

# Convergence

## Project manager's responsibilities

- To keep an open mind about which kinds of technology can be used to deliver whatever interactive application is under discussion
- To be aware of the emerging convergent platforms and their capabilities
- To take note of regulatory issues that emerge for the development of convergent applications
- To raise your own and others' awareness of the business challenges that converging media pose



## ■ What is convergence?

It has become increasingly difficult to find a single word or phrase to encapsulate new media as it stands now. The term 'new media' itself is problematic since 'new' redefines itself continuously. When the first edition of this book was published in 1996 it was quite clear that all this 'new stuff' we were doing on CD-ROMs, kiosks and the Internet was multimedia. However, to many people producing websites, and with no background in other media, multimedia is something you include in a web page like a video or an animation. Ironically, as the word was depreciating in one section of the industry it was being increasingly used by telecommunications companies (usually abbreviated to telcos) and broadcasters to describe the new kinds of computer-based services they were planning and delivering.

But while one buzzword was disappearing, a new one was emerging: convergence. When people talk about convergence in new media, they usually refer to the combining of personal computers, telecommunications and broadcast television. Including, or adding, the Web just about defines the key state of new media as we pursue it at the moment. In an alternative definition the essence of convergence is the ability to produce an interactive application once and be able to deliver it on all the media in the convergent group including the Web. I mention this definition in order to say that I believe this to be an element of convergence – something we sensibly aspire to – but not the core. More on this in a moment.



The most important part of this convergence is the role played by computers. Many devices now include microprocessors; ranging from vehicles to ticket machines, washing machines to microwave ovens, telephones to televisions. Once you realize how ubiquitous the microprocessor has become, you see how we no longer think of computers as being used to control things. They are now an integral and invisible part of the devices themselves. This is especially true where the devices themselves are digital: digital phones or digital televisions for example. Here the computer has as much access to the digital information as it has to the controls. To follow the McLuhan formula, the medium and the message become indistinguishable.

Convergence also recognizes that even though a sizeable minority of people have a computer in their homes, almost everyone (in the developed world) has a television and a telephone. It may be that by definition, convergent information technology spreads by stealth; disguised as something we already have and use every day.

There is the second use of the term in new media, and that is to refer to systems that are independent of the hardware or infrastructure they use. So a piece of convergent software would be equally at home on a mobile telephone or interactive television as on a computer. A good example of this point of view is Java. The Java computer language was designed so that a Java program would be able to run in many environments with little, if any, customization. In fact the original intention was for Java, or Oak as it was first called, to be a language specifically for convergence. The team at Sun who developed it tried to market it to makers of set-top boxes; but there was no interest at the time.

## ■ What does convergence mean to end-users?

One view, expressed in a PricewaterhouseCoopers analysis of convergence, is that the end-user – the consumer – is driving convergence. How might that happen?

Convenience is one factor. Why should we carry a telephone, a radio and a music player with us when we can carry a single device that does all three? You can already buy mobile phones that contain an FM radio or an MP3 audio player. It is significant that a radio-cassette player is not generally regarded as an example of convergence – perhaps because the two forms are ‘old-fashioned’ analogue and have been paired up since before the digital revolution – while adding a telephone into the mix now would be definitely convergent.

Another factor is expanded capabilities. A multichannel television with a powerful computer can not only record programmes for you to watch at another time but it could also learn your viewing habits and record programmes without the need for you to program it. The set would know what is available because it has access to the programme schedules, through the electronic programme guide, and because the programmes would be

tagged with metadata which labels their content. This set could also respond to a request like 'What can I watch now?' or 'Are there any good movies on?'

A survey (published in 2001) in the USA and UK by Pace, who make set-top boxes, found that the two most annoying things about television programmes are that they are on while you are not at home to watch them and that you are interrupted while viewing. These would seem to be strong motivations for an intelligent approach to time-shifting of programmes. The American company TiVo were the first to market this kind of set-top box, called a personal video recorder (PVR). The boxes gather information about the viewing habits of users in order to predict and suggest programmes. There has been concern about the privacy implications of such kinds of information gathering. In essence, is the box working for you to help you with your viewing, or working to provide marketing information for the set-top box manufacturer?

Thirdly, convergence offers new opportunities and possibilities for markets and devices that currently do not exist and are sometimes difficult to imagine: which makes market research difficult.

