Technical standards for Satellite & Cable TV in Asia

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1. Introduction

The advent of digital Direct-to-Home services in the mid 1990s brought Digital Television to consumers. Media corporations saw the opportunity to deploy the technologies that were originally developed for professional satellite services (contribution links, and primary distribution links to feed cable headends) for Pay-TV services directed at the consumer. They invested huge amounts of money in content rights, transponder lease and end user equipment, which came as part of a subscription package, or was heavily subsidised when sold via retail.

For return on these investments, these operators installed proprietary systems with exclusive links to their customers. The DirecTV satellite DTH service in the US is a prime example of this early model.

In a later stage, economies of scale favored some level of standardisation; the DVB standard found widespread acceptance especially for satellite DTH services.

This was also true for the digital cable market in Europe, where DVB-C was adopted. In the US cable market, a duopoly of technology suppliers, GI and SA, have set the proprietary industry standards for digital cable systems.

In all of the above cases, a proprietary lock-in was maintained via Conditional Access Systems as well as proprietary APIs (Application Programming Interfaces) for interactive content.

We will call this business model, which is based on end-to-end proprietary solutions that lock a customer to a service provider, a "vertical" model. Philips is a prime supplier of Set Top Boxes and systems in this model, serving a large variety of operators and service providers.

2. Horizontal vs Vertical business model

As the opposite of the above-mentioned "vertical" model, there is the "horizontal" business model. "Horizontal" does not equate to "Free-to-Air", it just means "public standards based, interoperable and available from multiple vendors, and compatible with multiple service providers".

The difference between "Horizontal" and "Free-to-Air" is that if a user wants to subscribe to a service, he will need to enter into a contract with a service provider. Obviously Free-to-Air services do need to use a horizontal model, as there is no direct relationship with the "service consumer".

A good example of a horizontal, but not free-to-air, model is a GSM mobile phone service.

From the previous sections it should be clear, why currently the pay TV industry situation is scattered and different proprietary systems are being deployed. Everybody is positioning and playing a game of "land grab" In the meantime, the value of a customer which is "owned" by a cable operator has grown to more than $4000.- in some recent deals. Even in the satellite markets, operators are willing to invest heavily in replacement of an entire population of Set Top Boxes after having done an acquisition.

With these tremendous amounts of money at stake, why would the situation ever change? Why would the current vertical model ever be replaced by a horizontal model ?

The answer is that there are some forces at work in the direction of the horizontal market. A number of these will be described below, and it is left to the reader to form an opinion on the likelihood that the current vertical business model transforms into a more horizontal one.

The installed base of Set Top Boxes is a burden on the balance sheets of Pay TV operators

Locking in the customer by using proprietary STBs can work for the initial tiers of subscribers, who are willing to pay heavily for premium services. However, as less affluent customers are addressed, e.g. in Asia, this becomes harder and harder for the operators. If 50% of the global TV audience would need to be addressed this way, then an estimated $75 Billion (500 Million * $150) would have to be invested by the collective service providers.

Economy of scale through standardisation of hardware

Hardware suppliers, such as Philips, have had to develop multiple variations of essentially the same functionality for the different Pay-TV operators. This keeps prices higher than strictly necessary, and limits the speed of innovation. Standard hardware would not only be cheaper, but could also be integrated into TV sets, driving prices even further down.

Regulatory policy

The European Commission as well as the FCC in the USA strongly favor "horizontal solutions", because in essence they foster open competition. For USA cable a timeline has been set, for satellite services it is unlikely that there ever will be strict regulations, but for terrestrial frequencies the allocation is heavily regulated and formats have to be approved by local governments. We have seen a strong preference for public standards in this area (EC, UK, USA,....). Cable and Telco industries are more and more pushed in the direction of "common carriers".

Ease of use for the consumer

Customers like to see a very clear message when they buy new appliances. "This TV set is prepared for any digital service you would like to subscribe to" is much more attractive than "You can connect this Set Top Box to your TV to enjoy XYZ services". For a mass market, this is certainly a consideration.

A recent US study from Boston-based Techtrends indicated, that, if given the choice, a majority of cable and satellite subscribers would prefer to purchase new digital Set Top Boxes (65%) rather than leasing them from their services providers (35%).

