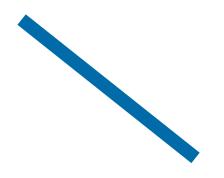**THE BROADCAST SOFTWARE BRIDGE INFRASTRUCTURE**

Integrated First and Second Screen Experiences

A white paper by Michael Lantz of Accedo

The usage of mobile devices has exploded over the past ten years. At the same time TV remains incredibly popular and powers the largest content industry in the world. The holy grail of next generation connected devices is, quite naturally, to connect the first screen, the TV, with the second screen, the mobile. This paper explores the prospect of integrated first and second screen experiences and the likely development over the coming years.

Interaction Paradigms of the First and Second Screen

Before going into the details, it's necessary to provide an overview of today's interaction paradigms for the first and second screens. Let's start with the mobile device, which should be familiar to all readers.

The vast majority of mobile devices today have touch screens as the main interaction method, potentially coupled with a home and menu button. Keyboards still exist but we will for the purposes of this paper disregard this rapidly diminishing set of devices. The difference between mobiles and tablets from the perspective of interaction is just the size of the user interface.

If we instead look at the first screen, the TV device, it is largely not touch enabled. Instead the vast majority of TV devices are shipped with a remote control device. Such devices can either be very basic, like a Roku remote or quite advanced like a Samsung TV remote. In addition, some devices are shipped with game controllers, external keyboards and gesture control devices.

Fundamentally, the difference between TV and mobile interaction is that for a mobile you interact with the same device you look at, while for the TV you interact with a separate device than to the one you're looking at. This sets some true limitations on the consumer experience, and we'll get back to this later.

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Consumer Behavior for Second Screen Experiences

At Accedo, we firmly believe that it is necessary to start by examining the consumer behaviour before designing any second screen experience. In many cases, we find that available technologies, rather than the consumer requirements, impact the implemented use cases for applications, which take focus and budget from functionality, which is truly important.

In our opinion, the most common complaint with a mobile application is that it's not possible to display the content or the application on a TV screen. At the same time, the most common complaints with a TV service are that it's difficult to find content that you're interested in and that it takes time to navigate the TV application, which is perceived as "clunky" compared to the slick mobile user interface. Even if it's possible to do so much more with integrated first and second screen experiences, we firmly believe that the main use case that consumers expect to be solved is simply to discover content on the mobile device and play it on the TV device.

Other use cases will be attractive for certain sub groups, but we believe that it will be years before we see a wide spread consumer adoption of these advanced use cases. We will explore four user cases in this paper to highlight a few of the differences.

Definition of Integrated Second Screen Experience

Before we go into the technology and a few of the use cases for integrated experiences, it's worthwhile to make a definition of what we mean with an Integrated Second Screen Experience.

Definition: An Integrated Second Screen Experience is a mobile application or service, which interacts with and impacts the experience on the first screen based on the interaction with the mobile device.

This definition, which we use at Accedo, effectively disqualifies a lot of today's so called "second screen applications" from being Integrated Second Screen Applications. Any stand-alone mobile app which doesn't connect to the TV device or TV service, but is just used while watching TV is excluded, including e.g. Social TV services, program guide apps, sports statistics applications, TV show applications and so on. These applications may be attractive, both from a consumer point of view and a broadcaster point of view, but are trivial to deploy and are not considered Integrated Second Screen Experiences.

Examples of Non-Integrated Second Screen Experiences

I've heard a number of people saying that Facebook is the dominant Second Screen application. In the sense that it is the most common mobile application which people use while they are watching TV, this is true. However, since there is no integration or interaction between the Facebook app and your TV screen, it doesn't fall into the definition of an Integrated Second Screen Experience.

Another important second screen category is the mobile apps from the programmers. Such applications are very attractive for talent shows such as X Factor, Dancing with the Stars and other live programs, where additional information and content can be made available to consumers via the second screen application. The vast majority of these applications exist in parallel to the actual program and are not considered an Integrated Experience. We see an increased interest in adding integrated features into those apps, but today the vast majority are just separate, stand-alone apps.

A third category is the program guide applications. Fundamentally, these applications give you tools to manage your TV schedule, including program guides, news, social feeds and any embedded links to third parties or program formats. The most well-known program guide application is Zeebox, but in most markets, there are at least 3-4 competitive applications on the mobile app stores with similar functionality.

Technical Solutions

The technical challenges of Integrated Second Screen applications are based on the need to connect the two experiences together. Once each device knows what the other device is doing, it's reasonably straight-forward to create attractive use cases.

In this paper, we can only provide an overview of the available solutions on the market, but it should give the reader a taste of the market possibilities.

