

Open Standards for IPTV Set-Top Boxes

What an Open Standard Could Do for the Success of IPTV



Content

| | |
|--|----|
| Executive Summary | 3 |
| Development of IPTV Set-Top Boxes (STBs) and the Need for Common Standards | 4 |
| The Case for Open Standards..... | 6 |
| Comparison and Contrast of Open and Proprietary Standards..... | 7 |
| Objections to Open Standards | 8 |
| Potential Advantages and Disadvantages for the Development of the IPTV Ecosystem | 9 |
| Implication for Policy Makers | 10 |
| Contact..... | 11 |

Authors:



Erik Almqvist



Martyn Roetter, Ph.D



Agron Lasku

Executive Summary

The global IPTV industry has experienced impressive growth, but penetration levels are still modest. Set-top boxes represent a not insignificant part of the total costs of providing such services to the end consumer.

To spur further development and to avoid sub-optimization based on multiple proprietary systems, a common standard will be increasingly important. Any such standard needs to be interoperable, affordable and innovation-friendly.

Since no single proprietary standard for IPTV STBs is likely to emerge, influential players should cooperate to establish a widely supported open standard. A common open standard may represent the best route forward, but does not in itself guarantee such qualities. Clear rules and procedures are needed to ensure robust competition and a win-win environment for all principal stakeholder groups.

Such a development will likely aid the prospects of the entire ecosystem, contributing to the growth and overall success of IPTV.

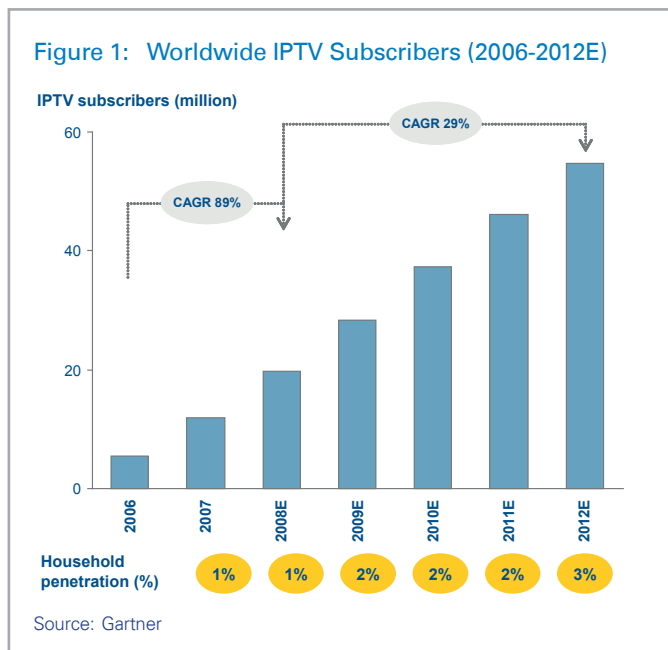
Development of IPTV Set-Top Boxes (STBs) and the Need for Common Standards

The global IPTV industry has experienced rapid growth, but penetration levels are still low (Fig. 1). STBs are a prime example of a multi-sided market in which firms need to persuade two or more distinct groups of customers (who value and need each other's participation) to exploit the same platform in order to generate any economic value.

Consumers are the ultimate source of demand for the services and applications that STBs can deliver. However, the quality and attractiveness of these offerings depends on a great deal more than STBs alone. They involve a complex ecosystem comprising network operators, terminal device vendors, service providers, content owners, infrastructure equipment and components suppliers, and software and applications developers (Fig.2). STBs, which represent at least 17% of a total subscriber acquisition cost for the operator¹⁾, are an important part of this ecosystem.