Content as the final unifying factor

In the PC market of the early 1980s, the first industry players were all wiped out when a flood of applications started to become available for the PC in a richer variety than for the other microcomputer platforms. For Pay-TV this has not been an issue till now, because its basic content (movies, sports,...) was compatible for all Pay-TV platforms. With the advent of interactive programs this is no longer the case. Authors have to recreate an interactive TV application for WinCE, OpenTV, MediaHighway or ATVEF. This is structurally untenable, and will lead to consolidation, one way or another.

Proprietary Pay-TV models will "run out of steam"

At this time there are more than a billion TV households world-wide, with less than 100 Million global subscribers to Pay-TV services (analog + digital together), so in fact this amounts to less than 10% penetration on a global scale.

Some leading industry experts that there is a "natural ceiling" to the penetration levels of vertical business models, and that as such historically there is not a precedent that these will be able to serve the public at large. This concept of a ceiling to vertical Pay-TV penetration levels is borne out by some recent market studies done in the developing UK digital (terrestrial) TV market.

3. Elements of standardisation

As mentioned before, DVB has played a strong role in the standardisation of Digital TV, firstly of the basic video and audio handling. Through the DVB Common Interface concept, it has also separated the basic receiver function from the security module.

Through last year's acceptance of the MHP – Multi-media Home Platform standard, DVB has

also standardised an API- Application Programming Interface for interactive TV applications.

A similar process is also underway in the US cable market, where the operators are now trying to regain control via initiatives like OpenCable™.

As with the DVB Common Interface, Cablelab's OpenCable™ defines a removable security module, here called "POD", or Point of Deployment module.

CableLab also intends to standardise the API for interactive applications, and has called upon the leading software suppliers to work together to develop a standards-based middleware software spec dubbed the OpenCable™ Applicaton Platform.

In the remainder of this paper, the various elements of this standardisation effort will be examined in more detail.

The role of Java

Java is the "right product at the right time". While in the past there have been a number of attempts to come to hardware independent solutions, none has caught on to the level of Java. There are several reasons for this.

Performance of the underlying hardware is today sufficient to make the penalty for hardware independence no longer prohibitive. Java is highly secure, and rich enough in expression to stimulate the creative freedom of authors. There is a substantial community of Java programmers and there is plenty of interest of key people to participate in Java-based projects. In the various DTV standardisation bodies Java is popular as the unifying format, with a migration path that will allow current users of proprietary solutions to move towards Java over time in a fairly graceful way. A significant recent development is the emergence of the first MHP-Java authoring tools.

Status of MHP

MHP as a standard API to interactive TV applications has benefits for all players in the value chain. Because the standard platform to a large market is of interest to the creative community, the consumer will see a rapidly developing diversity of new applications such as EPGs, TV content search agents, enhancements to TV programs and home shopping. When the full creativity of program designers is unleashed at the MHP platform, there will be many new, interesting applications that we cannot envisage at this moment. MHP will substantially enrich the TV experience.

As one of the leading Consumer Electronics companies in the world, Philips has been very active to support MHP standardisation efforts.

Key Philips achievements are in the field of small-footprint, broadcast oriented Java with breakthroughs in speed and memory requirements. Our Trimedia based demonstrators are spectacular in their Java speed of execution, and at various exhibitions we demonstrated interoperability together with several other manufacturers and content providers.

The MHP 1.0 specification was agreed unanimously, in the January 2000 meeting of the DVB Technical Module. This specification contains two of the three profiles addressed by MHP: the Enhanced Broadcast profile and the Interactive Broadcast profile. The key difference between the two is that the interactive profile makes use of an interaction channel between digital receiver and service provider.

MHP 1.0 contains the Java Virtual Machine and a complete set of Java APIs for enhanced and interactive digital TV broadcasting. The MHP broadcast transport protocols are based on DSM-CC Object Carousels, the interactive transport protocols on IP.

The third MHP profile, labeled "Internet Access", will be finished in the course of 2001. DVB will publish it as MHP 1.1. The profile will provide the extra Java APIs needed for Internet access, including full HTML support and broadcast transport protocols based on IP. In addition this profile will describe the optional HTML subset that may be used in the Interactive Broadcast profile.

