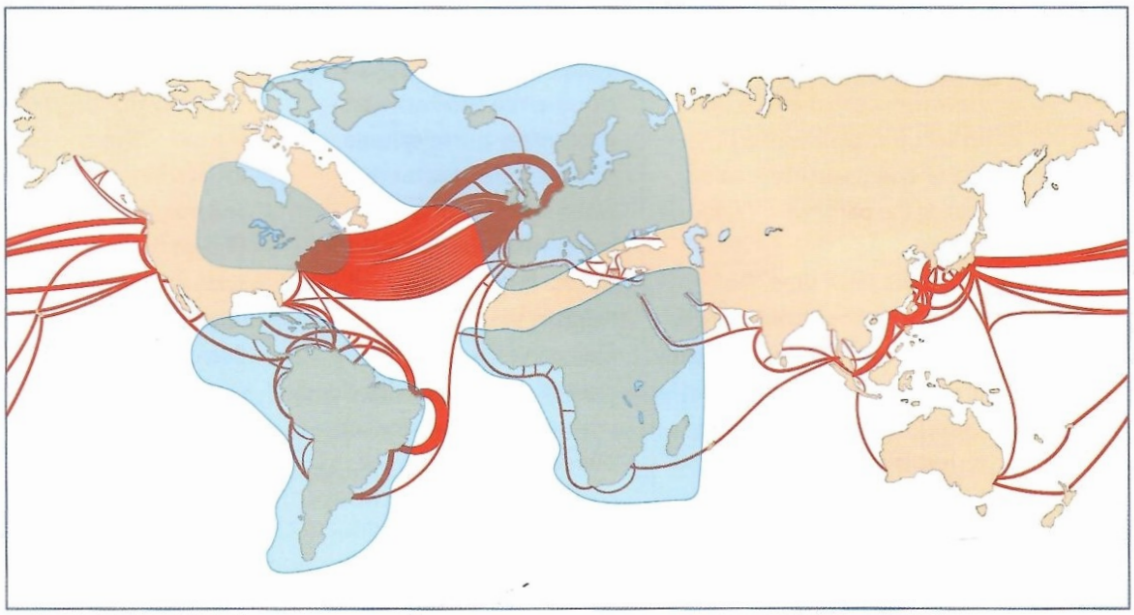
4 Networking

STARTER

Look at the map. What do you think the red lines represent? What do you think the blue shadows represent? Discuss your answers with a partner.



GLOBAL INFRASTRUCTURE

1 **You will hear a call between Dave Wells, the telecoms manager of an oil company in London and Jerry Rigg, a geophysicist in charge of a small exploration team in West Africa. They are discussing the infrastructure that is available and how they will set up a local exploration office and communicate regularly with London.**

These abbreviations appear in the extract you are about to hear. Think about how they are pronounced. Which one is the odd one out?

PTT MPLS PSTN VSAT DSL

TECH TUTORIAL

DSL = Digital Subscriber Line
Digital lines that are provided by telephone companies

PBX = Private Branch Exchange
A telephone system bought and used by a company in their office

PSTN = Public Switched Telephone Network
A country's telephone network

PTT = Public Telephone & Telegraph
A country's telephone network operator

VoIP = Voice over IP
Packetized voice over Internet

VSAT = Very Small Aperture Terminal
A small satellite dish normally mounted on the roof of a building

2 **Listen to the extract and look at the diagrams. Tick (✓) the infrastructure that has been completed and is available. Cross (✗) the infrastructure that is still being developed or is being planned.**

1 Submarine cable to Europe ☐

2 Intelsat connection ☐

3 Global Ethernet services ☐

4 National fibre backbone ☐

5 Digital switching equipment ☐

6 Fibre local loop ☐

3 **Listen to the extract again. Complete this email with the words in the box.**

infrastructure • capacity • local loop • redundant • data network • teledensity • lead times • global Ethernet

Hi,

I've had a talk with Jerry about the telecoms _____[1] that is available out there and it's still pretty basic. On the plus side, there's a high _____[2] fibre cable down the west coast and the country is connected via Intelsat 1, so there are _____[3] connections, so basic emails and phone calls will never be a problem even if one of them goes down.

However, at the moment there are no international _____[4] providers out there so _____[5] services are not available. They will be able to get a fixed line, but the _____[6] is just copper and _____[7] are very long because _____[8] is well below average.