Easy and/or automatic access to information can be achieved through devices that do not appear to be computers. An elevator in a building could give you a weather forecast if it detects that you are heading for the exit. Your shoes could give you directions when you go for a walk. Your refrigerator could check on the food inside and order replacements or warn you if some is out of date. It would be connected to the Internet in order to communicate. Actually this is not so futuristic. The web-fridge already exists and at least one US drinks company uses the Internet to monitor stocks in its vending machines.

End-users may be resistant to this. A UK car manufacturer added voice reminders for things like fastening seat belts and turning lights off. Owners were so annoyed with the reminders that most of them asked for the voice to be turned off. This suggests that the new capabilities will not necessarily be welcomed by everybody. However, it will always take time for new things to be accepted.

Other issues that bubble to the surface whenever convergence between consumer appliances like televisions and computers is discussed, are reliability and longevity. A crystal radio set constructed in the 1920s could still receive today's AM radio stations. A suitable television set from the 1940s could receive transmissions today (in black and white). There is nothing in computing that even approaches such a longevity and the computer market seems to thrive on its built-in obsolescence. The consumer market moves much more slowly than the computer world. It isn't unusual for people to use television sets that date back to the 1980s. The computer I used then has long since been thrown away. This attitude is partly because a 'machine' that is made out of software, like a word processor, is easily changed. Within some limits you can keep your hardware the same and change the software but eventually even that tactic will fail to keep up with the relentless march



of computer progress as new applications need new versions of the operating system and the new operating system needs new hardware.

We could debate for hours on whether convergence means a computer in your television (hence in your living room) or a TV receiver card in your computer (which would probably be in another room entirely). Later in this book we will also consider the differences in the ways the two devices work and how people use them. In time these issues may become meaningless. Twenty years ago, when you had a telephone installed, you probably had to decide where it would be. Would it be in the living room or perhaps the hallway? Now it is much easier to have more than one phone socket and move the phone about. More likely you will have a cordless phone in the house. By analogy, this suggests that in time we will not be concerned about where the convergent devices are since they will be moveable. They'll be small enough and/or light enough to go where we want them rather than make us go to them.

## ■ How do the convergent parts fit together?

Historically, the three parts of the convergence have been treated differently by governments: telecommunications, by now well over 150 years old, started out as an adjunct to postal services, offering increased speed of text messages. Most countries mandated their mail services to handle telegraphy and then telephony and the large investment needed to lay cables was seen as a role of central government or of large companies given monopolies to build infrastructure. In time, as the electronic services came of age, many split from the mail but often they are still controlled by government, directly or indirectly. In many cases, and certainly in Europe, the regulation

of telephony now aims to prevent former monopolies from continuing to control the telephone infrastructure and so impeding competition and/or the growth of new services.

Similarly with broadcasting: here governments wished to exercise control over the sparse resources of the radio spectrum. With a general pattern of state broadcasting giving way to mixtures of state and independent broadcasters – some commercial and some not – governments have worked internationally to control access to the airwaves but locally their prime target has been content.



The computer industry, of which the Internet is a part, has been lightly regulated, if at all. The Internet is legendary as a frontier of freedom; its roots firmly in the freedom of speech enjoyed in America and the open exchange of ideas prevalent in academic circles. This background to the Internet has often clashed with its commercial use and, in the long term, another convergence will be between those two seeming opposites.

Converging the three – telecommunication, broadcasting and computers – leads to regulatory anomalies and curiosities. When, for example, is an Internet connection a simple transfer of files and when is it a cable transmission of content? How do you reconcile copyright laws based on the production of physical books or sound recordings with the instant transfer of digital files on the Internet? Nicholas Negroponte, head of the MIT Media Lab and a long-standing guru of the technological revolution, asserts, in his book *Being Digital*, that as copyright is a reactive process it will probably have to break down completely before it can come up to date.

Coincidentally, it was Negroponte who also pointed out that convergence is happening at the same time as a shift between wired and wireless technologies. Many of the things that we used to consider wireless, such as entertainment broadcasting, are becoming wired (i.e. cabled) while many traditionally wired domains, such as computer networking and telephones,

are becoming increasingly wireless. This changes the way we think about things: for example a telephone number now increasingly represents a person rather than a place because we increasingly carry our phones with us and keep numbers when we move.

