"Converging Technologies in Telecoms, Internet, Media & Education"

IdeaGen

Topic Notes by Mícheál Ó Foghlú
(Executive Director Research, TSSG, WIT)

15th Oct 2009 (TSSG, Boardroom) original
2nd Dec 2009 (TSSG, Boardroom) follow-up

One way to think of convergence is from a business perspective: that these previously separate domains are merging to become dominated by companies who have an interest in more than one of these domains. Most famously this was convergence signalled by the merger of AOL and Time Warner (January 2000), though this led later to an agreed split (November 2009). More recently the merger that has caught attention is that of ComCast with NBC (November 2009). But you can see that there is a jostling for control between Telcos/ISPs, TV, Satellite, Cable, Computer Games, and other companies over control of the home gateway devices for multimedia services in the home.

The technical perspective of convergence is that services in all of these areas (telecoms, Internet, media and education) are starting to converge on the use of Internet technologies (i.e. using IP, the Internet Protocol) and light-weight Web technologies on top of this that mean the services can be accessed from any platform that can support a browser. The Internet has been around for 40 years; the Web has been around for around for just under 20 years, but the introduction of the Web started the exponential uptake of the Internet outside of academia.

Thus today even the telcos are moving towards the use of IP for their voice services with the advent of IMS. Thus many younger adults already consume more video content over Internet connectivity (e.g. via YouTube) than they do over traditional video distribution channels such as terrestrial broadcast, satellite or cable.
> e.g. Telco IP Convergence
> http://www.bestpricecomputers.co.uk/glossary/ip-convergence.htm

Certainly, if it were not for the disruptive power of the new paradigm of the Internet, that effectively changed the cost models of networks and services, we would not be talking about this topic of "convergence" like this today.

Essentially all of the .COM boom "e" technologies, eHealth, eLearning, eCommerce and so on, are all based on the use of Web and Internet technologies to develop simple services that leverage the pervasiveness of the Internet itself, and of devices that can run web browsers. The "m"

technologies, like mCommerce, are simply the mobile versions of the same thing, running on hand-held PDAs or increasingly on smartphones.

With the Web and the Internet anyone with a good idea for a new services can potentially deploy such a solution on a rented co-located server (located anywhere in the world) within a matter of months for a few thousand EUR. This fundamental lowering of the barriers to entry has created a whole slew of new innovative services, only a small subset of which are necessarily successful.

One common example of convergence is the emergence of Triple-Play and Quadruple-Play services where a home user can buy their TV subscription, Internet connectivity and telecommunications (Triple-Play) from one provider for a single integrated monthly fee, that is cheaper than separate subscriptions would have been. Quadruple-Play adds a mobile subscription to the package. In Ireland the most famous of these packages come from the cable operators, as this can cut out the need to pay monthly line rental for a telephone line, and give the largest savings.

Morgan Stanley have been doing a series of presentations with publicly available slide sets for the past six years that capture the amazing statistics on Internet and Mobile Telephony (October 2009, Web 2.0 Conference, http://www.morganstanley.com/institutional/techresearch/pdfs/MS_Economy_Internet_Trends_102009_FINAL.pdf). Here you find out how many users are using YouTube, Facebook, and other key Internet services, and how much money is being made in on-line advertising. Half of the slides are about the financials, and the other half about the key technological trends.

The following sections provide some background notes on each of the parallel topic groups that were used on 15th October 2009 for the brain storming sessions of IdeaGen, and will be used in the 2nd December 2009 follow-up event.

1   Partnerships

This is not a technical topic, but an opportunity to discuss partnerships between key players.

2   Finance/Funding

This is the opportunity to discuss funding mechanisms, especially from Enterprise Ireland and the Enterprise Boards who support local SMEs.

3   Digital Media

This topic is usually perceived as the content-provider part of a more complex services environment. Perhaps the simplest examples are the companies who produce audio and video content, and sell it via various distribution channels to end users. The opportunities offered by convergence are that it becomes easier to cut out parts of the supply-chain and sell virtual products directly to end-users. The details of successful digital media approaches are often as involved in the legal issues, and the digital rights management issues, as they are in the technologies of the distribution.