Best, Dave

4 From your knowledge of telecoms note three things that Jerry can easily do and three things Jerry can't easily do with the existing infrastructure.

When you have finished compare your notes with your partner.

5 Match the two part verbs in Column A with the meanings in Column B.

A		B	
1	put in	a	consider, think about
2	phasing ... out	b	discovered
3	dug up	c	get information about
4	rolling out	d	finishing with
5	look at	e	happening
6	going on	f	implementing
7	figure out	g	install
8	found out	h	taken out of the ground

6 Complete the sentences with the two part verbs from exercise 5.

1 We've been travelling around trying to _____ _____ what telecoms infrastructure is available.
2 What we have _____ _____ is that West Africa is connected to Europe
3 Some of the international data network providers are starting to _____ _____ expanding their networks
4 To its credit, the PTT is _____ _____ a national fibre backbone.
5 They are _____ _____ the old electro-mechanical exchanges.
6 Digital switching equipment is being _____ _____ the new exchanges.
7 So there's a lot _____ _____ at a national level.
8 The problem with the copper pairs in the ground is that they get _____ _____.

Listen to the extract again and check your answers.

7 **Read this email from Mgumba to David Wells giving some information about the country's main telephone network. Complete the email with the words in the box.**

PSTN • digital • twisted copper pair • VoIP • electro-mechanical fibre • PTT • regional • PBXs • local

To: Dave Wells From: Mgumba Batswana

Subject: The PSTN & Voice Services, In Country

Dave

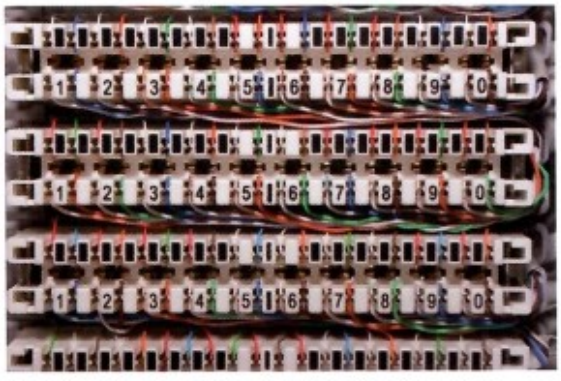
I've done some digging for you. The _____[1] was of course based on analogue technologies. Most of the equipment in the old exchanges was _____[2] but this started being phased out five years ago. Digital equipment was installed in all the _____[3] exchanges first and now 100% of intercity traffic is digital. Dialling codes exist for each city. There are still some _____[4] exchanges that are analogue but these are switching over to _____[5] at about one per month. The local loop/last mile is predominately _____[6] but fibre is available for large offices in city centres. Lead times are a minimum of 30 days for copper and 90 days for _____[7], if available. The _____[8] does install and maintain digital _____[9] for businesses. Their range can grow to about 500 extensions and two switchboards. I have only noticed one provider talking about _____[10] services.

Mgumba

8 **Make notes on the most important changes in the last few years that have affected:**

a your country's PSTN (Public Switched Telephone Network). Think about:
- equipment in local and regional exchanges.
- the rollout of fibre.
- broadband speeds.

b your own use of voice calls. Think about:
- your use of landlines.
- the price of calls.
- your use of mobile technology.
- your use of VoIP.



Compare your notes with your partner.

ENTERPRISE NETWORKING

9 Read this article from Big Oil's internal magazine about their experience in West Africa. As you read, number the order in which these things happened.

a The company set up a 100Mb Ethernet LAN. _____
b The team were given satellite phones. 1
c A contractor fitted out the office with CAT5 cabling. _____
d The company installed a private fibre loop to the new MPLS node. _____
e The company installed VoIP and teleconferencing applications. _____
f A global data networking provider extended WAN services to the capital. _____

When Big Oil started its search for oil in West Africa, their geophysicists carried out surveys to see whether there were any oil reservoirs underground. These surveys produced a lot of data which needed to be sent back to Head Office, but how do you transfer half a gigabyte of data out of the jungle when the local telecoms infrastructure isn't up to it, or not there at all? We talk to Dave Wells, Telecommunications Manager at Big Oil, about these challenges.

'The geophysicists who went out there first used sat-phones to transmit voice and data. But of course once the decision to drill was made, we had far more users to support with various requirements in a proper office environment.'

