



The Digital TV Transformation Opportunity: From Idiot Box to an Evolutionizing Gadget

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The TV is being hailed as the most 'evolutionizing' gadget. Its continual dominance over the living room and constant embracement of new technology facets, like internet and social networks, vouch for the same. Viewers' desire to watch/interact with TV differently has initiated, sustained and driven this evolution. The demand for a collective viewing experience, for instance, has led to the emergence of the social TV in US and family TV services¹ in India. Today, TV ecosystem players – original equipment manufacturers (OEMs), chip providers, content service providers – have to decode user demographics, socio-economics, culture and market maturity, to ensure next generation TV solutions aren't outdated or 'off the mark' on user expectations. How does one achieve that?

A 'usage based solutioning' approach is one way to avoid a user acceptance debacle early on. It can help an OEM decipher 'what will the user

switch to after turning on their DTV' and also enable content providers zero-in on 'what recommended content will have the 'highest sticky' quotient for different user segments'. One needs to begin with classification of the DTV market into established, emerging and next generation TV solutions, based on user patterns and evolution of feature sets. An in-depth analysis of next generation features demanded by each DTV user segment follows. These insights would throw open new use cases / opportunities for solutions. Each of the use cases / opportunities would be tinted with different colors like geographic specific user considerations, cultural diversities, age group specific demands etc. Solutions designed, architected and manufactured keeping the use cases in mind would result in a usage driven solution bound to be readily accepted, contemporary and cutting edge in the market.

Decoding User preferences in DTV market segments

Established Markets-Basic DTV

Regular TV functionality is an established trend in the DTV market that has been commoditized today. The different standards used across global DTV market include Advanced Television Systems Committee (ATSC) for North America, Digital Video Broadcasting (DVB) for Europe, Integrated Services Digital Broadcasting (ISDB) for Japan, Digital Terrestrial Multimedia Broadcast (DTMB) and China Mobile Multimedia Broadcasting (CMMB) for China, and Sistema Brasileiro de Televisão Digital (SBTVD) for Brazil. The only product differentiation element is display size, with price variation being between \$150 and \$500. Semiconductor companies need to ensure high picture quality, HD surround sound, and cable and terrestrial support across all display sizes while Original Design Manufacturers (ODMs) are working on achieving 'low price per feature'. They are adopting DTV solutions from ISVs to lower price. ISVs have common solutions with a complete feature set for cable/terrestrial/satellite reception to enable quick product roll out

