

Introduction

When computer people use the term **'platform'** they are referring to the system of **hardware** and/or **software** on which the user's **application** can run. In addition the term is often used to describe the phases through which the IT industry has evolved. Looking back on the fairly short history of computing it is possible to identify changes in the way services have been offered to users. In other words, we can identify a move from one platform structure to another. Up to now, this has happened twice and, consequently, we are now well on the way into the era of the **3rd Platform**.

What is the 3rd Platform?

The first computer services were delivered from large centralised computers called **mainframes**. Users had a terminal connected to the mainframe. These users were specialists working in large organisations or universities. Most office workers and members of the general public did not have access to a terminal. This phase is now called the **1st Platform**.

The advent of the **personal computer (PC)**, around the mid 1980s, was a dramatic change. This gave rise to the **client-server** approach in which organisations can keep files on computers called **servers** and people can access them from PCs called **clients**. This is called the **2nd Platform** and is still very common at the present time.

However, in the last few years there have been several technological developments that are changing the way that IT services are being delivered and used. These are:

- The delivery of services from the **cloud**
- The explosion in the number of **mobile devices**
- The similar growth in the use of **social networks**
- The huge increase in the quantity of data to be managed — in other words the advent of **big data**.

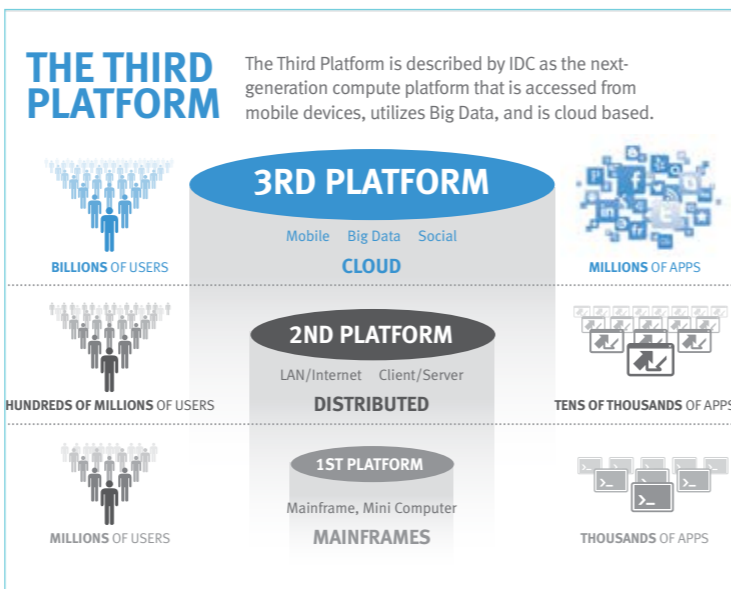
It is the influence of these factors that is giving rise to what is now being called the **3rd Platform**.

The Cloud

If you have a PC, laptop or tablet there are probably some applications such as a **word processor** installed in it. Millions of other users have the same programmes on their PCs. However, users can now access the same programmes from the **internet** and the documents they create can also be stored on the internet. This arrangement is called **cloud computing**. These services are known as **Platform as a Service (PaaS)** and **Software as a Service (SaaS)**.

Mobiles

We still call it a mobile phone, but it's really a small computer that can also handle phone calls. Many people now use their **smart phone** for everything — email, booking tickets, shopping, searching, playing games, social networking and so on. The growth in the number of mobiles has been phenomenal. It is estimated that there are some 4.5 billion users in the world today. A short time ago there was no such thing as a **mobile app**. While you are reading this there are probably thousands of developers working on new apps.



Social networks

Social networks are **web** based services that allow people who share interests to communicate with each other. A user can post a **personal profile**, photos and videos and contribute to **chat rooms** and **blogs**. Most of us already know these facts because the use of social networks such as Facebook has become almost universal over the last few years, especially among young people. The ability of users to access these services from their mobiles has driven the huge growth of these social network services. Some of these services cater for people with a common interest such as guitar music or photography. Such dedicated groups of users are commonly referred to as **on-line communities**.

