# Data Harbor –
# Making your Digital Lifestyle easier

SOUHEIL BEN-YACOUB **We are currently experiencing a proliferation of consumer electronics at home (for example DVD recorder, video camera) and of personal devices on the move (for example smartphone, organiser). End-devices with multiple functions and interconnection capabilities are the consequence of the convergent telecom, media, consumer electronics and IT industries.**

Data Harbor is a solution taking care of this complexity on behalf of the user by offering ubiquitous and unified access to all his digital content in and beyond the home.

## Convergence in Telecom – Past and Present

The concept of convergence has been around in the telecom industries for the last 15 years. The early visions are actually even older and were already mentioned in the late seventies when some technologist expressed the idea of an increasing overlap between computers, telephony and broadcasting. It has been argued that the highest growth rate and innovation will take place in areas where all these fields overlap.

But what exactly is convergence? The simplest and most generic definition could be the confluence and merging of hitherto separated markets, removing entry barriers across market and industry boundaries. Convergence is basically the redefinition of industry boundaries and the result is not one single convergent industry, but rather a new business eco-system of new specialised industries.

Convergence is driven by the digitalisation of all types of content, communications and information processing. Standards and common protocols are important drivers of convergence. This implies that different partners, players, producers and consumers of an industry agree on a compatible technology platform and adopt it to reach a critical mass.

One of the most active convergence areas now combines the telecom, consumer electronics, IT and media industries (fig. 1). The symptoms to be observed here are vanishing borders:
– telecom operators are entering into the media industry (offering TV over broadband and mobile music services),
– telecom and IT/Internet industry is entering into the consumer electronics market (camera phones, Dell selling LCD TV, Yahoo! branded DVD players).

The evolution of this new industry creates both, new possibilities to the customers, and new requirements or needs. In the work presented here, we started from a customer point of view in order to identify new opportunities.

## Convergence – User Perspective

Today, customers are confronted with various broadband access services and different devices to process or create digital content (for example music, pictures, video, TV, messages, documents, Personal Information Management, PIM, like calendar or address book). This renders managing content, devices and access complex for the user.

There is a perceptible trend showing that endusers want to control the way they consume digital content. For example, we are witnessing the success of "time-shifting" in the TV business (i.e. see at anytime your content, giving control over time). There is a new user trend now appearing: "space-shifting" (i.e. see your content anywhere, giving control over space). There are still different obstacles on the way to full control: Users struggle with different devices for dedicated purposes that are difficult to operate, are incompatible with each other, run short on battery and only connect to networks at dedicated places. Consumers are looking for devices that are simple and easy to operate, have long battery life, always provide access to the user's content and manage different formats. Personal information (calendar, contacts) is expected to be up-to-date and synchronised between different devices and different users of a community.

Users on one hand own different types of content (self generated, like photos, or bought online, like music) on different types of devices (digital camera, iPOD, PC etc.), and on the other hand perform more or less the same tasks on them (fig. 2):
– Consume: listening to music, viewing a video or photo
– Create: buy a song, take a picture, record a TV programme

Fig. 1. Convergence of telecom, Internet, media and consumer electronics.
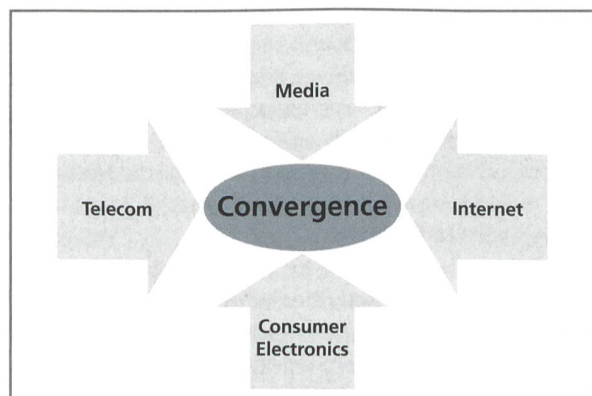
– Store: save on hard disk, memory stick or on CD
– Organise: annotate and structure photos (holiday, wedding, children) or music
– Share: showing a picture, lending a CD or DVD

These tasks are usually performed on each device separately, even for the same type of content, for example photos on a camera phone, a digital camera or a PC. With the increasing digitalisation of content and connectivity of end-devices, users expect to be able to transfer content or data seamlessly from one device to another. A characteristic of digital content is its flexibility (can be stored on different media) and its "flowing" feature (can be transported and shared on any network). What users also discover is that digital content is equally easy to create and destroy and therefore poses the problem of keeping digital memories and backups: how can we be sure to be able to access and consume our digital content in 50 years from now?