## ■ And the rest

Another aspect of convergence is that the convergent industries are going to beg, steal or borrow technologies and processes from each other. We are already seeing examples of this as wired and wireless technologies interchange and as multimedia – audiovisual content – gets onto web pages.

It will go further than this. Telcos are developing software applications called mobile agents which can be programmed to carry out autonomous tasks and sent off into computers in a network to carry them out. The telcos have a problem of a huge interconnected machine – the phone network, which is arguably the most complex machine built by mankind – and how to maintain it. Autonomous mobile agents can do this. For the rest of us an agent can carry out our instructions to do a wide range of tasks, just like a real life, say, travel agent might do. If we don't want to stay connected, or can't for some reason, then we can ask an agent to go off and do research for us and report back when we next log on. Greg Bear, in his science fiction novel *EON*, describes a future civilization where people often empower what are called 'partials' to do things for them. Since these people often travel in image rather than in person it can be difficult to know whether you are dealing with the partial (agent) or the real thing. You go on vacation and your agent carries on doing your job for you.

Another function for agents is in an area like video-on-demand and even broadcasting, where as more and more choice is available it will become increasingly difficult to follow all the possible programmes. This might lead us to stick with a small number of channels, as we might do in buying one newspaper over another. Alternatively we might allow our set-top box to learn our preferences and select programming for us. This is already being done with personal video recorders (as described earlier) which make use of your viewing habits and can match this against the programme guide to record and offer you things to watch. (See also the chapter on types of interactive TV: Chapter 3 in this book.) It is but a small step from that to empowering the agent to negotiate and pay for movies and other pay-per-view programmes we might want to watch. You might be able to buy personality scheduling agents so that your viewing choice gets off to a good start. Ironically, once you do this, you are coming back to the idea of selecting one television station and watching it, but again the agent will continue to learn and evolve following rules it learns.

## ■ How will convergence affect businesses?

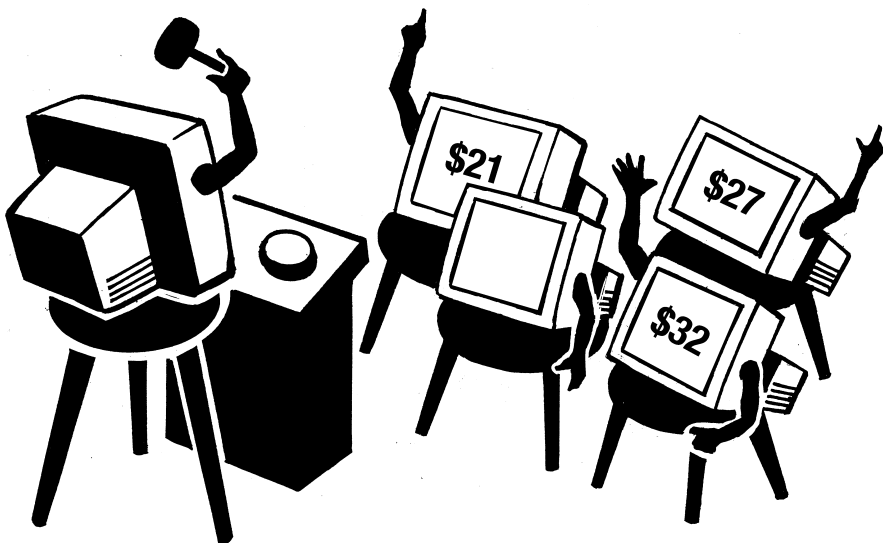
Changes in technology usually lead to new business opportunities, and often entire new businesses. These will go through several stages in the way they operate. Thirty years ago there were no video shops and no mobile telephone shops and records were usually sold in electrical stores. In a further twenty years you might imagine what new retail outlets there may be.

Despite initial reluctance, and fear of fraud, the Internet has become a popular place to shop. The Pace report found that 41% of those surveyed in the USA had purchased goods or services using either a computer or television. In the UK the figure was 23%.

The PricewaterhouseCoopers report points out that consolidation, where like players worked together, was the phenomenon of the 1980s and early 1990s. In the early 2000s the trend is for complementary players to converge.

Business will find new opportunities as a result of new activities and new ways to do old activities. New supply chains and channels to customers will emerge, and increasingly consumers will trade with other consumers on a worldwide basis.