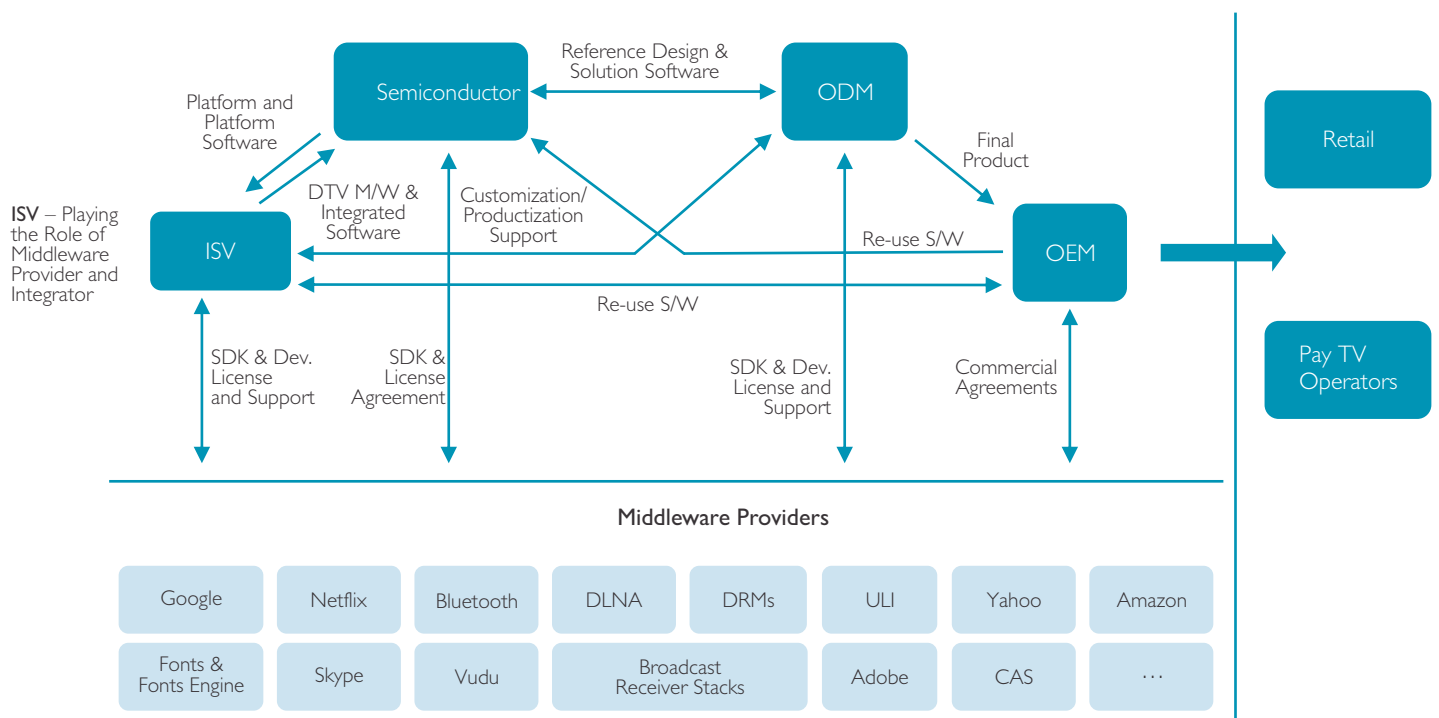
Emerging Markets – Smart TV

Today's consumer wants to be empowered with the choice of content. Connected/Smart TV frameworks have enabled convergence of broadcast and internet content giving rise to an ecosystem of over the top (OTT) application providers like Netflix, Hulu, Vudu, Rhapsody, and Pandora for content choice and Video on Demand services allowing the user to pay only for content consumed. The user is also demanding a connected entertainment experience where user content (bought, recorded or personal) is accessible from any device (tablet, smartphone, PC, etc). This is driving varying multiscreen content delivery solutions to transfer content across devices, both locally and online.

Opportunity for OEMs and Content Providers

User expectations open up different use cases, challenges and opportunities for ecosystem players (figure 1). OEMs are looking at this market as 'ARPU based business' moving away from 'one time sale' business. Their business models have transformed from sales to services maintaining a relationship with users. They are offering Apps on TV for networking on TV and TV based commercial transactions. Similarly, for content providers, functionalities like high-definition, 3D, VOD, DVRs, catch-up services, mobile and PC services are providing opportunities to retain subscribers and offer value-added services to advertisers.

Figure 1: Ecosystem



Opportunity for Semiconductor Companies

Semiconductor companies are partnering with technology companies for frameworks and ISVs for broadcast solutions and system integration, to arrive at a holistic Connected TV solution for OEMs. Maintaining low system on chip (SOC) costs while providing high processing power for 3D, Picture in Picture, Picture Aside Picture and View modes (panoramic, zoom and stretch), is a challenge. Further, Smart TV platforms need to support multiple Audio Video Codecs for streaming content from multiple sources.

