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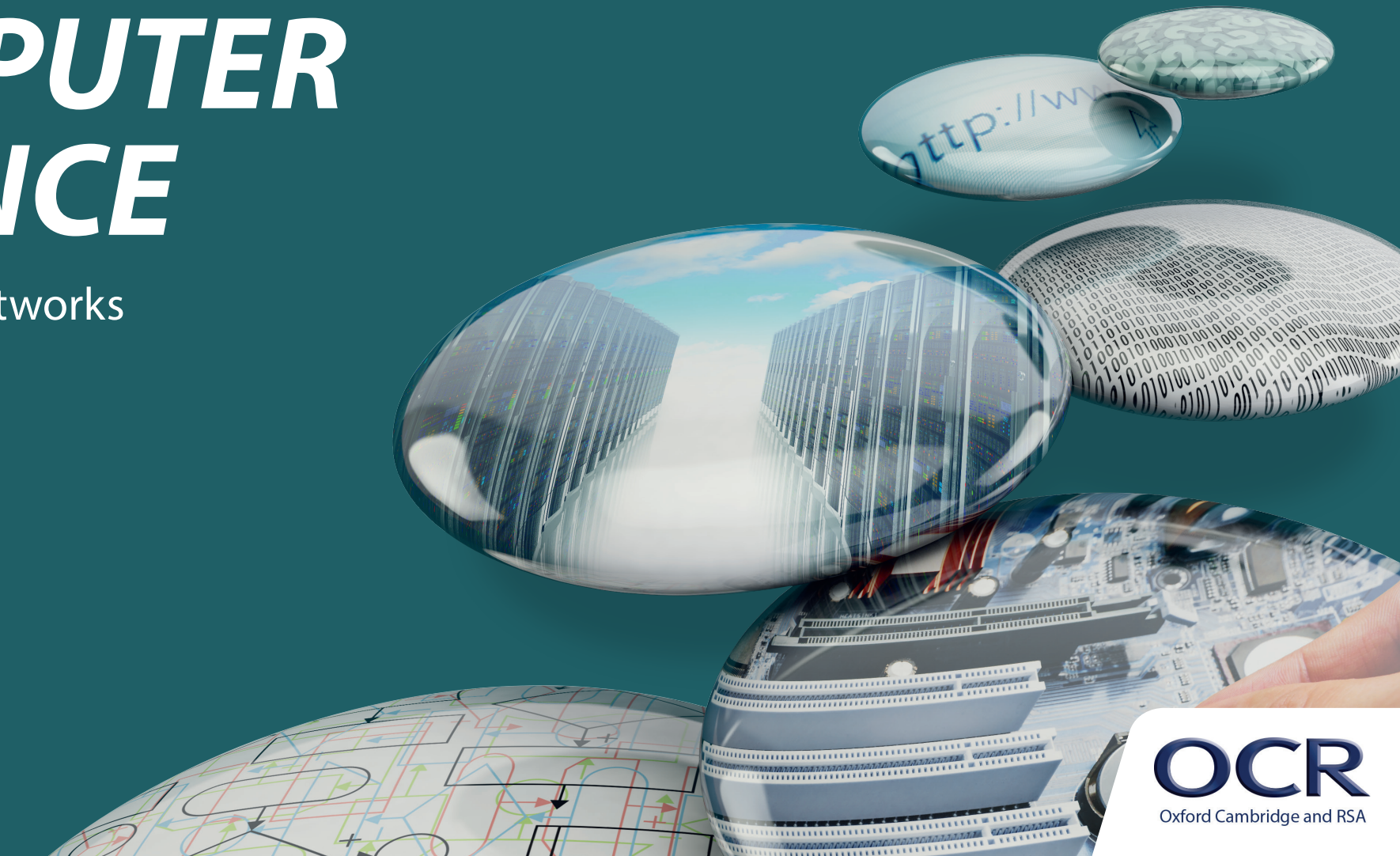
A LEVEL
Delivery Guide

H446

COMPUTER SCIENCE

Theme: 1.3.3 Networks

December 2016



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CB1 2EU

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Introduction

Delivery guides are designed to represent a body of knowledge about teaching a particular topic and contain:

- Content: a clear outline of the content covered by the delivery guide;
- Thinking Conceptually: expert guidance on the key concepts involved, common difficulties students may have, approaches to teaching that can help students understand these concepts and how this topic links conceptually to other areas of the subject;
- Thinking Contextually: a range of suggested teaching activities using a variety of themes so that different activities can be selected that best suit particular classes, learning styles or teaching approaches.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resources.feedback@ocr.org.uk.

KEY

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AS Level only — AS Level content only

Curriculum Content

a) Characteristics of networks and the importance of protocols and standards.

b) The internet structure:

- The TCP/IP Stack
- DNS
- Protocol layering
- LANs and WANs
- Packet and circuit switching.

c) Network security and threats, use of firewalls, proxies and encryption.

d) Network hardware.

e) Client-server and peer to peer.