Fig. 2. Managing content and devices: a complex world.
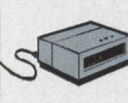
| TV | Photo | Music | Messages | PIM | Document |
|---|---|---|---|---|---|
| Create | Create | Create | Create | Create | Create |
| Consume | Consume | Consume | Consume | Consume | Consume |
| Organize | Organize | Organize | Organize | Organize | Organize |
| Store | Store | Store | Store | Store | Store |
| Share | Share | Share | Share | Share | Share |
| TiVO | Ofoto | iTunes | Topcall | Plaxo | Internet Storage |

Fig. 3. Data Harbor vision.

| TV | Photo | Music | Messages | PIM | Document |
|---|---|---|---|---|---|
| Create | | | | | |
| Consume | | | | | |
| Organize | | | | | |
| Store | | | | | |
| Share | | | | | |

Given the complexity faced by the users today, its management creates a business opportunity: It's about giving the user the freedom and flexibility to decide when and where to consume his content very easily. Watching a TV programme should not be linked to a TV set but should as well be possible on the home PC and even on a mobile device. Sharing your photos should be possible from your mobile phone, your home or office PC. Access to your content anywhere, anytime and on any device is the driving idea behind the Data Harbor concept.

**Data Harbor**

The Data Harbor concept is about offering simple, ubiquitous and unified access regardless of location and device. With Data Harbor, the complex management of networks, devices and content is shifted from the user to the operator. The user should be able to create, consume, organise, store and share all his data/content on all devices seamlessly (fig. 3).

Data Harbor is a service directly emerging from the convergence of different industries (telecom, IT, media, and consumer electronics). It addresses convergence on different levels:

– User services level: delivering the service to the same person on different access networks and devices
– Device level: multi-access device capabilities, multi-purpose device (PC acting like a TV, mobile phone at the same time being a camera, music and video consuming device)
– Network level: wired and wireless networks seamlessly delivering the user services

The role of the Data Harbor operator is to manage the different access possibilities and the different user and device profiles in order to enable a simple and convenient service experience. Content must often be adapted to the network and device capacity. Storage will be centrally located for backup and easy sharing, but local for privacy and optimal user experience.

The main convergence activities today are taking place in the digital home environment. Industry is setting standards like the DLNA (Digital Living Network Alliance, www.dlna.org) which has the vision to enable "a wired and wireless interoperable network where digital content, such as music and videos, can be seamlessly shared through personal computers (PCs), consumer electronics (CE) and mobile devices in and beyond the home" (fig. 4).

The operator benefits from increased customer ownership through unique differentiation features covering both the fixed and wireless broadband services. This new convergence era is mainly user driven and therefore can only succeed if it addresses the user expectations in terms of convenience, usability, security and reliability. The converging industry has identified this opportunity and is addressing it. Every industry player offers a specific answer based on its history, assets and culture.

