HGi-BR040

USE CASES AND BUSINESS REQUIREMENTS FOR A MEDIA GATEWAY (MG)

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3  INTRODUCTION

3.1  PURPOSE OF THIS DOCUMENT

This document describes the high-level Broadband Service Provider (BSP) business requirements for Media Gateway functionality primarily located at the customer’s premises. These are largely based on a set of 6 Use Cases involving the handling of various types of content (personal, broadcast, and IP).

To set the context the document presents a brief discussion of the available architectural approaches to the use cases before focusing on the Media Gateway approach. The document is intended to assist the BSP business-developer in identifying the potential benefit of such a Media Gateway, and the optimum disposition of the various functional elements involved.

While this document captures the high-level, business-focused Media Gateway functional requirements, the more detailed requirements will be the subject of a subsequent document.

3.2  CONTEXT: EXPLOSION OF DATA IN THE HOME

As a variety of new Consumer Electronics (CE) devices has entered the home, the requirements to store, transmit, and internetwork large amounts of associated data within the home has increased. Consumer devices such as video enabled smartphones, tablets and connected TV-sets all consume audio and video data. A typical French household already has more than 6 connected screens in the home (source: Mediametrie, June 2012).

Some of this media originates within the home (e.g. on consumer owned devices like cameras, digital media players, tablets), some comes from the internet, and of course BSPs already deliver premium content to these devices.

While much of this data is streamed, there are also various requirements for storage, for example to support time-shifting and repeat viewing. There are also requirements for adaptation of media formats and Digital Rights Management (DRM).

The proliferation of data consuming devices presents both a challenge and a business opportunity for the BSP. The document will allow the BSP to identify the ways that home-located media functions, in particular in the Media Gateway itself, can help to realize this opportunity. Interworking with cloud features is also covered where appropriate. Finally, remote access (customers accessing their data when not at home) is also within scope of this document.
3.3 END USER BENEFITS OF MEDIA GATEWAY

The high level use cases addressed by the Media Gateway are explained in more detail further in the document.

There is an increasing variety of end user behavior with regard to content services. On the one hand we are seeing more and more TVs in the home, while on the other, many, and especially younger, people tend to consume video on devices other than the TV. Today's users want complete flexibility within the household to consume whatever service they want on whatever device they choose. In general, they expect all the services to be available anywhere within the home and beyond. This of course includes premium content.

As the number of retail devices increases, users will want to seamlessly add new devices of different type whilst maintaining some unity of experience in order to leverage, on a new device, the skills already learned on another device. This homogenous user experience also provides additional comfort when the user permanently switches among multiple devices.

The possibility of seamlessly consuming services on different types of devices is also creating user's willingness for mixed cross-device usages. The “follow-me” or extended remote control use cases are already identified but another usages will probably also emerge. Users want all their devices seamlessly collaborating.

In addition, boundaries between classes of devices are becoming more fluid – for example, content guides can appear on a television or on a “second screen” such as a tablet or smartphone.

As many of these new devices are handheld, solutions that can wirelessly connect with multiple end devices may be required. The Media Gateway is able to support many end devices. This contrasts with traditional solutions such as a dedicated per-device set-top-box, which was, typically, associated with each end device.

Users also face problems due to the abundance of content; the number of places, devices and services offering this content is rapidly growing. Profusion of content and devices can cause another problem for users – incompatibility between content formats and device capabilities. The Media Gateway solution potentially addresses all these user needs.
3.4 TERMINOLOGY

The following meaning is assumed for the terms used in the present document:

**BSP (Broadband Service Provider)** – a telephone company, cable company or other carrier that offers high-speed communications to homes and businesses, typically for Internet access. Cable modems, DSL and fiber lines are the common technologies.

**Content browsing** – a feature enabling the search for content items by presenting all available content in a content catalogue (such as the PVR, a VoD service, list of available live channel programs etc.). An example is browsing still pictures in a set of directories on a disk.

**Content search** – a feature enabling the search for content items fulfilling required search criteria. An example is the search, in a content catalogue (such as the PVR or a VoD service for example), for all the movies starring Charlie Chaplin and realized in 1932. It requires a kind of query interface enabling the definition of search criteria.