Platform Vertical Solutions
- Apple AirPlay
- Samsung AllShare/Link
- Google Chromecast

Cross-platform Single Use Case Solutions
- DIAL
- iMediaShare

Cross-platform Multiple Use Case Solutions
- Accedo Connect
- Miracast
- Pay-TV middleware platforms

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The Platform Vertical Solutions have typically been provided by one platform, in order to provide an attractive competitive edge. They typically have an integrated intuitive user experience, but will only work on a limited set of devices either on the TV side or the mobile side.

The Cross-platform Single Use Case Solutions are normally focused on solving the use case of playing video on the TV screen activated from the second screen. This is the most important use case, but may in certain situations not be enough.

The Cross-platform Multiple Use Case Solutions are more generic in nature, and allow for more advanced use cases not only related to video sharing, but also with other messages and information being shared between devices.

Use Case 1 – Video Viewing

The key use case currently is the possibility of controlling video playback on the TV screen from the second screen. This theoretically gives the consumer the possibility of using each device for what it's good at and getting a better experience.

The use case is normally as follows:

1. Consumer browses content on the mobile
2. When consumer has found what he's looking for, he completes the purchase on the mobile device.
3. When the video starts playing on the mobile device, the consumer selects an option to play on the TV screen.
4. The TV screen will now start playing the video.
5. The mobile screen will change to an advanced remote control, potentially with additional information about the video.

Fig 1. Accedo Connect enables quick pairing of companion devices to the TV or STB.

The use case works easily with on demand content, but parts of it can work with linear content as well, where discovery will likely take place via the program guide on the mobile device.

If we look back at the fundamentals of the two interaction paradigms described earlier, this use case works quite well since the interaction on the second screen device is quite limited and can be done without reading lots of text and complex UIs on the mobile device. This use case should be intuitive for consumers.

Fig 2. Controlling video playback on the TV Screen from the second screen.

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Use Case 2 - Gaming

There are great possibilities for creating attractive TV-centric family gaming experiences that benefit from an Integrated Second Screen Experience. The typical use case will be games where each player has hidden items or cards, or alternatively where each player will need to interact with the game simultaneously. For such games, which are typically family style board games, each player will use their own mobile device for their personal items and share a common game board on the TV. Imagine for example Scrabble, where each player has their own letters and can combine words on their own device while they are sharing a game board on the TV screen.

The use case is normally as follows:

1. The first player uses his second screen device to see his personal items. He completes his turn by interacting with the TV screen.
2. The TV screen displays the results of the first player's move and the turn goes to the next player.
3. The second player uses his second screen device to complete his turn similar to the first player.
4. And so on until all players have done their turns and it's time for the first player again.

This use case will require a more flexible messaging principle between devices, but for innovative family-style gaming concepts, it provides a great use case.

If we examine the two interaction paradigms, we see some weaknesses in the gaming use case. It's clear that the gaming use case will work better with turn-based gaming where users can look at their personal screen intently for periods of time and the interaction with the big screen is limited. For games with significant real time interactivity, a traditional controller will in most cases provide a better experience, simply because the consumer cannot look at two screens at the same time.

Use Case 3 – Participation TV

I have previously mentioned that mobile apps, which just add value to a program on the mobile do not count as Integrated Second Screen Experiences. When such apps actually interact with the program on the TV screen, we have decided to call them "participation TV". The innovation possibilities are endless and it's mainly the producer of the show who will decide the limits of interactivity.

Here are a few examples of attractive participation TV functionalities, which can be added into a second screen experience.

- Reality shows: Contestant questions and voting.
- Political debates: Agree/disagree with what is being said in real time.
- Sports: Statistics related to who's present on screen at each time.
- News: Available links to related stories on the TV screen.

Normally the key to participation TV is the live element. For scripted content, like dramas and movies, the interaction with the program is less relevant, and can be satisfied with second screen apps, which are not integrated with the first screen.

From an interaction perspective, participation TV works well. The viewing experience doesn't require 100% attention to the TV screen, and it's possible to have quite advanced interaction with both text and video information on the second screen as a complement to the first screen. This use case should work quite well for consumers.

Use Case 4 – Interactive Advertising

Interactive TV advertising has been a topic for over 15 years, with numerous attempts from middleware companies and interactive services companies to deliver an attractive interactive advertising functionality. The main problem has been scale. Various technologies exist which can recognise the ad sent to a consumer and then allow the consumer to interact with that advertisement, which will give higher value to the ad and will justify the additional investment in the interactivity. However, if a TV channel needs to invest in multiple advertising technologies to reach a significant part of the market, the cost for delivering the interactivity is too high to justify a mass deployment.