**Data Harbor related Activities in the Converging Space**
Several companies have already identified the opportunity to offer users a new way of dealing with devices and content based on the new convergence. Telecom operators,
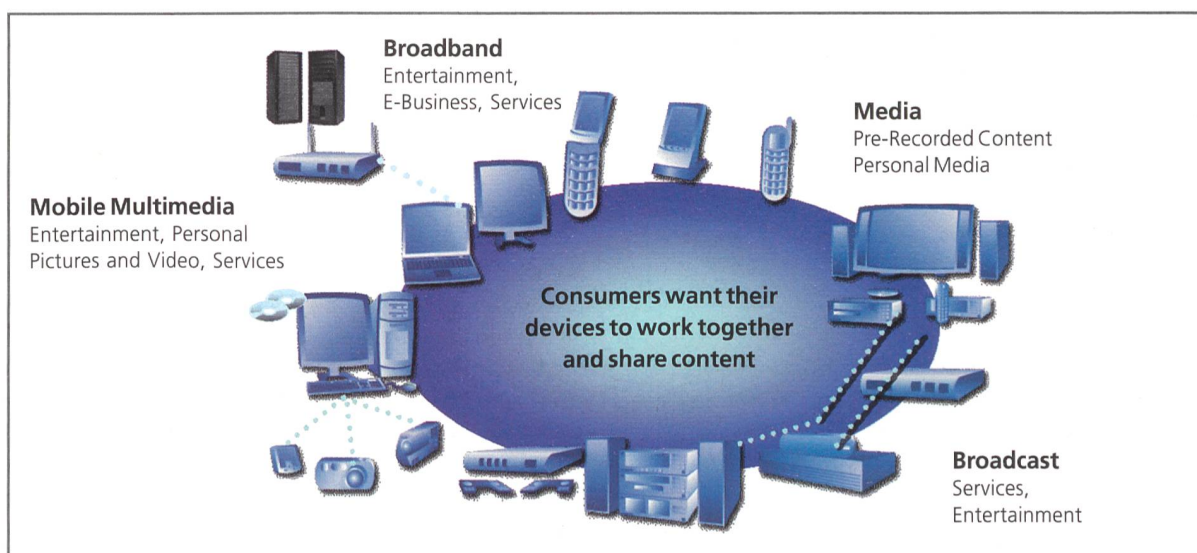
Fig. 4. The Digital Living Network Alliance vision (source: DLNA).

portal service providers and device manufacturers cooperate or compete in order to create a new business eco-system. Here are examples of recent moves illustrating this changing industry.

### SBC, Yahoo!, 2wire

SBC Communications (www.sbc.com), Yahoo! and 2wire teamed-up to offer a user-centred service: U-Verse. This service enables the user to buy any online content (music, video) from Yahoo! and to store it on a set-top-box provided by 2wire and SBC. The user can record TV programmes and store them on the set-top-box. Using a mobile device (SBC owns the mobile operator Cingular Wireless) users can access their content from anywhere and at anytime.

### Nokia

Nokia is evolving towards a mobile data harbor based on its assets (the mobile handsets) and aimed at simplifying and enhancing the customer experience. Users are storing a lot of information on their mobile phones and there is a chance to unlock this content and make it available to family and friends. Nokia offers Lifeblog (www.nokia.com/lifeblog), a software which transfers all the mobile handset content (SMS, MMS, pictures, videos) onto a PC and structures it according to a timeline. The user can browse and annotate the content on the PC. The "Nokia Image Album" is a piece of hardware (hard disk, operating system, network interfaces, CD drive) connected to the TV set. Users can transfer their mobile handset content through Bluetooth on the "Nokia Image Album". Using remote control users can navigate through their content on the TV screen and thus share photos, music and videos with family or friends in the living room.

### Microsoft

Microsoft is developing a strong strategy based on the home PC as a central element of the converged digital home (www.microsoft.com/windowsxp/mediacenter/default.m spx) and is also expanding in the mobile business through the portable media market where it pushes a dominant reference design based on the "Portable Media Center". Microsoft announced for 2005 several initiatives to get a foothold in the mobile phone market by launching smartphones supporting Microsoft's operating system. Moreover, Microsoft owns several core technologies like codecs, delivery platforms and copyright protection solutions. The Media Center Edition 2005 PC platform, launched end of 2004, is a central piece towards controlling this market.

### Conclusion

After the technology hype of telecom convergence in the 90s, the topic is back again 15 years later. This time convergence deals with telecom, media, IT and consumer electronics. The industry is in transition and the borders are being reshaped and redefined. The new world envisioned by this convergence will keep its promises if instead of adopting a technological approach, players of the industry address user expectations in terms of convenience and usability. The main battle today is about having user-owned content flowing through all devices (PC, TV, mobile phone, camera, etc.) interconnected by wired and wireless broadband networks. The analysis from a user viewpoint shows that an increasing complexity in handling content and devices poses serious challenges to the user. The aim of Data Harbor is to address this complexity by enabling a simple and ubiquitous access to all user-owned data anywhere, anytime and on any device. The ultimate vision of Data Harbor is to make the user's digital lifestyle easier. ■

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