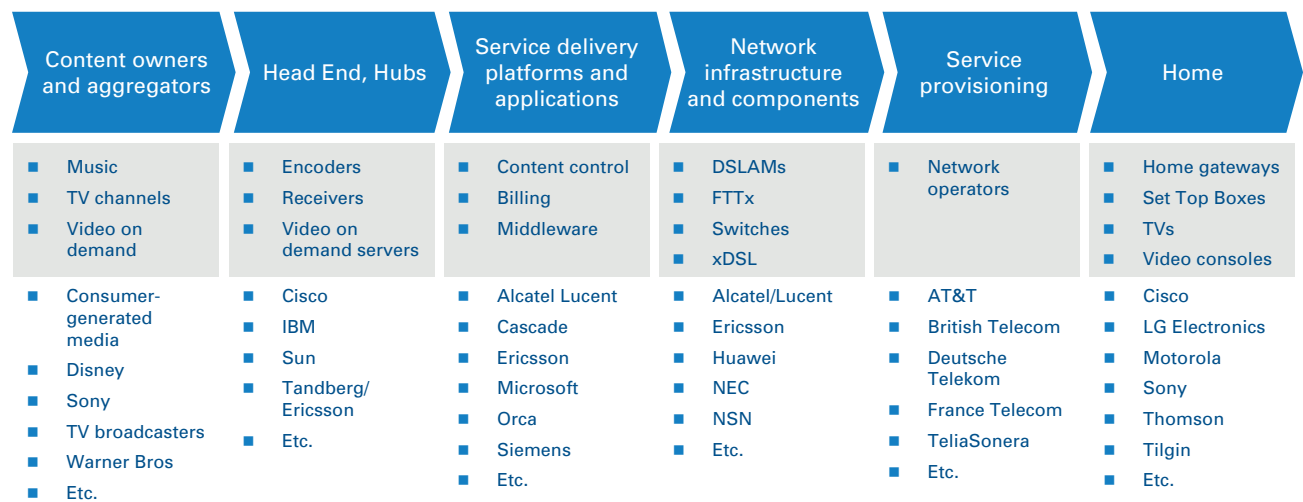
As increasing numbers of IP-based devices find their way into homes, there is growing value in a single controller that can both interface with wide-area networks and manage the distribution of information and content to diverse devices connected to a local or home-area network. In principle, several different platforms are capable of delivering this level of functionality, such as hubs, routers, bridges, or even products developed from PCs, DVD players and video game consoles, as well as STBs. There is no consensus as to which of these products will successfully evolve into the "brain" of connected homes.

The successful, sustainable growth of this ecosystem requires that all its parts, including STBs, must be interoperable, affordable and innovation-friendly. If STBs are to become a nexus in the complex ecosystem, they will have to be as affordable, functional and interoperable as possible. Otherwise they may be limited to the role of a peripheral component or an interface with only modest functionality.



Note: 1) STB cost of USD120 and total subscriber acquisition cost for the operator of USD692. Source: DirecTV 2008; premium (high definition and video recording) STBs can cost USD250 or more

Figure 2: Simplified Overview of the IPTV Ecosystem: Examples of Features/Products and Players



Source: Arthur D. Little analysis

There is a risk that the current situation – with no one widely accepted and many competing standards – may lead to lower interoperability and higher costs. The multiple remote controls that consumers often need in order to interact with their home entertainment systems including STBs illustrate the limitations and frustrations that common standards should aim at overcoming.

In some cases, proprietary standards that have achieved widespread acceptance can accomplish the above mentioned goals. However, there does not seem to be a set of proprietary standards for STBs well placed enough to achieve sufficient acceptance to become a de facto or common standard and drive a large global market.

The Case for Open Standards

An open approach can be more effective and efficient than reliance on proprietary systems, provided certain conditions are met and risks are recognized and mitigated. For example, the adoption of the open digital GSM cellular standard on a global basis in the 1990s replaced the multiple analogue cellular standards that prevailed in the 1980s. This change helped the industry to exploit to the full the benefits of performance and economies of scale from development to manufacturing enabled by extensive commitment to a standardized digital technology. As a consequence, cellphones progressed from their original “brick” formats in the early 1980s (weight: 985 grams; dimensions 300x44x89 mm; talk time: 1 hour, standby time 8 hours), which sold for almost \$4,000, to typical mid-1990s (weight: 250 grams; dimensions 160x58x28 mm; talk time 3 hours, standby time 30-50 hours), to 2005-vintage characteristics (weight: 85 grams; dimensions: 97x43x19 mm; talk time: 4 hours, standby time: 400 hours). Today, the open digital GSM standard leads the mobile market with a global share (mid-2009) of 89% in terms of numbers of subscriptions, compared to 9% for the major alternative technology – CDMA2000.