Opportunity for ODMs

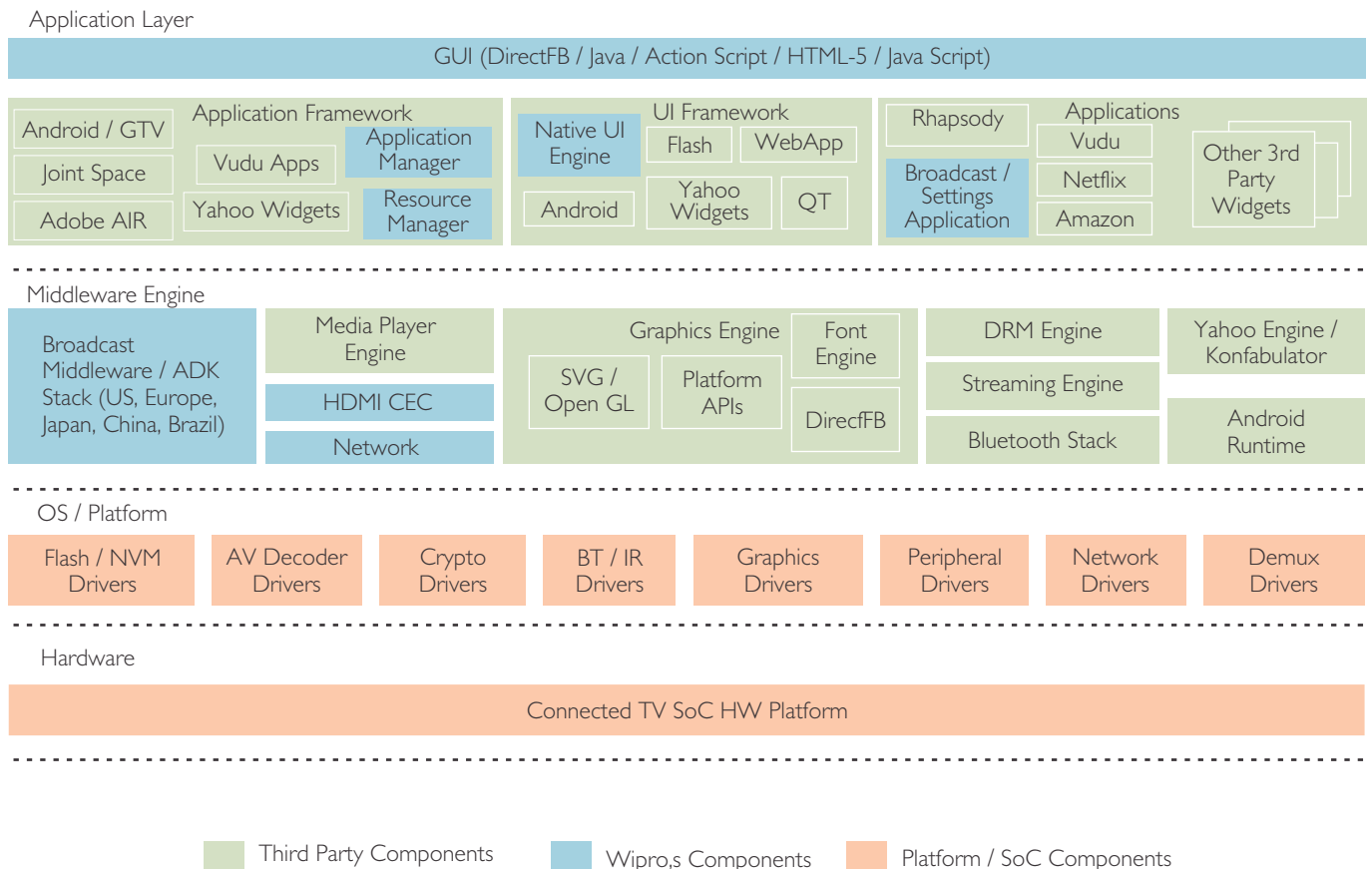
ODMs have a stronger role in the hardware platforms design with the inclusions of support for components like Wi-Fi, Bluetooth, Wired interfaces, Camera and Headphones. They need to partner with DRM companies for content protection. Continuous management of software

upgrade for various components in the Smart TV pose a challenge. Traditional serial software updates (provided by DVB-SSU) are becoming irrelevant due to the software component increase in Smart TVs. Off-the-shelf solutions are needed from ODMs.

Opportunity for ISVs

ISVs (limited to traditional broadcast solution in the past) are shifting towards a layered approach providing services to integrate broadcast solution with internet TV frameworks like Yahoo Connected TV, Google TV and Joint Space. This is opening up a new revenue stream for ISVs. Their broadcast stacks serve as the generic integration layer to application/middleware Framework from Android/GTV, Vudu, Yahoo Widgets etc (Figure 2). As a result, ISVs have begun licensing their DTV middleware stacks. They are transforming into system integrators and one-stop-shops for solution development, support and scale across multiple product lines.