Big data

It is often assumed that organisations do not have enough **information** to make the right decisions about product development or marketing. However, it is not the amount of **data** that is the problem but the management of it. In fact, it is often claimed that there is too much data available. Put simply, the amount of data is so large that organisations can have serious problems using it effectively. At the same time they can not afford to overlook it. Because of its size and complexity Big Data requires automatic analysis to turn it into information. Central to the task of interpreting this data to identify trends and enable business decisions, is the new breed of technologist called the **Data Scientist**.

What effect will the 3rd Platform have?

Some of the world's best brains are occupied with attempts to forecast the impact of the 3rd Platform and help organisations to use it effectively. The fact is that many organisations are already using cloud services and many individuals will also do so in the near future. Many people see social networks as tools for communication between private individuals. However, businesses are learning how to use these networks in innovative ways. A well known example is the way that Google analysed searches for medical information to forecast flu epidemics. The patterns and topics of communication revealed by **social network analysis** can tell a lot to an imaginative Data Scientist.

It is inevitable that there will be many changes in the ways that people are employed and work is done. The 3rd Platform effectively brings together a range of separate technologies. Any device with an **IP address** can be connected. Examples include all kinds of **sensors** (weather, traffic, pollution, medical etc.). Access for mobile devices is easy via the mobile network or **WiFi**. In fact, everything can be connected all the time. This is why the phrases such as the **'internet of things'** and **'any place, any time'** have emerged.

The consumer comes first

Many 2nd Platform applications were designed either for business or for licence to individuals. IT commentators now think that 3rd Platform apps will be designed primarily for the consumer but also used by business. This will mean that consumer pressure will result in cheaper software and ease of use. In short, IT will become consumer friendly and will be viewed as a utility model such as gas and electricity. There will be less need to worry about equipment obsolescence, updating/upgrading hardware and software and backups as they are now the providers' responsibility.

The changing world of IT

What kind of career requires a mix of the following attributes?

- Scientist
- Analyst
- Problem Solver
- Storyteller
- Mathematician
- Creative Thinker
- Team Worker
- Artist
- Computer Technologist

The answer is the new Data Scientist

The world of the 3rd Platform is changing the way work is done, and more dramatic changes are due in the future. The Data Scientist is a new type of role requiring a subtle mix of skills and an ability to bring them together in an effective manner.

A real understanding of the impact of the 3rd Platform requires us to think differently. This is not simply a new piece of hardware or a new computer programme. It is a different way of life and the Data Scientist is forging the way.

The future?

We must realise that what seems obvious now was not always so. For example it was a big risk for large businesses to move from the mainframe services of the 1st Platform to the PC based 2nd Platform. On the other hand it was easier for small business owners, who never had expensive mainframes, to invest in a PC and learn its advantages. It was harder still for mainframe manufacturers to make the move to PCs and some never did. It is not easy to forecast the future of technology. The growth of social networks or mobiles was not forecast with any accuracy.

The IT industry is in a permanent state of change. Companies such as EMC must be innovative and able to adapt to any unforeseen circumstances that might arise. The key to success here is the Data Scientist.

EMC is a global leader in enabling organisations to implement cloud computing and to store, manage, protect and analyse their most valuable asset - information. They are the world's leading developer and provider of information infrastructure technology and solutions that enable organisations of all sizes to transform the way they compete and create value from their information.

EMC serves customers in more than 100 countries around the world. These customers include financial services firms, manufacturers, healthcare and life sciences organisations, internet service and telecommunications providers, airlines and transportation companies, educational institutions and public-sector agencies.

The company employs approximately 63,000 people worldwide and had reported revenues of over \$ 21 billion in 2013

Find out more about the work of EMC at www.emc.com

EMC in Ireland

EMC established its manufacturing facility in Ovens, Cork in 1988. This was the first EMC plant outside of North America and is now the largest one outside the US. It is known as a Centre of Excellence and incorporates research, training as well as manufacturing. An investment of €20 million was made in the Research and Development Centre in 2008 as part of its 20th anniversary celebrations. The EMC sales offices are located in Dublin and Belfast.