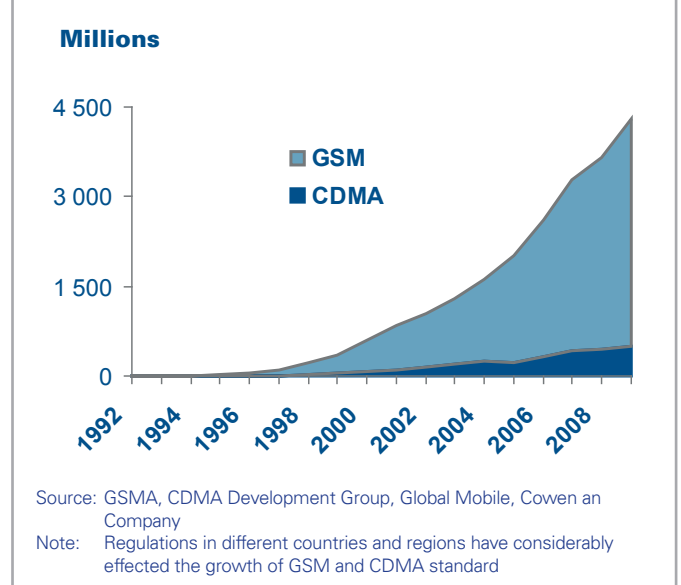
The GSM/UMTS/HSPA or 3GPP ecosystem has gathered increasing momentum over CDMA2000 even in markets where it was launched after CDMA, such as in the Americas (Fig. 3). This success has encouraged major CDMA2000 operators to abandon their road map and switch to the 3GPP platform for the next generation “4G” networks (LTE). In India and Brazil, major mobile operators have even decided to devote significant spectrum to deploying pre-broadband GSM technology in addition to their original CDMA2000 networks, as they perceive that the market growth potential for the latter is more limited.

Open standards will only be productive if they are initially developed and perceived to be able to capture a large share of their target markets. Then all essential participants will devote their highest priorities and most valuable resources to developments based on these standards. In a classic “chicken and egg” situation, the success of an open standard depends on the level and effectiveness of commitment that it receives from influential players, while that commitment at least in part

relies on broad scale adoption. Nevertheless, commitment alone is not sufficient to ensure success, but rather the criteria of interoperability, affordability and innovation-friendliness need to be fulfilled as well.

Multiple existing standards bodies with varied origins have significant stakes in standards that will need to be considered in the formulation of future open standards for STBs – ITU-T, IEEE, 3GPP, IETF, W3C, ETSI, and DSL Forum are several, far from exhaustive examples. This circumstance can be beneficial i.e. there is considerable and very valuable prior art and engineering that can be built on without having to invent an entire new wheel from scratch. But it also complicates the question of establishing an agreed best vehicle through which to formulate and manage open standards. A vehicle with a comprehensive mandate is required comparable to the ambitions of the Open IPTV Forum, which is attempting to address all levels in the value chain from content management and APIs to transmission, presentation and customer platforms.