Thinking Conceptually

Approaches to teaching the content

This topic is quite straightforward to teach. It can be taught relatively simply by going through the contents and teaching how network systems support data exchange and the pros and cons of different types of network, for example. However, if time and experience allows, you may choose to set up a network with your students. It would also be beneficial to have actual network hardware to show students.

It is best to cover networks in one standalone section since the topic does not really border too much on other parts of the specification.

For network security, it is always a good idea to choose an issue that has been in the news recently. Get students to research other similar famous stories and find out how security issues could have been prevented, in order to give them some idea of the realities surrounding these issues.

If the explanations of all the terminology surrounding networks are not clear to students, it can be quite easy for them to get confused. As long as the explanations are clear you do not run the risk of students getting bogged down in the details, which it is not necessary at this level.

There is freedom to teach a few concepts in depth or allow scope for lots of research but in less detail. It is left to your professional judgment.

Common misconceptions or difficulties students may have

There are quite a few acronyms in this topic that students may not have encountered before. A student glossary is an excellent idea; students can add terms that are unfamiliar to them and define them in their own words.

Conceptual links to other areas of the specification – useful ways to approach this topic to set students up for topics later in the course

Networks can quite easily be taught as a standalone part of the specification, but could be taught alongside 1.3.4 which is about web technologies and includes discussion of server and client-side processing.

Some of the network security topics would also lend themselves to 1.5 Legal, Moral and Ethical Issues which covers the Computer Misuse Act, which would come into play here, as well as 1.5.2 Moral and Ethical Issues.

Thinking Contextually

Activities	Resources
Features of computer networks (Teach ICT) http://www.teach-ict.com/gcse_computing/ocr/215_communications_networking/networks/miniweb/index.php This link provides you with access to the first three pages of this resource; a subscription is required for access to the full resource. This activity is provided as a suggestion for teachers only, but you may wish to use the resource if you already have a subscription to teach-ict.com. Covers networking (LAN and WAN). A concise account that does not go into too much detail.	Click here
Features of computer network topologies (Teach ICT) http://www.teach-ict.com/gcse_computing/ocr/215_communications_networking/network_topologies/theory_network_topologies.html Covers network topologies. A concise account without too much detail.	Click here
The internet (BBC Bitesize) http://www.bbc.co.uk/education/guides/zp9jpv4/revision/1 Covers how the internet works including protocols. Nice diagrams and a test.	Click here
Features of network addressing (Teach ICT) http://www.teach-ict.com/gcse_computing/ocr/215_communications_networking/addressing_protocols/miniweb/index.php This link provides you with access to the first three pages of this resource; a subscription is required for access to the full resource. This activity is provided as a suggestion for teachers only, but you may wish to use the resource if you already have a subscription to teach-ict.com. Covers IP addressing, MAC addressing and protocols. A concise account without too much detail.	Click here
TCP/IP – an animated discussion (YouTube video) https://www.youtube.com/watch?v=RbY8Hb6abbg An animated discussion about how data is moved around on the internet. Topics include TCP/IP, Routing Information Protocol (RIP), Open Shortest Path First Protocol (OSPF), Border Gateway Protocol (BGP), Backbones, Autonomous Systems, Interior Gateway Protocols, Exterior Gateway Protocols, Hiding.	Click here

Thinking Contextually

Activities	Resources
Security (BBC Bitesize) http://www.bbc.co.uk/education/guides/zs87sbk/revision Covers viruses, encryption and acceptable use.	Click here
Network hardware (BBC Bitesize) http://www.bbc.co.uk/education/guides/zh4whyc/revision Covers LANs and WANs, topologies, wired and wireless connections, networking hardware, client-server, P2P, types of server.	Click here
Network hardware (Teach ICT) http://www.teach-ict.com/gcse_computing/ocr/215_communications_networking/network_hardware/miniweb/index.php This link provides you with access to the first three pages of this resource; a subscription is required for access to the full resource. This activity is provided as a suggestion for teachers only, but you may wish to use the resource if you already have a subscription to teach-ict.com. Covers network hardware. A concise account without too much detail.	Click here
Client server (Teach ICT) http://www.teach-ict.com/gcse_computing/ocr/215_communications_networking/client_server_peer/miniweb/index.php This link provides you with access to the first three pages of this resource; a subscription is required for access to the full resource. This activity is provided as a suggestion for teachers only, but you may wish to use the resource if you already have a subscription to teach-ict.com. Covers client-server and P2P networks. A concise account without too much detail.	Click here
Activity – Public key encryption (CSUnplugged) http://csunplugged.org/public-key-encryption Activity regarding encryption using maps.	Click here

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