Of course consumer to consumer trading (C2C) has existed for many years in the form of jumble sales, car boot sales, rummage sales, yard sales and so on, and small ads in shop windows and local newspapers, but this has mainly been a trade in used goods. Everyone can have the opportunity to create something and it is especially easy to trade if your goods and your channel are both electronic. One example of C2C trading is the Internet auction website (of which the best known is the American eBay) but many people have their own website to promote and often sell their wares as if





they were operating a craft stall at a local market. Of course it is difficult to draw a line between B2C (business to consumer trading) and C2C with something like a small craft website, but the key point here is that the operation can be very small and ad hoc in a way that a bricks and mortar business cannot. Online businesses are sometimes referred to as clicks and mortar. The biggest barrier to doing business online is probably collecting the money. Fortunately as consumers have come to accept buying online, so have banks. It gets continually easier to get a merchant account to take credit cards on your website and many ISPs offer packages for setting up shops which include links to merchant services. Credit card companies are also going out of their way to reassure card-holders that the Internet is not such a risky place to shop and remind their customers that, in the case of fraud, the card company will bear the risk, not the individual customer. This presumably is a recognition that an online shop is no more likely to be a source of fraud than a restaurant in the high street or local mall.

The PayPal service, set up in the USA, takes the merchant account idea and strips away most of the formality. Anyone can register their credit card with PayPal and then not only pay money but also receive it. In this way someone without a merchant account can receive payments online and this has become one popular way to pay for auction wins. On a small scale PayPal has no charges for the transactions. In general, receiving money costs money and this ranges from 1% for a standard merchant account with a large turnover to as much as 8% or more for a bureau account.

One risk of all this convergence is the danger of reinventing the wheel and designing it to be square. An example of what might be inappropriate convergence would be streaming radio into a mobile telephone and forgetting that radio already exists. The obvious answer to this is to ask what features audio streaming has that radio does not: interactivity, extra information and a wide international choice of sources are three possibilities.

In this book we will explore some of the technologies in the convergent media and the basic techniques with which you produce programs for them. Much of this is new and so we will not be going into specific detail about how to produce, say, an interactive TV programme or a location-aware mobile application. But we can show you the directions that these things may take. The next few chapters explore the main features of the technologies and how you might work with them, then we go on to look at the key asset types you will use in convergent media, and in new media as a whole.

In producing an interactive project you may have the challenge of producing it for more than one of the convergent platforms, or you might have to choose which is most appropriate, either as the client or as the developer. Ideally, each converging technology is enhanced by the convergence and so there will be new business opportunities in that technology. In some cases a completely new opportunity will arise as a result of the convergence. The impact of the convergence can be greater than the sum of its parts.



## THEORY INTO PRACTICE 1

Think of a profession – dentistry for example.

1. Try to predict a use of convergent technology that would be beneficial for the professionals.
2. Try to predict a fun but probably implausible piece of convergence for the same set of professionals.

### ■ Summary



- Convergence = the combining of PCs, telecommunications and broadcast TV.
- Convergent software is designed to work across the converging delivery platforms.
- Convergence offers convenience, expanded capabilities and new opportunities.
- Consumers take time to adjust to innovation.
- Converging technologies throw up regulatory anomalies.
- Convergent industries will use techniques and processes from each other.
- Convergent technologies will affect business supply chains and all that this implies.

### ■ Recommended reading



Sun Microsystems website for Java is at

<http://java.sun.com> and a brief history of the project is at

<http://java.sun.com/nav/whatis/storyofjava.html>

(there are other accounts on the same website and links elsewhere as well)

The Pace Report 2001 – Consumer attitudes towards digital television – is published by Pace Micro Technology plc, Victoria Road, Saltaire, Shipley, West Yorkshire, BD18 3LF, United Kingdom. A summary is available on the Web at

<http://www.pace.co.uk/documents/PR/pacereport01.pdf>

PricewaterhouseCoopers report on the six forces affecting business, including convergence at number one, is at

[http://www.pwcglobal.com/sixforces/PwC\\_html/index.html](http://www.pwcglobal.com/sixforces/PwC_html/index.html)

Negroponte, N. (1995) *Being Digital*. Westminster, MD: Knopf