may contain privileged information and are intended for the named addressee(s) only. They must not be distributed without our consent. If you are not the intended recipient please notify us immediately and delete the message and any attachments from your computer. Do not disclose, distribute or retain this email or any part of it. We believe but do not warrant this email and any attachments are virus free. You must therefore take full responsibility for virus checking.

14 Match the verbs in A with the words in B to make expressions from the email.

A

- 1 be
- 2 change
- 3 download
- 4 open
- 5 run
- 6 scan
- 7 shred

B

- an email attachment
- a document
- a program
- a victim
- a webcast
- a laptop
- a password

15 Now complete sentences 1–7 with the expressions from exercise 14. You may need to make changes to the verbs.

- 1 Why can it be dangerous to _____ if you don't know who sent it?
- 2 Why is it important to _____ like a bank statement that contains personal information, and not just throw it away?
- 3 How often should you _____ or a desktop for spyware and malware?
- 4 Why can it be harmful to _____ from the internet and run it on your computer?
- 5 Why is it a good idea to _____ regularly even if there's no evidence it has been compromised?
- 6 What are the advantages of _____ as opposed to having training seminars?
- 7 Have you ever _____ of ID fraud?

16 Work in pairs. Ask and answer questions 1–7 above.

GIVING INSTRUCTIONS

We often use the imperative to give instructions:

Ensure your desks are clear.

Use passwords.

Do not leave them where they can be seen.

We can also use a passive modal to give formal instructions.

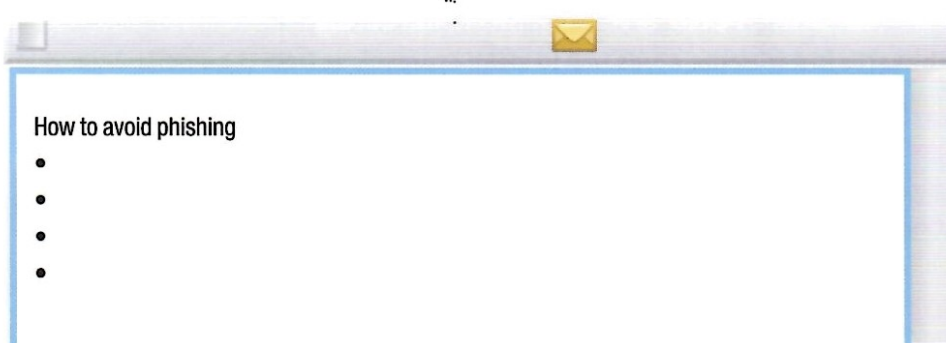
*Only company provided and approved software **may be used**.*

This password should not be shared with any other individuals.

*All laptops **must be kept** secure at all times.*

*Under no circumstances **should** any programs **be** downloaded.*

17 Use the language from the box above to write a short email to the members of staff of a company. Think of three or four bullet points under the heading. (*Phishing* is the fraudulent stealing of information about bank accounts, PIN numbers, passwords, etc).



How to avoid phishing

-
-
-
-

OUTPUT

Read the article about Telecoms and IT in finance and answer the questions below.

The Impact of Technology on Global Stock markets

The period of time between a trade being initiated and its completion is called latency – a key parameter for everyone involved in trading.

Before technology was introduced, the average number of daily trades at the London Stock Exchange was 20,000, amounting to about £700m worth of shares changing hands. After the introduction of automated trading, the figure went up to a daily average of 59,000 trades. This year saw nearly £18bn of transactions in one day.

'The speed and volume of trading is much, much higher these days,' said Sebastian Kolksmann who works for London Investments in Frankfurt. 'Transaction flows are faster driven by end investors, by electronic trading, algorithms, and lower latency.'

'Time is money as they say,' commented Bob Sherunkle, a New York Trader for London Investments. 'If our technology gets me information a nanosecond faster than everyone else, I may be able to sell a stock quickly, a split second before its price drops, or I may be able to buy another stock before its price starts to rise and it's more expensive for everyone else. That's why we need the fastest connectivity, the quickest processing, and the lowest latency out of our systems.'

So where do all these data transactions happen? Each exchange will have its own data centre that stores all the historic and current trading data with inputs, buy and sell requests, or market information, coming from all over the world. Trading companies are now

starting to host their own server equipment at the stock exchanges' data centres, providing sub-millisecond access to the trading systems and market data, thereby eliminating network latency.

For member firms that are connected to Stock Exchanges via 100 megabit IP connectivity, collocating their servers could reduce roundtrip trade execution and market data transmission times by another one and a half milliseconds. Typically transaction capacity at exchanges is around 20,000 continuous messages per second and end-to-end execution latency for a deal is from about six milliseconds to three milliseconds.

Watching all this going on in dealer rooms around the world are the traders, surrounded by numerous screens showing red and green numbers and banks of phones allowing them to receive instructions from their clients to buy and sell, and effect those requests using their computers or calling another trading house. Just one exchange such as London will have more than 100,000 screens connected directly or indirectly to its data centre and trading systems. Of course, some dealers may be really putting IP networking technology to good use and have the same data on their laptop screen, while they are sitting on a beach somewhere in the world, trading virtually.

- 1 What was the main effect of the introduction of automated trading?
- 2 Where are more and more trading companies now keeping their servers?
- 3 How many messages can typically be sent per second?

OVER TO YOU

- Do you think the technology mentioned in the article will mean the end of centralized stock exchanges such as London, Tokyo, and New York?
- What are the security risks of having so many sensitive transactions happening online?