**IPTV (Internet Protocol TeleVision)** – a content delivery method based on a managed IP network. Usually, content services (such as VoD or Live channels for example) provided to the customer by IPTV are offered by the Broadband Service Provider i.e. the Service Provider whose broadband access network is used by the customer.

**Live content** – content distributed by a Service Provider with a predefined schedule and independent of the user’s demand. Broadcasted or multicasted TV channels are its best examples. This term does not necessarily imply that the content is happening at the moment of broadcast, such as live sports content, but is used in the same sense as is commonly used in the pay-TV industry.

**OTT (Over The Top)** – a content delivery method based on an unmanaged IP network such as Internet. Usually, content services (such as VoD or Live channels for example) provided to the customer by OTT are offered by Service Providers that are distinct from the Broadband Service Provider whose broadband access network is used by the customer.

**Premium content** – content distributed by a Service Provider, available in a restricted way and requiring some kind of protection (CAS or DRM based) due to its market positioning. Usually it is the opposite of the so-called “Free-to-Air” content available in an unrestricted way.

**PVR (Personal Video Recorder)** – a feature allowing the user to record live content and then to watch it later on demand.

**RUI (Remote User Interface)** – uses an RUI server which implements all user interface functions for a number of client devices. The server can be used to generate, for example, an Electronic Program Guide specific to a Service Provider’s “look and feel”, and send it to a client device. The client can then display this graphics data without the need for any proprietary software from that Service Provider. Client
devices such as TV sets, tablets, Blu-ray players, PCs etc. need only to be compliant with the requirements of the RUI protocol to work with an RUI server.

**SP (Service Provider)** – a company offering content-related services such as VoD or Live channels for example. It can be the same or distinct company from the Broadband Service Provider.

**Time-Shift** – a feature allowing the user to use at least the pause and resume trick-modes while watching live content.

**Trick-modes** – features allowing the user pause, resume, fast-forward and rewind operations on watched content.

**VoD (Video on Demand)** – a service allowing the user to chose, for playing, a piece of content available in the VoD content catalogue. The method of delivery could include OTT, IPTV, and other forms.

## 4 Definition of a Media Gateway

The Media Gateway (MG) is an extension of the current Home Gateway. The current Home Gateway functions, such as routing, management, NAT/firewall, storage, applications enabled through OSGi or another application execution environment, and home networking, are all still supported. The Media Gateway adds functions traditionally located in a dedicated STB, such as media acquisition, media
protection, and optionally media rendering. The Media Gateway has storage capabilities to support services such as time-shifting and adds new functions such as media adaptation and media distribution.

The Media Gateway brings various benefits such as reducing the box count (in the limit, eliminating the need for any STBs) in the home providing content to variety of device types.

5 Architecture Approaches

The MG is focused on serving a range of use cases - premium content, timeshifting, interaction with multiple end devices, displaying services based on media formats and conditional access technologies, etc. This section compares MG with other approaches that might be viewed as alternative to serving these use cases.

The first is a pure extension of the STB architecture – multiple STB.

The second is a Cloud approach that migrates traditional STB functions partly into the Cloud and partly into Smart TVs.

5.1 Multiple STB Approach

Architectures based upon a STB connected to each television can be extended to a multi-STB/multi-television architecture to address additional televisions. This could include a primary STB that includes media storage, together with “subsidiary” STB; or it could be based on multiple independent STB.

However, the traditional STB does not include features such as wireless interface to multiple retail devices, and flexible transcoding of media formats and content protection.

In comparison with a multiple STB approach, the MG approach provides flexibility to address retail devices with a variety of media and contention protection types.

Note that in a MG-centric architecture, there may still be a need for subsidiary STB for secondary televisions. However, in fact one driver for introduction of MG is to reduce the number and complexity of STB within the home.

5.2 Cloud + Smart TV Approach

If conventional STB are removed from the home, STB functionality can potentially be moved into the Media Gateway itself, into Smart TVs, and/or into the Cloud.

The “pure” approach based on mixing the Cloud and Smart TVs is very appealing; however it has several potential issues for Service Providers:
• **Complexity of management of in-home devices** - Service Provider deployed devices such as STB are managed by the SP so as to maintain the latest firmware, access rights etc. The number of variants is relatively small and easy to maintain.

In contrast, the Cloud + Smart TV architecture may require SPs to also track a large variety of Smart TV devices and hardware/firmware configurations. These provide a potentially large management problem, because new models appear on the market every year and the SP must support all of them.