Figure 3: Global Growth of GSM and CDMA Subscribers (1992-2009)



Comparison and Contrast of Open and Proprietary Standards

The critical difference between “proprietary” and “open” is that the former is controlled and managed by one company or competitor, even if it is adopted by or licensed to many organizations, while the latter is subject to the decisions and procedures of a standards body with several and sometimes many participants. (Fig. 4)

Neither “goodness” nor “badness” is an intrinsic property of either open or proprietary standards. A proprietary standard may be widely adopted and become a de facto standard that achieves high volumes and hence economies of scale and affordable prices (e.g. Windows), while an open standard may fail to achieve market acceptance and remain high priced (e.g. ISDN). However, the contrary may very well be the case e.g. the price of DVD players reduced by 50% in 3.5 years while the price of IPTV Set-Top Boxes took almost 7 years to reach that level. (Fig. 5)

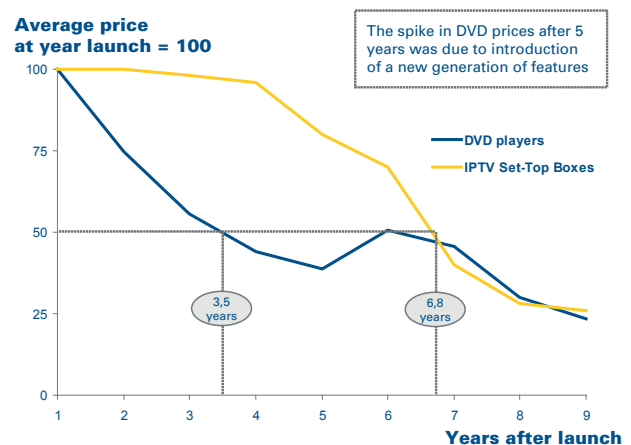
Whatever standards are involved, rapid decreases in their prices are hallmarks of successful consumer electronics products. Nevertheless, open and proprietary standards do vary significantly along the dimensions of “goodness” and risk.

Figure 4: Respective Characteristics of Open and Proprietary Standards Along the Three Major Dimensions of “Goodness” and Risk

| Characteristics | Open standards | | Proprietary standards | |
|--------------------------------|---|---|--|---|
| | Dominant | Fragmented | Dominant | Fragmented |
| Affordability | High | Low | Potentially high, but variable | Low |
| Interoperability | High | Low | Potentially high, but variable | Low |
| Innovation-friendliness | High | Variable, probably limited | Potentially high, but variable | Low |
| Major risk | May inhibit innovation unless upgradeable | Substantial investment in development with no/little return | Power of one competitor to distort competition | Consumers and services providers may be left stranded |

Source: Arthur D. Little analysis

Figure 5: Indexed Average Sales price of IPTV STBs vs. DVD Players Starting From Their Commercial Launch



Source: Gartner, Natixis Research Report, Morgan Stanley Q2 2007 Global Technology Data Book

Note: The DVD Video format was not introduced simultaneously in all continents: in Japan in November 1996, in the United States in March 1997, in Europe in November 1998, and in Australia in March 1999

Objections to Open Standards

There are several sources of concern and objections to open standards:

Delays: The need for negotiation and cooperation, especially if it involves large organizations, can make the open standards process sluggish and unresponsive to the dynamics of fast moving consumer markets

- Response: The example of the open standard DOCSIS (Data Over Cable System Interface Specification) cable modem is illustrative of how these objections can be overcome. Prior to DOCSIS, expensive proprietary cable modems were supplied by multiple manufacturers, both large and small. In November 1996, CableLabs, the North American cable industry's R&D arm, put the DOCSIS project on fast-track status, aiming to have a complete specification written by the end of the year. Laboratory tests of prototype equipment were carried out from mid-1997, while the first certified open standards cable modems were certified in the first half of 1999, to be joined within months by dozens of other products.

Unwieldy compromises: Negotiations between companies with diverse interests may result in compromises or added complexity in a standard, and an expensive or commercially unattractive outcome for implementation (or an example of the unattainable "perfect" chasing out the practical "good.")

- Response: Both 3GPP (formerly GSM) and DOCSIS are examples of multi-party standards organizations groups that have succeeded in establishing and sustaining viable open standards for well over 20 and well over 10 years respectively.

