

# iBYTES

## What is Cloud computing?

### Welcome to iBYTES – a free and exclusive teaching resource from OCR

For teachers and students of GCSE ICT and GCSE Computing, *iBYTES* provides interesting and topical content to enrich learning, both in and out of the classroom.

Issue 7

- What is cloud computing?
- So how does the 'cloud' really work
- The family with their heads in the clouds
- The technical stuff
- Teacher's guide specification criteria map
- Cambridge Technicals in IT
- Turning teachers into tech entrepreneurs

# What is cloud computing?

Cloud computing is as simple as storing our data – photographs, music, files we create on our computer – online instead of on our own hard drive. To the everyday user of cloud computing, one of the biggest advantages is that we can access our files wherever we are... as long as we have an internet connection and a device that we can view and edit them on.

Many of us already use cloud computing as an alternative to transferring files by memory stick or portable hard drive. If you use applications such as Dropbox, Apple's iCloud or Microsoft's Sky Drive on your computer or mobile device, then this is cloud computing. It lets you store music, photos, files, contacts, etc and automatically shares them across devices you are connected to.

We might also store photographs in the cloud, on websites such as Snapfish and Photobox, which we can share with friends and family or have printed.

Also, it's now possible to download and play games on our TVs, computers or mobile devices from the cloud, rather than having to buy and load an optical disc.

Most of us probably use the cloud for our email accounts – if we use webmail rather than an email application, eg for Gmail, Yahoo Mail or Hotmail, then we are using the cloud to store our emails rather than downloading them onto our computers. This means we can also access them on our smartphone or tablet.

When we use our favourite social networking sites, we are storing our messages, status and photos in the cloud.

Nowadays you can buy a home computer built especially for cloud computing – for example, Google Chrome laptops have smaller local drives (eg 32GB) than other computers but come with a large amount of cloud storage, as it is intended that the user will store most documents in the cloud.

Some businesses are moving over to the cloud, storing not only data away from their local drives but also accessing the software they use from the cloud. To do this, the computer just needs some interface software to access the application software in the cloud.



What is cloud computing?

So how does the 'cloud' really work

The family with their heads in the clouds

The technical stuff

Teacher's guide  
specification criteria map

Cambridge Technicals in IT

Turning teachers into  
tech entrepreneurs

## So how does 'the cloud' really work?

Of course, we aren't really storing our data in clouds without any physical storage means, it just seems that way when we access our files that we haven't saved onto our hard drive or memory sticks. The 'back end' of a cloud computing system is computers and servers that store our data and administer the service we subscribe to and this includes backing up all our data so that if the server holding our data breaks down there is still a copy of it that we can access.

## What drawbacks might there be to cloud computing?

- Businesses might be worried about security of data, as they are no longer 'in charge' of storing their own files
- Privacy of data could be a problem, as users are accessing their data from many locations and devices, so usernames and passwords are essential and other authentication methods may be needed
- It's unclear who actually owns the data – is it the company that owns the servers where the data is stored or is it the company that created the files?
- Web-based software applications don't yet have all the functionality of desktop software
- If we don't have internet access then we can't update our files.

## What are the benefits to a business of using cloud computing?

- Access to files and data anywhere at any time.
- Reduced hardware costs as less processing power is needed and less hard drive space to store files
- No need to buy software licenses for every employee, they could pay for as much as they need from the cloud company
- Space to store servers is not needed as the servers will be at the cloud company's site.





## The family with their heads in the clouds

**Ellie** is in Year 9 at school. Her teachers use an educational social networking site to post class worksheets on and to collect homework for marking. They also set short quizzes on this site to test end of topic understanding. Ellie has a Physics assignment to do which she will 'hand in' via the website; her teacher, Mr Gupta, will mark the work and give written feedback on the website, which only Ellie will be able to see, along with her grade, when it has been marked.

Ellie also has an ICT test to revise for. She and her classmates will take the test online, using the website, and the ICT teacher will view the results of the test immediately after each student has submitted their test. The teacher can then store these grades in an online markbook



to track each student's progress throughout the year. These marks can be accessed wherever the teacher is, which means that when writing reports from home or meeting parents at a parents' evening, the teacher has all the necessary information at his fingertips.

**Mr Gupta** particularly likes the paperless classroom that this system creates – his students have no need to print off their work and hand it in, they can submit it in electronic form and receive their grade and feedback online.