• **Complexity of the Client Application and Cloud Server Software** – In addition to the management issue described above, the increased number of types of client devices present in the SP’s customers’ homes also has an important impact; the number of the software versions of both the Client Application and the Cloud Server that have to be developed, validated and maintained by the Service Provider - explodes.

• **Unclear demarcation of responsibility for Smart TV Software** – In a CE device (such as a Smart TV) – where software is partially provided by the CE manufacturer and partially by the SP - the responsibility for the correct functioning of the end device may become unclear. For example, new CE firmware, may be automatically updated by the CE manufacturer that may break the Service Provider’. In the event of malfunction, the service provider may have to field complaints from the customer.

A Media Gateway approach enables Service Providers to reduce the need for STB but without the drawback of the pure Cloud/Smart-TV approach. However, it also has its own issues:

• **Interoperability issue** - the standardization and especially the degree of interoperability of the current content consuming devices are still quite feeble. This implies, in many cases, the utilization of some kind of lightweight STBs.

• **Additional complexity** - MGs provide a set of benefits like being able to work with low-bandwidth WAN interfaces, upgradability of codecs/target CE devices etc. However, this happens at the cost of additional complexity in the MGW itself. Depending on the SP’s network performance, a more classical STB-based approach (when each STB communicates directly with the Cloud) can be, for the traditional content services, less complex and more efficient. However, the Media Gateway approach shows its advantage in the case of the networks having low access-bandwidth. Broadcasted content (from satellite or terrestrial tuners in the Media Gateway) can be redistributed in home networks to multiple content consuming devices without overloading the WAN-link. The utilization of modern efficient codecs, such as HEVC, can also be easily deployed thanks to the Media Gateway approach – the HEVC streams are converted by the MG if the consuming devices don’t support this codec. The optimization of the access-bandwidth utilization is also important since (a) it allows the SP to increase the number of customers served, (b) improves the quality of content to each customer, and (c) uses a single
content stream to feed multiple devices (with content adaptation being done by the MG where necessary). This aspect becomes even more crucial if the SP plans to deliver the highest quality content (4k Ultra HD) to the largest part of its customers.

The issues, mentioned above, of different architectural approaches mean that there is no single best option in all circumstances. The right choice will depend on the Service Provider’s network performance, its operational constraints and its willingness for providing additional and extended content-related services. Hybrid architectures mixing elements of different approaches will probably prevail in real-life deployments.
6 USE CASES FOR A MEDIA GATEWAY

This Section describes six Use Cases all of which include seamless interaction between the growing variety of video and network enabled retail devices in the home. All these use cases involve the Media Gateway working in conjunction with a Cloud service. Some include media consumption outside the home to support customers “on-the-go”

6.1 USE CASE 1: PREMIUM CONTENT DELIVERY ON RETAIL DEVICES

Users are increasingly using portable screens such as smartphones and tablets to consume content. This use case involves the consumption of premium content on these devices, which is currently restricted to a TV via a STB.

While in principle the same STB approach could be used, most of these new video-enabled devices are portable. Therefore requiring connection via a STB would be very limiting with regard to location (in the house) and the inconvenience of having to plug a wire into the STB, even if it supported the appropriate connectivity. In this Use Case, the role of the Media Gateway is to enable premium content consumption by a whole range of device types (using a wireless interface) without the need for a dedicated per-device STB.

Fig. 2 - Premium content delivery on retail devices
The main roles that the MG needs to perform in order to do this are:

- Termination of a variety of DRM and CAS protection schemes, and conversion to a single common link protection mechanism; note that the security this provides needs to be acceptable to all the content providers.
- Conversion of various video transport protocols (e.g. RTP streaming to HTTP)
- Provision of a suitable wireless interface, and the ability to connect to the portable devices in a user-friendly way.
- Multicast and broadcast to unicast conversion.

Note that while the end-game can be to remove STBs, there may be an interim step, in which parts of the STB function are moved to the MG, resulting in a ‘lightweight’ STB for fixed TVs.