Big Oil's telecoms team is used to providing global voice and data connectivity into remote locations, says Dave. 'We worked with one of the global data networking providers to extend their WAN services here and convinced them to put an MPLS node into the capital. This meant they had a local presence and it allowed us to connect to their global network. We then had 8Mb connectivity from the router in my comms room in London down to the capital. We decided to pay to dig a trench and lay our own fibre local loop to give us reliable, high capacity bandwidth to our new premises.'

'A local contractor wired out the office with CAT5 cabling. We installed and remotely manage our own LAN hub and run a 100Mb Ethernet LAN around the building to laptops and PCs which have the same specifications and applications as London. We decided against a standalone PBX because we had a full 8Mb for voice, data and video traffic. We set up our 30 staff with VoIP and teleconferencing applications on their computers and they use headsets for their voice calls. This all works well, and from the traffic analysis we can see that they actually videoconference with London more often than just talk because of the infrastructure we put in for them.'

Despite being remote, the team on the ground now have the same capabilities as London, another example of how telecoms and IT can support businesses that operate in hard-to- reach places.

10 Read the text again. Say if the following statements are TRUE (T) or FALSE (F) according to the text.

1 The geophysicists did not find evidence of underground oil reservoirs. ☐
2 Dave Wells said the new office only needed satellite phones. ☐
3 A global networking provider opened a new facility in the capital. ☐
4 The exploration office installed its own local loop. ☐
5 The LAN in the exploration office is managed from London. ☐
6 The staff in the exploration office make all their calls via their computers. ☐

11 Read the text and find a word or phrase that means:

1 A person who is in charge of a company's telecommunications.
2 An organization that provides international telecommunications and internet access.
3 A network that covers a wide area such as a city or country.
4 A point where a connection can be made to an MPLS network.
5 A cable which allows a user to connect to a local exchange or node.
6 A network in an office or home that links different computers together.
7 A common connection point for devices in a local network.
8 A private telephone exchange that serves a business or office.

RELATIVE PRONOUNS

We can use the relative pronouns ***who, which, where, when,*** and ***that*** to describe and define.
We use *who* for people:
*The geophysicists **who** went out there first used sat phones.*

We use *which* for things:
*These surveys produced a lot of data **which** needed to be sent back.*

We can use *that* for people or things:
*Telecoms and IT can support businesses **that** operate in hard-to-reach places.*

We can use *where* to mean *in which, on which,* or *to which.*
*We looked for a building **where** we could set up an office.*

We can use *when* to refer to times, days, weeks, months, etc.
*We had several days **when** communication with London was very difficult.*

12 Complete these definition using *who, which, that, where,* or *when*.

1 A satellite phone is a kind of phone ...
2 A geophysicist is a scientist ...
3 CAT5 cabling is a kind of wire ...
4 A Telecommunications Manager is someone ...
5 An internet café is a place ...
6 A bank holiday is a day ...

13 Practise using these relative pronouns in a short game.

PARTNER FILES Partner A File 4, p.75 Partner B File 4, p.77

NETWORK MANAGEMENT

AUDIO 14

14 Listen to the telephone call between a Big Oil Network Operations Manager and a remote employee in the exploration office. They are trying to locate a network fault.

Complete the left-hand column of the trouble ticket with the words below in the right order. See the example.

Ethernet cable and port • IP address • LAN hub • network card • ping test • power • round trip delay • router • VPN

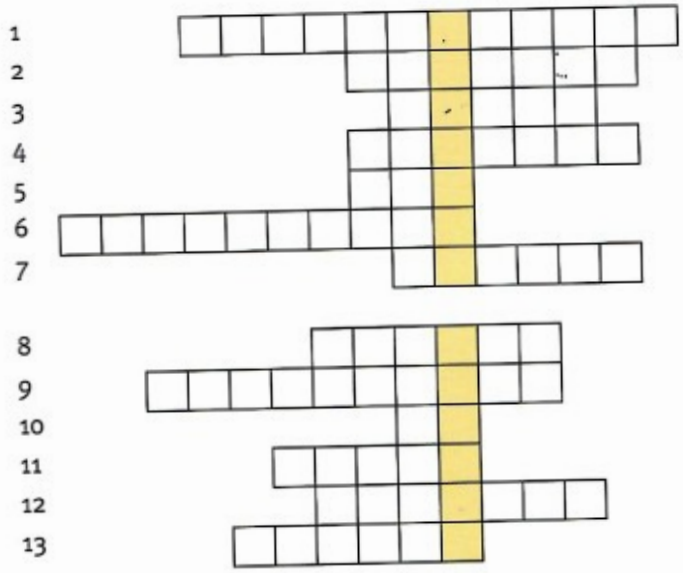
Big Oil Network Fault Management	**Trouble Ticket Number 2574**
User Name	Florence Knight
Contact Numbers	Office +219 1 356 5011 Mobile +219 7831 565889
Email Address	fknight@bigoil.com
Summary	User has lost voice and data connectivity to her PC this morning
1 *Power*	Yes / No
2	Connected / Unconnected
3	Functional / Non Functional
4	Tested / Untested
5	Visible / Invisible
6	Responding / Unresponsive
7	10.223.44.867*
8	Successful / Unsuccessful
9	Acceptable / Unacceptable
Trouble Ticket	Open / Closed