In 2012, a partnership with University College Cork and the Irish Management Institute (IMI) saw the development of a new executive programme, the Masters in Data Business. Also, Cork Institute of Technology (CIT) offers BSc and MSc degrees in Cloud Computing.

EMC now employs over 3,000 people in Ireland

Find out more about the EMC Ireland Centre of Excellence at <http://ireland.emc.com/coe>.



Find this and other lessons on www.sta.ie

Syllabus references

The main syllabus references for the lesson are:

Leaving Certificate Technology

- Information and Communications Technology
- Data Communications and Computer Networks: Operational characteristics of a conventional network. Local Area Networks (LANs)
- Internet and the World Wide Web. Email and other Internet applications. Image formats. Multimedia applications.

Transition Year

Science and Technology in Action is also widely used by Transition Year classes.

Learning Outcomes

On completion of this lesson, students should be able to:

- Explain the meaning of the term '3rd Platform'.
- Identify the main distinguishing features of the 1st, 2nd and 3rd Platforms.
- Define the terms 'cloud', 'big data', and 'social network'.
- Discuss why IT is now considered to be moving to a consumer utility model.
- Suggest why it may be difficult to forecast the impact of technological change on the business world.
- Construct a personal development plan designed to prepare for a career as a Data Scientist.
- Outline the role and product lines of the EMC Ireland Centre of Excellence.

General Learning Points

These are additional relevant points which are used to extend knowledge and facilitate discussion.

- The term 'platform' is common among IT people. Any piece of hardware or software that supports some other operation can be called a platform. In the case of the 1st, 2nd and 3rd Platforms, the term is used to describe the high level configuration or system that provides the final service to the user.
- The move to the cloud offers serious marketing challenges for industry. There is a big difference between selling applications under licence for installation on PCs and delivering them from the cloud. This is similar to the challenge faced by the music industry moving from CD sales to streaming delivery.
- Among the main consumer issues relating to cloud computing are the location and security of the data and the reliability of the service. These are particularly sensitive issues for the management of government data.

- Students can learn more about the cloud and big data in the EMC lessons in Science and Technology in Action at www.sta.ie. *Understanding the Cloud* is in Edition 8 and *The Digital Universe* is in Edition 9.
- The characteristics of the 3rd Platform can be debated but a widely accepted view is that the main drivers are the huge growth in mobile devices and the delivery of services from the cloud.
- Facebook started as a social networking site at Harvard University in 2004 and is now said to be the largest social networking site in the world.

Student Activities

1. The Boolean operators are **AND**, **OR** and **NOT**. They can be used in database searches in order to narrow down or expand a search. Internet search engines do not always apply them strictly.

In Google searches

- the **AND** operator is not needed; just enter the items you are searching for
- the **NOT** operator is **NOT** or a **minus sign** (with no space after it); a hyphen produces anomalous results
- use **OR** for the OR operator; it must be in capitals.

To see the effect of these operators note the number of entries or 'hits' found using different combinations. As an initial investigation search for the following and record the number of 'hits' in a table.

Entry	Number of hits (in millions)
solar	135
flare	26
solar flare	4
"solar flare"	0.9
flare NOT solar	11
flare -solar	11
flare -solar	179 !
"solar flare" pdf	0.25

True/False Questions

- | | | |
|--|---|---|
| a) Internet access is increasing seen as another utility — like water, gas or electricity. | T | F |
| b) The 1st Platform had more users than any other Platform. | T | F |
| c) The 2nd Platform is characterised by the client-server model. | T | F |
| d) The main frame computer is the main component of the | | |
| e) 3rd Platform. | T | F |
| f) 'Data scientist' is another name for computer programmer. | T | F |
| g) Useful business information cannot be derived from the | | |
| h) analysis of social network traffic. | T | F |
| i) Data is not the same as information. | T | F |
| j) Delivery of services from the internet is called cloud | | |
| k) computing. | T | F |
| l) Boolean algebra is used in designing electronic circuits. | T | F |

Check your answers to these questions on www.sta.ie.