> http://en.wikipedia.org/wiki/Digital_media

4   Online Marketing

On-line marketing used to mean the use of the Web and Email for marketing. As a very cheap publication platform with a global reach the Web has transformed the marketing industry. The most successful modern Internet companies, most famously Google, generate significant portions of their revenue from advertising, essentially changing the business models of marketing.

Similarly Email offers an almost free distribution channel, and its abuse has led to a race between spammers and spam defences that sees the majority of emails sent today being automatically trapped and deleted by this spam filtering tools.

More recently the on-line marketing world has become enamoured with various forms of social network for viral marketing, most famously with Facebook and Twitter.

> http://en.wikipedia.org/wiki/Internet_marketing

5   Cloud Computing

Cloud Computing is essentially the next step in the cost reduction and ease of use of the Internet and the Web.

It is a vision of virtual services in a cloud, where one no longer needs to worry about the management and configuration of the infrastructure that supports the services, where ideally the resources required are automatically added as needed, and the service provider is billed according to actual usage of resources.

> http://en.wikipedia.org/wiki/Cloud_computing

Perhaps the most famous cloud computing initiatives are Amazon's Elastic Compute Cloud (EC2: http://aws.amazon.com/ec2/) and Google's app engine (http://code.google.com/appengine/).

Cloud Computing is often split into three distinct levels of conceptualisation:

Software as a Service (SaaS http://en.wikipedia.org/wiki/Software_as_a_service) allows an individual service to be managed in the cloud, with its code and data being deployed virtually across the infrastructure that is needed. Arguably, the use of Google's web-based applications such as Mail, Calendar, and Docs already show the power of moving desktop software to be serviced by the could rather than the desktop. Their ease of use on smartphones such as the iPhone and Android phones (like the HTC Hero or Motorola Droid) show the flexibility such services can provide, providing there is an Internet connection available.

Platform as a Service (PaaS http://en.wikipedia.org/wiki/Platform_as_a_service) allows a platform, such as remote machine, to be virtualised and access remotely. This can include the ability to dynamically grow the capacity of the platform (CPU power, memory, disk space and so). Data centres have been moving in this direction for some time, and virtualisation technologies such as Sun's and VMware's products have made it much easier to deploy such virtualised servers today.

Infrastructure as a Service (IaaS http://en.wikipedia.org/wiki/Infrastructure_as_a_service) is perhaps the lest well developed of the three. The idea is that whole networks with multiple virtual servers can be leased out to those who need them. Arguably telecommunications itself is moving in this direction, with IMS (IP Multimedia Subsystem) allowing a single core network to be shared by an Operator's fixed network and mobile network, and potentially even for a single core to be used by multiple different operators. This has been called "Cloud Telco".

6   Security

Security is a huge area that has some technical aspects and many non-technical aspects. From the technical perspective many security problems originate from the open nature of the platforms and networks that have helped create huge uptake of the Internet and the Web.

Microsoft's original desktop was notoriously insecure, most obviously when any single application failed it would result in the whole system being unstable (e.g. Windows prior to Windows NT). More recent versions have become more secure with properly memory management for applications (to stop the instability problem) and proper file ownership and permissions on the file system to allow for more secure deployments. However, whole industry has arisen around the need to protect the Windows desktop from attack, and no modern system is complete without a virus protection and general malware protection program, with regular updates. Apple argue that their desktop is more secure, but many security experts believe that it is the market dominance of Microsoft that has made it the main target for malware, rather than pure technical superiority of Apple's OS X. As smartphones and other devices become more complex, there is a risk that all computing platform will require the same battle between hackers and virus protection as has evolved since the 1980s on Windows desktops.