Figure 2: Architecture of a generic Smart TV solution being provided by ISVs



Smart TV Architecture

Opportunity for Game Console Providers

Gaming console providers are tapping into this market. With online services capable of delivering video and interactivity, consoles can double up as entertainment centers from dedicated gaming devices. Users can create 'private clouds profiles' for storing personalized content. The rise of content (video and images) editing apps allows better management of content. Alongside, private cloud is providing a seamless experience across consoles and other devices like tablets, mobile phones and PC. The user gets greater device independence with profile and content access independent of the console device.

The scenario of a gamer uploading images and videos on private cloud, editing the image using video editing tools on his tablet and accessing the final video on his DTV is the future. Similarly, a gamer starting his game at home and resume the same on his buddy's console is the near future. However, achieving this is not easy.

Profile management and integration for seamless experience across devices would be stumbling blocks before gaming console providers. A common framework for the gaming ecosystem could be one resolution. This could be achieved through the interactive IP back channel (through http) from Smart TV receiver to the Cloud server. Subscriber Profile management would be needed at the cloud server level. However, only time will tell about who will take this lead, drive the change and will the market accept this change. Challenges like 'who will own the billing of the various apps / media consumed?' are bound to emerge.

Next Gen Markets - Social TV

Enabling television on multiple product form factors will create the need for seamless experience which will be enabled through cloud based services. The next generation TV is expected to be social. Today, television programs are generating a second audience on social sites—an audience that is often known to 'multi-task' by using their TVs, computers and mobile phones simultaneously. To integrate this social consumption, OEMs need to continue to keep audience glued to broadcast programs and improve the video recommendation system. ISVs would need to integrate social networking tools and data into their electronic programme guides (EPGs) Middleware. This will enable suggestions based on an individual's previous viewing preferences, critics' choices and recommendations from Facebook and Twitter.

Further, 'Next-gen' television services need to bring together multiple video sources including linear streams from traditional TV channels; à la carte version of television services; video programs from Web; professional content on the users' hard drives and personal content. Aggregating content from varied sources would need newer user interfaces, probably even natural user interfaces using gestures and speech.

As broadcast and Web models converge, advertising is evolving towards e-commerce. The next generation of TV services would need to aim towards 'targeted advertising' messages. Subscription data and viewing patterns will allow operators to insert targeted ads based on the user interest. However, privacy issues and technical issue like jerks because ad insertions would be a possible deterrent, opening up an opportunity for OEMs to preserve user experience.

DTV Wearing the 'Geo' Glasses

US and European markets are always looking for new features in DTVs. The US market has embraced Next Gen cloud based and media gateway solutions whereas we see an increased IPTV adoption in Europe. Features like HD DVR and Catch-Up TV are getting positive response in both markets. The constant change in User TV viewing patterns and content changing is driving different form factors. Though the TV and STB continues to be the central consumption device worldwide, TV reception on other form factors like the mobile phones, tablets and In-Car TVs is catching up in US and Europe markets. The rest of the markets (APAC, MEA and Lat Am) are followers in technology. Analog shutdown has made migration to digital TV imperative. Features like internet Apps and widgets along with 3D, HD are catching up in these markets. TVs with large form factors and cinemascope displays to harness the power of content consumption from multiple sources without compromising on the TV viewing experience are also in demand.

Looking ahead

Looking ahead, the psychology of the couch can be expected to drive DTV market. The DTV user is distinct and merely porting of famous app clients will not work. The desire of the DTV user is to be passively entertained and the player who decodes the couch psychology will succeed!

Footnote:

- 1) The recording services, for instance, is being marketed as a feature enabling a family TV watching experience. It is being sold as a feature allowing a mother to record her favorite serial while she watches the cricket match with her sons and husband.

About the Authors

Narayan Shenoy heads Wipro's Product Engineering led consumer electronics business across the world. He built the licensing business around Digital TV solutions of Wipro and supported product development initiatives of TV, STB and portable electronics customers across the globe. The cutting edge solutions under Shenoy's leadership have won laurels like the CES and EISA awards in the past.

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