Ellie likes this method of working because she gets immediate feedback from tests and homework – she doesn't need to wait for the next lesson for homework or test results to be given back by the teacher. She can also hand in her work from home as soon as she has finished it, without having to bring a hard copy in. This means that she is less likely to forget to hand in work and so get in trouble! Ellie can look back at comments on a piece of work wherever she is, without needing her books with her and she can use the website to communicate with her teachers and classmates, so if she doesn't understand something she can ask for help even if she isn't in the lesson. Her teachers can upload revision resources and links to other websites to help the students revise for tests or carry out research for assignments. Mr Gupta has created a number of revision resources for his class, such as online flashcards and mind maps. Ellie can access these via an app on her smart phone, so she can revise for a test wherever she is.

The advantages to Ellie's teachers of using this method of working is that assignments can be posted at any time, from home or school, and scheduled to appear at a specified time, so if a teacher has a planned absence from school they can set work in advance for a class to access. Marks can be stored automatically in a mark book, without the need for entering them manually. Assignments and tests can be stored online and re-used for future classes. If a student has a long term absence from school, then work can be accessed and carried out at home by that student, so they don't fall behind in their work.

... continued



What is cloud computing?

So how does the 'cloud' really work

The family with their heads in the clouds

The technical stuff

Teacher's guide specification criteria map

Cambridge Technicals in IT

Turning teachers into tech entrepreneurs



What is cloud computing?

So how does the 'cloud' really work

The family with their heads in the clouds

The technical stuff

Teacher's guide specification criteria map

Cambridge Technicals in IT

Turning teachers into tech entrepreneurs



**George**, Ellie's father, works for a local company. The company has recently decided to move over to using the cloud to store their files, rather than storing them on the local drives of their computers. As George travels around the country for his job, he often needs to access work files and emails when he is away from the office. The company has provided each of its employees with a laptop, which has interface software installed so that the employees can access the servers that store their files. So, when George is travelling on a train or staying in a hotel, he can access all of the files he needs to, by linking to the wifi system on the train or in the hotel where he is staying. He can also access all of his emails in this way, so he can keep in touch with his manager.

The advantages to George are that he doesn't have to travel to the office whenever he needs to access a file and there is less of a security risk than if he used a memory stick to carry files around with him, which might get lost or left on a train. Even when he is away from the office for several days at a time, George can still be in close contact with the company and know what's happening, so he won't feel isolated from developments happening whilst he is away.

The advantages to the company are that it doesn't need to spend as much money buying high specification laptops and computers for its employees, as the work is stored on servers that belong to the cloud company. Also, if employees, like George, have access to their files wherever they are then they should get a more efficient workforce.

**Ruth**, Ellie's mother, is a teacher at the local primary school. She spends a lot of time in the evenings creating teaching resources for her class, using everyday software applications such as slideshow software and word processing software. She needs to be able to access these at school the next day to either print out or show on the whiteboard in her classroom using a digital projector. Ruth uses Dropbox to save these files to at home and she can then access them the next day from her classroom computer – when she switches the computer on in the morning the files will automatically be synchronised to that computer, which also has the Dropbox application loaded onto it.

The advantages to Ruth of using Dropbox are that she doesn't have to stay late at school every night to create resources on her classroom computer, she can fit this work in around her family in the evenings and weekends. She can also store the resources she creates and they will be there for future years and she can even set up a shared folder within her Dropbox folder and invite another teacher of a parallel class to share the resources that she has created. Ruth can also use this as a backup of important files, saving them on her computer's hard drive at home and also in Dropbox. Best of all for Ruth, as the files she creates are mostly of a small size, the amount of space she needs from Dropbox is free which means she doesn't need to pay to subscribe to this service.



# Dropbox

... continued



Ruth's family lives in a different part of the country from their grandparents and cousins, so they use photo sites and social networking to keep in touch and to share photographs of the family. They upload their photographs to Flickr, often via a smart phone that was also used to take the photograph, and invite family to share these photographs. The photographs don't need to be printed and posted

but if Ellie's grandparents want to print a photograph of her, they can choose which one and even edit it before printing it. When the family organises get-togethers at Christmas and for other occasions, they often use Facebook to post information about dates and whose house they're going to meet at. This means that all the family members can see the posts and join in the arrangements together.

What is cloud computing?

So how does the 'cloud' really work

The family with their heads in the clouds

The technical stuff

Teacher's guide specification criteria map

Cambridge Technicals in IT

Turning teachers into tech entrepreneurs



What is cloud computing?