Examination Questions

Leaving Certificate Technology (HL) 2010, C, Q. 3 (a) & (b)

- (a)
- In the management of prescriptions and general patient welfare, the medical profession has recognised the increased use of ICT as a positive development. Outline three ways in which ICT could be used by doctors and other medical professionals.
 - Many multi-national companies make extensive use of ICT to support the sharing of ideas and resources. Give two advantages of using video conferencing rather than email or telephone communication.
- (b)
- A computer games company installed a LAN (Local Area Network) with connections for the network server, 15 office computers and 5 wireless laptops in their new office. Outline three functions of the server on the network.
 - The company has appointed one of its employees as a system administrator who works closely with the branch manager. Describe two important tasks for which the system administrator would have responsibility.
 - How could the company make use of an intranet?

Leaving Certificate Technology (OL) 2011, A, Q. 1

- Modern mobile phones have become multifunctional devices. Name two functions they offer other than making phone calls.
- Recently the mobile phone has developed into the smart phone. Name two applications (apps) that can be used with a smart phone.



Leaving Certificate Technology (HL) 2012, Part C, Q. 3

- Distinguish clearly between a database and a spreadsheet.
- Outline two factors that have made tablet computers one of the fastest growing consumer products in recent years.
- Outline the main features of peer networks and of client networks.

Leaving Certificate Technology (HL) 2013, C, Q. 3

- Suggest two advantages and two disadvantages of using computer networks.
- Describe the main components, features, capabilities and limitations of a wireless network.

Leaving Certificate Technology (HL) 2014, A, Q. 14

- Social networking sites play a significant role in the lives of many people. Describe the impact of on-line advertising and real-time reporting as features of social networking.

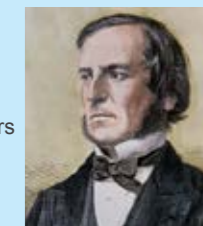
Did You Know?

- Over a billion people worldwide use mobile apps and this is forecast to grow to over four billion users by the end of 2017.
- Your mobile phone is a much more powerful computer than the computer that was in the space craft for the first moon landing.
- Around 4.5 billion people worldwide use mobile phones but there are about seven billion subscriptions because some people have more than one account..
- Nearly two billion people worldwide make use of social networks and this is growing rapidly.
- The EMC Ireland Centre of Excellence in Cork is a global leader in enabling businesses and service providers to transform their operations and deliver information technology as a service (ITaaS).
- References: Mobile: <http://mobithinking.com>. Social Networks: <http://www.emarketer.com>.

Biographical Notes

George Boole 1815 - 1864

George Boole, who taught in University College Cork, is one of the most influential figures in the history of mathematics. Long after his death, others used Boolean Algebra to make huge advances in electronic and computer circuit design.



He was born in England and was a child prodigy who started school before he was two. He taught himself Geometry, Greek, Latin, French, German and Italian. He also became very involved in education and social causes. In his early twenties he became interested in mathematics and wrote his first paper. He won first Gold Medal of The Royal Society of London in 1844 for a paper on Differential Equations.

He was appointed Professor of Mathematics in Queen's College (now UCC) in 1849. This illustrates the depth of his reputation since he had little formal schooling and no university degree. He is now most famous for his work on logic and probability. The binary foundation of the digital world is based on his algebra.

Revise The Terms

Can you recall the meaning of the following terms? Revising terminology is a powerful aid to recall and retention.

1st Platform, 2nd Platform, 3rd Platform, 'any place, any time', big data, blogs, chat rooms, cloud, cloud computing, data scientist, internet, 'internet of things', IP address, mobile app, mobile devices, 'on-line communities', personal profile, platform, Platform as a Service (PaaS) smart phone, social networks, Software as a Service (SaaS), WiFi.

Check the Glossary of terms for this lesson on www.sta.ie