Stifling innovation: Adoption of open standards may stifle the introduction of valuable innovations that cannot be fitted into their framework, for example because they are not backwards compatible with earlier versions of the standard

- Response: The 3GPP community has progressed through multiple versions of its standards with steep increases in performance and the introduction of major new technologies (TDMA to WCDMA to OFDMA air interfaces) while remaining true to the core principles of its ecosystem. DOCSIS has also successfully incorporated innovations in successive generations, most recently DOCSIS 3.0

Susceptibility to "hacking": An open standard may be more vulnerable to attack by hackers to disrupt service and harm consumers

- Response: Susceptibility to hacking is a function of the popularity of a standard, not whether it is open or proprietary. The many and frequent viruses and worms let loose on Microsoft Windows and the Internet Explorer browser are evidence of this fact of life. Furthermore, open standards may be able to benefit in combating hacker attacks from the much wider pool of developers involved in its success than those that any one company can afford.

Corporate and even geo-politics: An open standards process may be captured or distorted by financially or otherwise powerful special interests who direct the standard along paths that favor their agendas, and not the broader, more fundamental market requirements

- Response: 3GPP has successfully expanded its participants from its Euro-centric origin to worldwide reach, including significant roles for technology developers and operators in Asia and the Americas in the formulation of successive generations of standards.

IPR (Intellectual Property Rights): Open standards may include intellectual property from many contributors, each one of them demanding license fees that drive up the cost of products and make their pricing uncompetitive.

- Response: DOCSIS adopted the approach of requiring that to be eligible for incorporation into the standard technology, vendors had to make their submissions freely available to other participants. In the GSM world, various patent owners have found ways (e.g. cross-licensing; the 3G Patent Platform based on FRAND (Fair, Reasonable, and Non-Discriminatory) to help ensure that the costs of equipment are not unduly burdened by IPR costs.

Potential Advantages and Disadvantages for the Development of the IPTV Ecosystem

Consequences of open standards are many. Companies that learn to exploit these consequences to their benefit can prosper while others will not.

For operators, a common standard will lead to lower equipment costs as their choice of suppliers expands, and higher market growth as expanded features deliver more value to consumers, more of whom can then afford the products thanks to their lower costs. But they will also have to cope with the risks that open standards could lead to loss of revenues to competing providers, higher churn rates since consumers can switch more easily, and unbundling of TV services that may fragment revenues among many services providers²⁾.

IPTV STB manufacturers would benefit from open standards through boosted volume sales and greater ability to exploit direct retail channels. Nonetheless, it would become more difficult for them to lock in operators as customers, and they would likely be faced with more intense price competition, resulting in lower margins.

Consumers could benefit from lower prices and richer feature sets as well as greater choice in equipment and service providers. The ideal impact would be comparable to the virtuous cycle initiated by the introduction of open standards-based DOCSIS modems. They fueled rapid growth in U.S. cable modem subscribers (over 95% CAGR in the 5 years following their introduction), accompanied by a decrease in prices from over \$500 pre-DOCSIS to about \$120 in mid-2001, or just over 75% within a period of 3 years.

Most broadly, well defined and implemented open standards can deliver the following benefits:

- Ensure interoperability between diverse products and services to maximize their value to consumers in an “anywhere, any device, anytime, any network” environment
- Enable the maximum economies of scale and hence minimize the costs (maximum affordability) of IPTV products delivered to market
- Permit access to the widest range of R&D resources, from large companies to small entrepreneurs, to develop innovative applications and services that can be offered to the maximum number of users at the lowest per user costs
- Establish a framework for code of conduct or self-regulation that allows the industry to address policy issues, such as consumer protection, distortion of competition and other issues in far reaching ways that can gain support from policy makers, regulators, and public opinion.

Note: 2) European Tier 1 operators seem to perceive that the advantages of open standards outweigh the potentially negative consequences according to a quick poll conducted by Arthur D. Little in September 2009

Implications for Policy Makers

Implications for Policy Makers

In many markets, including STBs, no single proprietary standard has emerged or is likely to emerge. These markets will fall far short of their potential unless influential players cooperate to establish a widely supported open standard. Without this cooperation, market development will be inhibited by the higher costs to suppliers and to consumers that will result from its fragmentation. IPTV market growth will also be impeded by the difficulties or loss of value consumers experience as result of the limited interoperability of proprietary products and services. Limited interoperability frustrates simple “plug and play” use and prevents consumers from accessing the same content and using the same services whenever they wish, regardless of their location.