So how does the 'cloud' really work

The family with their heads in the clouds

The technical stuff

Teacher's guide specification criteria map

Cambridge Technicals in IT

Turning teachers into tech entrepreneurs



## The technical stuff

There are three main types of cloud computing services available. Below is a brief description of these services:



IBM: What is cloud computing

### Software as a Service (SaaS)

Cloud-based software applications are run on remote computers owned and maintained by a cloud company. The Internet and usually a web browser are used to connect the user's computer or mobile device to the cloud computer.

Google's gmail is an example of a cloud-based SaaS application.

Benefits to a user of SaaS applications:

- No software to purchase, install, or maintain - this is done by the cloud company
- It can be used immediately after signing up
- Apps can be used on any computer or mobile device and data is accessible on any device connected to the internet
- Data is not lost if your computer or smart phone breaks as it isn't stored on your own physical device.

### Platform as a Service (PaaS)

This provides a cloud-based environment used by software developers and web developers. The cloud company provides the hardware (network, servers, storage) and tools to help in building applications, so the user can create and control software and software settings without the expense of buying the necessary hardware and software. Applications can be developed, deployed to the cloud and marketed quickly.

### Infrastructure as a Service (IaaS)

This type of cloud computing provides companies with resources on a pay-per-use rental basis. So a company only pays for the servers and storage space that it actually uses.

Advantages of an IaaS:

- Demand can be quickly scaled up or down, according to current needs
- Costs are related to actual usage.



## Teacher's guide

Specification criteria map for GCSE ICT J461  
and J061:

|   | Content Specification | Page number in specification |   |
|---|-----------------------|------------------------------|---|
| ICT systems   | 2.1.1                 | 6                            | ▶ |
| Exchanging information  | 2.1.2                 | 7                            | ▶ |
| Keeping data safe and secure  | 2.1.5                 | 9                            | ▶ |
| ICT and modern living   | 2.1.9                 | 10                           | ▶ |
| ICT systems   | 2.3.1                 | 13                           | ▶ |
| Exchanging information  | 2.3.5                 | 14                           | ▶ |
| Legal, social, ethical and environmental issues when using ICT within context | 2.3.8                 | 15                           | ▶ |

What is cloud computing?

So how does the 'cloud' really work

The family with their heads in the clouds

The technical stuff

Teacher's guide specification criteria map

Cambridge Technicals in IT

Turning teachers into tech entrepreneurs







## Cambridge Technicals in IT

The Level 2/Level 3 Cambridge Technicals in IT are going from strength to strength with centres welcoming the opportunity to use a wider range of assessment methods, as well as selecting activities that suit their particular learners. Many centres are considering 'The Project Approach' and identifying units which can link together. This allows learners to present evidence that meets the requirements of a number of different units. An example of this can be seen in the online resource under the heading of 'Support materials' for the Level 3 Cambridge Technical in IT on the **OCR website**.

Consider Unit 31 – 'Digital graphics for interactive media' and Unit 17 – 'Interactive media authoring'. For Unit 17, learners are required to generate outline ideas for an interactive media product and produce annotated design documentation. For Unit 31, learners are required to generate outline ideas for digital graphics for an interactive media product and provide a detailed plan of ideas generated for digital graphics. The evidence from Unit 31 will support the evidence for Unit 17. For the actual creation of the designs, for Unit 17, learners are required to create an interactive media product following industry practice, working within appropriate conventions. For Unit 31, they are required to create digital graphics for an interactive media product following industry practice, working within appropriate conventions. Again, you can see how the evidence for Unit 31 will support the evidence required for Unit 17.

Another aspect of the qualification that is proving popular is that the evidence can be presented electronically. Centres are actively encouraged to present electronic evidence, especially when learners have been recorded giving presentations or have created animations, games, websites, spreadsheets and/or databases. There is no requirement to produce numerous screenshots of how something was developed unless the assessment guide at the end of the unit specification specifically requests it. All the moderators ask is that the audio recordings can be clearly heard and that if the created product has been moved to another system, that it is accessible and still works as originally designed.

If you are currently involved with the Cambridge Technicals in IT or are considering implementing it from September 2013, then find out about our new programme of events during 2013/14 by regularly checking OCR Eventbooker. Also, there is an online training session which provides an overview of the structure of the qualification, calculation of grades and how to interpret the unit specifications available on the OCR Professional Development Programme website. You will need to register to access these free online resources.



**OCR Eventbooker**



**OCR Professional Development Programme**



**What is cloud computing?**

**So how does the 'cloud' really work**

**The family with their heads in the clouds**

**The technical stuff**

**Teacher's guide specification criteria map**

**Cambridge Technicals in IT**

**Turning teachers into tech entrepreneurs**

## Turning teachers into tech entrepreneurs

OCR is launching a new initiative to help teachers design and create innovative educational technology for use in the classroom.