Additional functionality in the MG may include the following:

- Adapting the content format to suit each receiving device, e.g. to match the screen resolution, or frame rate. This may involve transcoding content,
- Since the STB can no longer provide the UI or look and feel that the SP requires, this has to be done elsewhere, for example using the ‘Remote User Interface (RUI) concept. This involves an RUI Server providing the graphical user interface to the video enabled devices (RUI Clients).
- Checking that a given rendering device has the right set of capabilities for a given piece of content,
- Checking that each device type is allowed to display the content under the terms of the license agreements,
- Optimizing home network connectivity to deliver the content correctly to the end-device,
- As the MG is an always-on device, it can act as a proxy for home network devices when they go into low power mode. For example, it can maintain discoverability and provide wake-up controls.
- Providing a local content-rendering capability to allow direct wired connection via an HDMI output.
6.2 USE CASE 2: INTEGRATION OF 3RD-PARTY SERVICES

Media Gateway can also be used as a single integration point for providing media services offered by 3rd-party providers having reached a business agreement with the Service Provider managing the Media Gateway. Instead of integrating them individually on all content consuming devices, it can be appealing to have a single integration on the Media Gateway that is then responsible for redistributing these services to the consuming devices in a standardized way. It can also provide more flexibility by allowing Service Providers to adapt the interaction between the Media Gateway and the content consuming devices if a specific behavior of the latter requires such an adaptation. This approach also enables customization of these services with a user experience adapted by the Service Provider delivering the Media Gateway.

The most flexible way of integrating 3rd-party services in the MG is probably through an application environment running on the Media Gateway.

![Integration of 3rd-party services diagram](image)

Fig. 3 – Integration of 3rd-party services
6.3 Use Case 3: Home Based PVR and Time Shifting

TV services are shifting steadily from traditional linear to on-demand delivery in most markets, and a single PVR that can serve all display devices is a compelling value proposition for any modern multiscreen home.

The picture above shows the Media Gateway providing a centralized PVR. Depending on content rights and level of offering, service providers may enable playback only within the home, on some home based retail devices, on the go, or even through a web browser, say from a hotel PC.

Time-shifting makes more technical sense from within the LAN for bandwidth and latency reasons, but the PVR functionality can be ensured either locally on the Media Gateway, or remotely in the Cloud, depending on the local legal content rights situation.

A Cloud-based PVR infrastructure enables also the implementation of a “start-over” service i.e. the possibility to watch from the beginning a live program that emission has already started some time ago and is currently ongoing. The additional utilization of a home-based Time-shift engine enables a less bandwidth-consuming implementation of this service.
6.4 **USE CASE 4: “FOLLOW-ME”**

“Follow-me” enables users to suspend the current content stream and resume it later on any of their devices, either within or beyond the home. The MG can control which content is allowed to be streamed outside the home depending on the nature of the service and license conditions.

![Fig. 5 – “Follow-me” engine](image)

This feature relies on collecting and sharing data about content consumption on different devices also opening interesting analytics possibilities.

“Follow-me” can be implemented locally, in the Cloud, or via a hybrid of both.
6.5 USE CASE 5: EXTENDING REMOTE CONTROL USING NON-DEDICATED DEVICES

The number of remote controls in most households has become a nuisance to users. A new concept called Extended Remote Control is expected to emerge on retail devices. This will enable the control of content consumption on a variety of devices from other devices playing the role of controllers. Handheld retail devices such as tablets and smartphones will increasingly be used as control devices.

Features will include all the legacy remote controls such as channel changing or volume regulation as well as new enriched personalized functions, such as:

- Viewing other live channels on the controlling device’s screen without disturbing the view on the controlled device’s screen, seamlessly switching between the two screens
- Non-disruptive content selection – searching, browsing, previewing and selecting new content without disturbing the controlled device’s screen and then switching back and forth between the two screens,
- PVR programming,
- Integration with social network services e.g. friend’s recommendations or their current activity

Some of the Extended Remote Control features, such as PVR programming, could also be available remotely (on-the-go).
It is important that service providers deliver good Quality-Of-Experience (QoE) for cross-device remote control features (for e.g., when a tablet is used to preview channels and then transfer control to the TV-set), and this requires tight synchronization between the content streams reaching all participating devices which a home-based solution.

### 6.6 USE CASE 6: LOCATION-AGNOSTIC HOME CONTENT SERVICE

Current content search and browsing methods are difficult to adapt to the new world of abundant content and diverse retail devices.