Policy makers and stakeholders involved in video products and services, and in particular in STBs, have strong common interests despite their diversity. They should unite around the principle of establishing open industry standards across technologies for products and the delivery, management and security of services and content. Such an attempt is essential to ensure robust competition, maximize cost-reducing economies of scale and scope in these markets, and define an industry-supported code of conduct that can address policy issues in a demonstrably satisfactory and purposeful framework.

If open standards are to be successful, they require:

- Clear rules governing the contributions of Intellectual Property (IP) to the standard, and the rights and obligations, financial and other, associated with their use by members and non-members of open standards groups
- Procedures for securing and incorporating input from consumers and policy makers as well as supply-side stakeholders
- Procedures for testing and certifying “plug-ins” and applications from any source as interoperable and compatible with the standards
- Criteria of “goodness” for reviewing, assessing and selecting submissions and eventually revisions to incorporate into the open standards, including but not limited to factors such as costs of implementation, upgradability, schedule for implementation and backwards compatibility.

Contact

If you would like more information or to arrange an informal discussion on the issues raised here and how they affect your business, please contact:

Austria

Karim Taga
taga.karim@adlittle.com

Italy

Giancarlo Agresti
agresti.giancarlo@adlittle.com

Nordic Countries

Martin Glaumann
glaumann.martin@adlittle.com

Belgium

Jean Fisch
fisch.jean@adlittle.com

India

Srini Srinivasan
srinivasan.srini@adlittle.com

The Netherlands

Martijn Eikelenboom
eikelenboom.martijn@adlittle.com

China

Jian Xu
xu.jian@adlittle.com

Japan

Yoshikazu Matsuoka
matsuoka.yoshikazu@adlittle.com

Spain

Carlos Abad
abad.carlos@adlittle.com

Czech Republic

Dean Brabec
brabec.dean@adlittle.com

Korea

Daesoon Hong
hong.daesoon@adlittle.com

Switzerland

Karim Taga
taga.karim@adlittle.com

France

Didier Levy
levy.didier@adlittle.com

Malaysia & Singapore

Thomas Kuruvilla
kuruvilla.thomas@adlittle.com

UK

Richard Swinford
Swinford.richard@adlittle.com

Germany

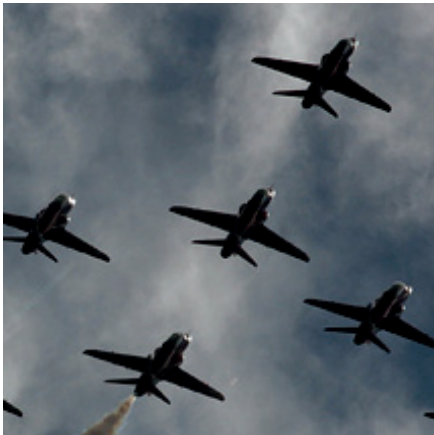
Michael Opitz
opitz.michael@adlittle.com

Middle East

Thomas Kuruvilla
kuruvilla.thomas@adlittle.com

USA

John W. Brennan
brennan.john@adlittle.com



Arthur D. Little

Arthur D. Little, founded in 1886, is a global leader in management consultancy; linking strategy, innovation and technology with deep industry knowledge. We offer our clients sustainable solutions to their most complex business problems. Arthur D. Little has a collaborative client engagement style, exceptional people and a firm-wide commitment to quality and integrity. The firm has over 30 offices worldwide. With its partner Altran Technologies Arthur D. Little has access to a network of over 18,000 professionals. Arthur D. Little is proud to serve many of the Fortune 100 companies globally, in addition to many other leading firms and public sector organizations. For further information please visit www.adl.com

Copyright © Arthur D. Little 2009. All rights reserved.

www.adl.com/open_standards