*In order to avoid using an IP address in use we have used a fictional IP address. Real IP addresses consist of four numbers ranging from 0 to 255 separated by dots.

15 Listen again and cross out the correct words in the right-hand column.

16 Complete the word puzzle to find the hidden expression. Listen to the extract again if necessary.

1 Florence tells Greg that she has lost voice and data _____.
2 Greg tell her that he will walk her _____ a series of tests.
3 First of all he asks her if there is _____ to the PC.
4 He asks her to check that the Ethernet cable is _____ in.
5 He doesn't bother to check the LAN _____.
6 It's clear that the LAN is _____.
7 Greg says that the VPN network _____ OK.
8 Greg can see the _____ on his network management application.
9 The problem is that the network card is not _____.
10 Greg asks her to reboot her _____.
11 Greg says he will _____ her network card with a ping test.
12 Greg carries out a round trip delay test to check that _____ is acceptable.
13 At the end of the conversation, Greg closes the _____.



17 Work with a partner. Role play two calls to sort out technical problems.

PARTNER FILES Partner A File 5, p.76 Partner B File 5, p.78

OUTPUT

Read the article about networking developing countries and answer the questions below.

As developing countries seek to upgrade their telecoms networks, they are faced with difficult choices.

On the one hand, they have the advantage of being able to forget about rolling out national fixed line networks. In some countries, teledensity is as low as 4%, so expanding a wired network to cover an entire population is far too expensive. The result is that they can bypass an old technology and move straight to a national wireless network to provide broadband and voice (VoIP) services.

On the other hand, there is a difficult choice to make – Wi-Max or 3G?

In many developing countries, Wi-Max (Worldwide interoperability for Microwave Access) has already made a huge impact. It delivers high-speed access wirelessly, enabling fixed and mobile broadband services over large coverage areas. It is an IP-based system and comes in two versions, fixed and mobile. Fixed Wi-Max is suited for delivering wireless last mile access for fixed broadband services, similar to DSL. Mobile Wi-Max supports both fixed and mobile applications with improved performance and capacity while adding full mobility. In India, Tata has launched what it says will be the world's biggest Wi-Max network, with a projected cost of $600 million.

In the other corner is 3G (and coming soon, 4G and LTE), a well-established wireless network in developed countries. 3G has evolved from the voice-centric telecoms world, but is able to deliver not just voice but high-speed broadband access as well. The last ten years have seen the growth of huge networks in the developed world, and emerging nations are catching up rapidly. China is investing billions of dollars in rolling out a nationwide 3G network that will reach 70% of the population, and the Asia Pacific region expects to have over 500 million 3G subscribers in the next few years.

In the longer term, we are already starting to see the convergence of Wi-Max and 3G. While Wi-Max has broadened to become more mobile and capable of being used for media services, 3G cellular has become increasingly broadband, resulting in practical convergence between these fields of development. What's more, both are driven to use the same core sets of technologies.

At the moment, developing countries still have to make a choice between the two systems, and are faced with the familiar Betamax vs VHS or BluRay vs HD decision. But if the two technologies can co-operate rather than compete, then the future of broadband and voice services in developing countries will look a lot brighter.

1 Why are some developing countries *not* developing their wired networks?
2 What suggests that Wi-Max and 3G are equally suitable for developing countries?
3 According to the text, what will happen to Wi-Max and 3G in the future?

OVER TO YOU

- What wireless technologies are being used in your country?
- What are the limits to wireless technology when compared to fixed line?
- Can you see the world becoming entirely wireless in the future?