**A series of regional events starting this September, followed by intensive residential technology 'pre-incubator' camps will, for the first time, give teachers the chance to develop new educational technology for themselves to help improve teaching and learning, and potentially make money for their schools.**

In partnership with Invent-ed.com, a company run by education entrepreneur Richard Taylor of MediaTaylor Ltd, OCR will run a programme of events from September 2013 to help schools and teachers understand and benefit from the dynamic world of educational technology (edtech). Along the way, teachers will be supported and challenged by experts from the world of technology.

Until now, there have been very few programmes which work directly with a range of schools to identify edtech ideas and support their development into successful businesses. OCR wants to encourage teachers to tap into their own valuable skills and hard-won expertise in the classroom to identify gaps in the edtech market, and, according to Mark Dawe, OCR Chief Executive, "to be active, not passive consumers of edtech".

Following the successful example of the Startup Weekend Education London event in January, OCR's initiative kicks off this Autumn with ten events around the UK to help teachers to understand the major edtech trends and begin to develop their own ideas. Following the ten regional events, there will be two 'edtech pre-incubator camps' held within Cambridge University, where the best ideas identified by teachers at the regional events will be challenged by a panel of edtech entrepreneurs, educationalists and OCR staff.

OCR's Mark Dawe said: "Education is about more than just exams, and improving education for teachers and learners is at the heart of what we are trying to do. As a not-for-profit organisation, we want to support schools to identify new ways of working. Encouraging them to be active, not passive consumers of educational technology, is just that. This also complements our campaign to help schools engage with Computing, to help them understand how to make computers work, not just use IT programmes designed by others."

Richard Taylor said: "UK has been a leader in technology for decades. We are on the third computer revolution in schools now and this is a great time for teachers to be encouraged to think differently about edtech, especially with ideas they think could help improve learning in their classrooms and potentially translate into income for their schools in the future. An outstanding example of what can be achieved is TTS Online, an early edtech product developed by Thomas Telford School, and I think their success is an example that could potentially be replicated by more schools around the country."



What is cloud computing?



So how does the 'cloud' really work



The family with their heads in the clouds



The technical stuff



Teacher's guide specification criteria map



Cambridge Technicals in IT



Turning teachers into tech entrepreneurs



# Do you have a **passion** for Information Technology?

Do you have a passion for a technological area? Do you have a lot of knowledge of this area? Do you think that you could write an **iBytes** document using that knowledge?

We are on the lookout for imaginative and dynamic teachers to write **iBytes** documents. They should be informative, exciting to read and centred around a recent technological development. They should also strongly and visibly link to our **GCSE in ICT** or **GCSE in Computing** specifications.

If you feel that you could contribute an **iBytes** document, please email Julian Parkin on [julian.parkin@ocr.org.uk](mailto:julian.parkin@ocr.org.uk)

To give us feedback on, or ideas about the OCR resources you have used, email [resourcesfeedback@ocr.org.uk](mailto:resourcesfeedback@ocr.org.uk)

## OCR Resources: the small print

OCR's resources are provided to support the teaching of OCR specifications, but in no way constitute an endorsed teaching method that is required by the Board and the decision to use them lies with the individual teacher. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources.

© OCR 2013 - This resource may be freely copied and distributed, as long as the OCR logo and this message remain intact and OCR is acknowledged as the originator of this work.

OCR acknowledges the use of the following content:

Cover cloud: Maksym Darakchi/Shutterstock.com • Page 2 Cloud upload: Bagiuiani/Shutterstock.com • Page 3 Woman in the clouds: Andresr/Shutterstock.com • Page 4 Teenage girl on phone (modified): dotshock/Shutterstock.com • Page 5 Man on train: Peter Bernik/Shutterstock.com • Page 6 Cloud servers: Oleksiy Mark/Shutterstock.com • Page 7 Cloud image: bannosuke/Shutterstock.com • Page 8 Background (modified): echo3005/Shutterstock.com

[www.ocr.org.uk](http://www.ocr.org.uk)

OCR customer contact centre

## General qualifications

Telephone 01223 553998

Facsimile 01223 552627

Email [general.qualifications@ocr.org.uk](mailto:general.qualifications@ocr.org.uk)

*For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored.*

© OCR 2013 Oxford Cambridge and RSA Examinations is a Company Limited by Guarantee. Registered in England.

Registered office 1 Hills Road, Cambridge CB1 2EU. Registered company number 3484466. OCR is an exempt charity.