Content access must eventually become agnostic to its:

- location – whether it’s physically at home or in the Cloud,
- type – whether it’s video, music or image,
- origin – whether it’s user-generated or coming from the service provider,
- type of content protection.

A “Home & Cloud” would aggregate and unify content search and browsing independently of content location. User access location may be restricted depending on content protection.
7 SERVICE PROVIDER’S ROLE, VALUE AND BENEFITS

An integrated solution comprising fast service-delivery, the right content, the right content-rights-management solution, and an end-to-end QoS into the CE device, is necessary for SP-delivered content services.

In fact, up till now the Service Providers haven’t been focused on an end-to-end QoS defined so broadly. In the world where content services were delivered only to a dedicated STB connected to an access gateway by the intermediary of a trouble-free link (most usually a short Ethernet cable) the management of the home network part was not really necessary. Now with the multiplicity of client devices connected to the home network by the intermediary of heterogeneous networking technologies (different Wi-Fi, different PLC, Ethernet, MoCA, …) and the increasing demand for home-network bandwidth they generate, a right management and a dynamic, service-oriented bandwidth optimization become fundamental. Let’s imagine a family member subscribed to a High Definition (HD) premium TV channel (as for example the National Geographic Channel HD) trying to watch it on his Wi-Fi connected HD tablet while another family member is backing-up his PC to a NAS also by the intermediary of Wi-Fi. Clearly, a simple reduction of the premium content quality (and thus the required bandwidth) that can be achieved by an adaptive streaming technology is not the right answer for a subscriber paying for HD content on an HD device. A more sophisticated home network diagnostics and management is required. The Media Gateway will enable this. There is however a challenge for service providers embracing this new multi-device world: they will need to extend their view of QoS and customer support to include elements they don’t provide and/or control.

For Service Providers having many bandwidth-constrained customers (such as ADSL customers) the Media Gateway with DTT or SAT tuners enables the delivery of the most popular live channels to multiple retail devices working simultaneously. Thus the multi-room promise becomes available to all customers.

As premium content distribution is ruled by legal and licensing constraints that vary with countries, content, time, usage, consuming device type etc. a major role of the Media Gateway consists in supporting and enforcing these constraints.

Governments’ regulations enforce power consumption and standby thresholds, which may have a significant impact on the user experience, particularly when home network devices make the transition to low power mode. Both content-source and content-consuming devices can become “invisible” as they transition to low power mode. However, solutions alleviating this problem can be offered by involving an always-on device. The Media Gateway is the best candidate to play such a role.

A homogenous user experience on different types of devices, and especially on retail devices, can be ensured by a Remote User Interface (RUI) technology leveraging Media Gateway capabilities, such as for example its always-on status. This homogenous user experience can be optimized only by an in-home Media Gateway. The same is true for extending the homogenous user experience towards mixed cross-
device usages. Furthermore, a given user experience that the user became familiar with and that is designed and delivered by his service provider to a wide range of devices, constitutes a strong asset for withholding the user and reducing the churn.

Another major advantage, for service providers, of the Media Gateway consists in its central role of seamlessly integrating the different hardware and software components that make up a service bundle. For business and technical reasons these components have to be split in an optimized way between the home and the Cloud. Clearly, the added flexibility of a Media Gateway operating within a Cloud-empowered architecture can bring great benefits to service providers. However, some features can only be placed in-home. Every service provider must elaborate his own rationale on where to locate the different features of his services, to decide to which extent its Media Gateway has to be Cloud-empowered. A hybrid architecture mixing Cloud-based and gateway-based functionalities is within reach of many service providers, and it can provide clearer differentiators as well as the reassuring barriers to entry for new comers.

In today’s competitive landscape service providers must innovate fast, and having part of the storage and processing in the Cloud will help deploy corrections, updates and new features in a simpler way. But the home-based Media Gateway is a key element for innovation too – especially as the basis for new and optimized usages mixing at the same time two or more devices. These cross-device usages will clearly go beyond the five scenarios we have studied and described above. This capability of the Media Gateway provides unique benefits that competitors cannot copy easily.

As more and more users’ own retail devices are coming into play, service providers have to leverage them to reduce their CAPEX and at the same time to increase ARPU by making premium services available through a multitude of retail devices.

Furthermore, fewer devices delivered by service providers mean also less logistical issues, a smaller inventory, and less after-sales-service requests. It also means a less transportation and packaging as well as less electronics and plastics.