Status of OpenCable™

The objective of OpenCable™ was to specify the next generation of consumer device, targeted at the US cable market. It should encourage competition between suppliers, spur innovation and facilitate availability of the Set Top Boxes at retail.

OpenCable™ is comparable with DVB; both are using MPEG and QAM channel modulation.

The main differences between OpenCable™ and DVB are in the areas of:

- the security module (future POD vs Common Interface),

- meta data handling (PSIP vs PSI/SI)

- interactive applications (OpenCable™ Application Platform vs MHP),

- audio (AC3 vs MPEG)

- return channel (DOCSIS vs DVB-RC)

One of the key elements of OpenCable™ is the requirement of interoperability with the legacy of proprietary systems that is already deployed in the US.

The standardisation of OpenCable™ is not completely finalised yet. Missing components are issues over how to handle electronic program guides and agreement on a digital copy protection scheme. These issues are directly related to the final standardisation of the POD module.

Also, discussions are still on-going on the interoperability standards between DTV sets and cable boxes.

Still, OpenCable™ is a very important US initiative that has the potential to create a horizontal market in the US. Therefore Philips has pledged its support, signified e.g. by the agreement that we reached with AT&T in August 2000. In that agreement, Philips agreed to make available through retail channels, a digital Set Top Box that will accept an OpenCable™ compliant POD module. The companies have made arrangements to create compatibility with AT&T's existing head-ends, based on the Motorola-GI DES conditional access system, a breakthrough accomplishment for the broadband

industry. AT&T and Philips also formed a business alliance with the goal of increasing the competitive retail market place for advanced digital cable Set Top Boxes.

4. Standards choices for Asia

How do the various standardisation developments in Europe and US apply to Asia?

First of all, the smaller, segmented and less far developed markets of Asia make the need for standardisation even stronger than in other geographical areas. Only a few large cable or satellite operators in Asia would be able to support a proprietary platform.

We can also take the phenomenal growth of GSM in Asia as a reference. It would be hard to imagine that the current size of the GSM market would have been reached if every GSM operator would deploy its own proprietary hand-set.

In a number of Asian countries, the pre-paid GSM service model was especially successful. This model, in which handsets are not subsidised can be considered the most pure horizontal model.

In the area of Conditional Access, the DVB standard is commonly adopted for both cable and satellite operations in Asia. Even with a built-in DVB compliant CA system –as opposed to using the DVB Common Interface-, the smart card offers a renewable security device that is very effective to combat piracy.

Especially in the area of interactive applications, harmonisation of standards between satellite, cable and terrestrial would also be an important impetus for further growth in the Asian region.

DVB-MHP, with its use of the Java language seems an important candidate for this interactive application standard, as it can be used among all three delivery platforms.

DVB-MHP is expected to be widely adopted for free-to-air digital terrestrial channels. As these channels will also be carried on the cable and satellite Pay TV platforms, compatibility of interactive applications between the different delivery platforms is an extremely important advantage.

The availability of "lean" MHP implementations make a widespread deployment now a cost-effective possibility. Therefore, it is not a surprise that we currently see rising interest for MHP, not only for digital terrestrial TV, but also for digital cable and satellite operations.

Apart from the choice of API, the main decision would them seem the choice of cable operators between DVB-C and OpenCable™. This decision is made slightly easier by the fact that Asian operators do not face the legacy issues that US cable operators face.

Currently, DVB-C has the advantage of being a mature standard, while OpenCable™ is still being finalised. However, the use of the DOCSIS return channel standard in OpenCable™ is definitely an advantage for those operators that want to roll out both interactive Set Top Boxes as well as cable modems, using the same infrastructure in the network. Therefore, we see combinations of DVB-C and DOCSIS adopted by some European operators, such as UPC.

5. Conclusions

Although cable and satellite pay TV is currently dominated by vertical business models, it is believed that a horizontal, standards-based business model will be required in the next phase.

This conclusion is believed to be especially valid for Asia, where few operators can support a proprietary platform, especially for interactive applications.

There is a window of opportunity opening up in the coming 1-2 years for the emerging OpenCable™ and DVB-MHP platforms. These iniatives have broad support from key industry players, broadcasters as well as equipment suppliers and have the potential to spur the next wave of growth for the cable and satellite industry.