Second screens suddenly offer a way to have an interactive device in every consumer's hand while they're watching TV. It has the added benefit of not interrupting the ad break, removing value from the following ads. The main problem is for the mobile device to know which ad is playing on the TV screen. This problem is technically more or less solved. The most common solution is that interactive advertising service providers are, in their data centres detecting, in real time, exactly which ads are playing on all major TV channels. The mobile device knows which channel the TV is tuned to by recognising the audio stream, and will then know exactly which ads are playing. The consumer can then in an application related to the program format get additional messages and interactions from the advertiser during ad breaks.

The only thing holding off a mass deployment is the natural growth of a new market. Sales organisations and advertisers need to understand the new possibilities and measure the value of the new technology.

Non-Consumer Use Cases
In addition to the consumer use case, we believe a significant value can be delivered with non-consumer use cases, i.e. usage of the integrated technology, which is not visible to the consumer.

- Consumer tracking, i.e. what consumers are watching on their TVs

- Consumer technologies, i.e. which combinations of devices and technologies consumers are using

- Video quality, i.e. how video quality, buffering and streaming experience is perceived by consumers.

- Device diagnostics. By letting the STB or TV connect to the mobile device it is possible diagnose firmware and device quality over the air.

This area is still very immature, but is expected to grow rapidly over the coming years. By having all devices connected to each other, the prospects of Big Data analysis to finally understand consumer behaviour in the living room is fantastic.

Pay-TV Operators Have the Greatest Opportunities
The most important player to deliver a truly integrated second screen experience is the pay TV operator. They completely control the set top box, which is the central hub for video consumption in the home. In many cases, this is also the only device, which can receive and decode video content, which in itself creates attractive use cases for second screen experiences.

Pay-TV operators normally have proprietary TV middleware, with both local components and cloud components. Modern pay TV middleware expose APIs for mobile devices to access certain second screen functionalities.

- Record and view PVR content

- View on demand content on any device (in the same wifi network)

- Enhanced remote control for the STB

- Cross-linking to external catch-up TV players.

A number of the use cases for pay-TV operators are very strong second screen use cases, and we believe that these operators will aggressively push Integrated Second Screen Experiences the coming years.

Broadcasters and Cable Networks Rely On ACR Technologies
A TV channel today is normally handing over their feeds either over satellite or via fibre to their distributors. After the hand-over, they have no control over which device is accessing their feeds, and will not be able to create any true second screen services which interact with the live channels for all devices.

They essentially have two options:

1. Integrate with all available pay-TV solutions on the market.

2. Rely on technologies on the second screen device, which can recognise the content playing on the air, so called ACR technology.

Automated Content Recognition (ACR) technologies are currently by far the most common solution, since this provides a reliable way of providing true interactivity to all consumers regardless of TV device. This technology is relatively expensive and will likely take time before it's wide spread.

OTT Pure Plays Will Be the First Ones Out
Pure OTT companies have two significant benefits compared to TV channels and operators. Firstly, they know that the TV device is online when the consumer has started it. Secondly, they have rights to content on all devices where they have an application. Maybe not a full library, but a significant part of the library should be available.

These two aspects allow them to implement the key use case of browsing content on one device and playing it on the other. The only requirement is that both devices have the same app playing at the same time, and then it's a simple matter of connecting the devices with each other via the Internet or local network and establish interactivity.

Timelines for Market Availability
Let's be clear – Integrated Second Screen Experiences are already deployed in the market today by many companies in the value chain. However, they have failed to make a big impact on the consumer experience. I believe that the main reason is simply device lifecycles. In order to make full use of these Integrated Second Screen Experiences, the consumer must have a fairly recent Smart Phone or Tablet and at the same time a fairly recent Connected TV or STB. So far the overlap is less than 30% in developed countries and around 10% in more emerging markets. On top of this, it's clear that this is a significant change in consumer behaviour. It is likely that it will take time before consumer adoption is wide spread.

Accedo estimates that around 10% of consumer households use Integrated Second Screen Experiences on a regular basis. We also believe that the increased consumer maturity and proliferation of more devices and services will cause this to rise rapidly to about 20% at the end of 2014. Once we reach market usage of 25-30%, we believe the market size is there to start innovation initiatives in earnest.

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Will Consumers Care?

Today, consumers are truly excited about being in control of their TV consumption. The key change in the market is the ability to consume linear and on-demand content on any device whenever the consumer so desires. Many industry pundits have touted second screen experiences as the next big wave in the TV industry, which we believe is a huge exaggeration. We believe it's mainly a "convenience innovation", which adds some value to existing use cases, but will not be a fundamental change in consumer behaviour.

I believe that an Integrated Second Screen Experience will be as natural as using a remote control 10 years from now, and I believe that it will improve the way we experience TV interactivity. However, I also believe that additional revenue streams are marginal and the conversion of consumers to a new paradigm will take at least ten years, with plenty of laggards holding on to remote control interaction for the foreseeable future. The lack of new revenue opportunities will cause the transition to be slower than originally anticipated.

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