The Media Gateway also allows service providers to optimize their roadmaps, to keep their existing back-end infrastructure delivering content services (including CAS and DRM solutions), to integrate seamlessly new back-ends and services and at the same time to reduce its dependency on back-end providers. In fact, a back-end solution can be replaced by another one without any impact on the user’s retail devices.

Looking further into the future, service providers with the Media Gateway will be able to collect much more real-time data from all retail devices in the home. The promise of “Big Data” analysis will let service providers personalize their offerings like never before.
8 High-level architecture variants of the Media Gateway

The highest-level differentiator that a service provider must choose is whether to offer a Media Gateway with a « headed » or a « headless » architecture. A headless gateway provides streamed content via an IP connection, which is usually either Ethernet or Wi-Fi. A headed gateway has in addition the ability to deliver content locally through regular Audio/Video cabling such as HDMI.

![Headed Media Gateway](image)

![Headless Media Gateway](image)

Fig. 8 – Headed vs. Headless Media Gateway variants

Another variable is whether or not to integrate the WAN access technology, typically the DSL or fiber part. A « footless » gateway is a Home Gateway that has no particular access technology. It therefore requires an external modem to operate.

![Footless Media Gateway (headed)](image)

![Footless Media Gateway (headless)](image)

Fig. 9 – Footless Media Gateway variants
Another key architectural issue to clarify is the level of chipset integration. Currently a high-end Media Gateway would require 2 or 3 different chipsets to fulfill all their tasks. This is partly due to the fact that the leading specialists in one area don’t necessarily have the same level of expertise in others. So for example a leader in digital television may not have sufficient expertise in DSL access technologies. But on the other hand multiple specialized chipsets enable different form factors of the Media Gateway – basically a 1-box and 2-box hardware architectures.

There is still a clear need for greater integration at the hardware and low-level software end, although this is going to happen further down the road. It will be possible to build a high-end Media Gateway based on a single chipset in the not-so-distant future. This will enable a new round of innovation in form factors and another drop in energy consumption.

However, greater hardware integration has to take into account an increased complexity of the software running on top of it. Multi-core designs with hardware-supported software virtualization appear as a strong requirement. Thanks to the software modularity and insulation they enable, the service providers will be able to manage independent teams/providers working on specific feature sets with different life cycles and separate roadmaps.
9 DEPLOYMENT AND PHASING CONFIGURATIONS

At this time, the headed variant of the Media Gateway suits deployment needs probably the best. In fact, it enables service delivery with a guaranteed Quality of Service to a single TV set of roughly any contemporary type. And at the same time it allows direct service delivery to such retail devices as tablets, smartphones, PCs, most modern compatible connected-TVs etc. However, a lightweight “companion STB” is required in order to deliver services to a second, and next, incompatible TV-set, which is roughly all existing TV sets today.

The headless variant of the Media Gateway is also able to fulfill all these requirements, however it requires the “companion STB” even for the main TV-set which is clearly more encumbering to the user. Obviously, future availability of compatible TV-sets will naturally resolve this problem. On the other hand, the headless variant has the advantage that it can be placed somewhere else than where the TV is. This variant requires also the most advanced mastery of the dynamic home network optimization in order to deliver the required QoS. This is why the deployment scenarios based on the headless Media Gateways will probably take place later in the future.

In a short and medium term, the “companion STB” is clearly here to stay as the HDMI control provides an advantage for a better user experience. In fact, it guarantees a seamless and direct access to the service provider’s offer.

The deployment of services based on the Media Gateway must also take into account the fact that currently many content rendering standards available on the retail devices only guarantee that a particular functionality is present but not its performance level. Thus the QoS as perceived by the user cannot be guaranteed. For example if the user interface has some 3D animations, it may be difficult for a service provider to ensure that the rendering of 3D is of an acceptable quality.

It is a shame to have to use the lowest common denominator where all devices are limited to the capacities of the weakest. There is therefore a clear need to differentiate between different retail devices. Some can be used in a “best-effort” mode, whilst others that have some specific rendering or security features can be used in cases where service providers guarantee a certain level of performance.

For premium content, dynamically checking a retail device’s capacity in terms of rendering performance or content protection could also become mandatory. In the end a successful service provider should be able to know which user interactions can be guaranteed on which device and really commit to those.