The Internet itself is also insecure. Its architecture assumes anonymity and so do many of its primary services. They were developed when the Internet served a small academic community who trusted each other. As this architecture has scaled to the world, the weakness of this assumption have been exposed, so that now the most popular services are plagued by spam, unwanted and unsolicited communications. Some estimates put the volume of spam at around 80% of all emails sent. Jonathan Zittrain in his recent book, *The Future of the Internet and How To Stop It* (http://futureoftheinternet.org/) has argued that this fundamental insecurity will lead people back towards more controlled environments, such as offered by traditional telecommunications services, where there is a billing relationship with the customer, even if they can be somewhat anonymous with various pre-paid options, that means that the cost associated and this level of auditing reduces the potential for spam abuse.

7   Telecoms

The convergence of Telecommunications and Internet Technologies means that many traditional Telecommunications services, such as voice calls, can now be offered directly over the Internet data network, most famously by Skype (which uses a proprietary mechanism), but also by services that use an open standard called SIP such as Google Talk or various VoIP (voice over IP) provides such as Blueface.ie in Ireland. This direct availability of cheaper alternatives to traditional telecommunications directly for the end user, and also the ability to use IP infrastructure for crossing national boundaries, thus reducing the cost of interconnects, has transformed the telecommunications world. The Telcos have now adopted the IP infrastructure as the core part of their next generation network, for example in the IMS (IP Multimedia Subsystem) platform that is planned as the core of future fixed and mobile networks. Their hope is that this shift can reduce their costs and allow them the flexibility to deploy hybrid value-added services that can compete with pure Internet services, and avoid their being relegated to "bit-pipes" – i.e. they want to have more value that just being paid by volume to move data around.

http://en.wikipedia.org/wiki/IP_Multimedia_Subsystem

8   Mobile Apps

Perhaps the iconic gadget of the late 20th and early 21st century is the mobile phone, and perhaps the most iconic mobile phone is the iPhone from Apple. This epitomises convergence. Steve Jobs' launch of the iPhone as a keynote as Macworld in San Francisco in January 2007 captures the nature of this convergence compellingly (http://www.apple.com/quicktime/qtv/mwsf07/).

But, at the same time it is important that the key statistic about mobile phones is that worldwide profile, often with more mundane handsets. In general, there are ten times more mobile handsets than there are desktop PCs, and one in six of the world's population already has a mobile phone (PCs 100M+, Phones 1B+). The key services that the majority of these phones currently offer are voice and text (SMS), rather than fancy smartphone Internet applications. The promise is that these will all migrate towards smartphones.

The key thing that the iPhone has done, by capturing a significant portion of the smartphone market, and by offering a standard development platform for applications, and a distribution channel to sell those applications, has created a clear example of how the smartphone mobile application area can develop.

There are currently five major players in the smartphone market (c.f. slide 39 of Morgan Stanley Internet Trends slideset October 2009 http://www.morganstanley.com/institutional/techresearch/pdfs/MS_Economy_ Internet_Trends_102009_FINAL.pdf):
(a) Apple's iPhone (11% of devices shipped Q1 2009) has 65% of web usage.
(b) Symbian is currently dominant in terms of devices (49% of devices shipped Q1 2009) and is used by Nokia and Sony Ericsson (each with its own variant) seems to be on the wane as a platform as both handset manufacturers are shifting to other platforms.
(c) RIM's Blackberry (20% of devices shipped Q1 2009) is specialised as business devices with excellent email connectivity.
(d) Windows Mobile (10% of devices shipped Q1 2009) seems to be loosing favour with handset manufacturers.
(e) Google's Android (2% of devices shipped Q1 2009) seems set to be the big challenger to the iPhone with new phones launched by Motorola (Droid), HTC (Hero) and Sony Ericsson (Xperia X10).
So it looks like it may be becoming a two horse race between the iPhone (with a closed application store, where Apple share revenue for each application sold) and Android (with an open model, where application developers can sell directly to customers, or give away applications for free, in other words an Internet application model), assuming the latter can avoid too much fragmentation.

There is another type of mobile application, one that is designed for a PDA or other mobile device, that is not a phone. These applications are critical in certain market sectors, such as in inventory management in warehouses, or in guides for heritage sites. Arguably over time these may be able to run on smartphones, reducing the need for additional devices. However, there are always arguments in favour of dedicated devices for certain tasks that can be managed and monitored and this guaranteed to do that task well.