

Gentlemen.

Digital Media in Italia (dmin.it), a not-for-profit organisation established in Italy, has considered the subject Green Paper.

we believe that the [Executive summary](#) and the [Introduction](#) of the dmin.it proposal posted at <http://www.dmin.it/proposal.php> constitute a valid response to your first question

(1) What are the factors that enable US companies to establish a successful presence in the fragmented EU market despite language and cultural barriers, while many EU companies struggle? What are the factors hindering EU companies?

because this very question has been the basic factor that has prompted the establishment of the group and motivated the work carried out that led to the development of the dmin.it proposal.

Best regards

Leonardo Chiariglione

Coordinator, Digital Media in Italia

*Response to public consultation***To**

European Commission
Directorate General for Communications Networks, Content and Technology
Unit G1
Office BU25 05/181
B-1049 Brussels
CNECT-CONVERGENCE-AV@ec.europa.eu

Information Society

Brassersplein 2
2612 CT Delft
P.O. Box 5050
2600 GB Delft
The Netherlands

www.tno.nl

T +31 88 866 70 00
F +31 88 866 70 57
infodesk@tno.nl

From

Pieter Nooren and Martin Prins (TNO)

Date

6 August 2013

Subject

Response to Public Consultation questions in DG CONNECT's Green Paper
"Preparing for a Fully Converged Audiovisual World: Growth, Creation and Values"

E-mail

pieter.nooren@tno.nl

Direct dialling

+31 88 866 72 07

1. Introduction

In April 2013, the European Commission's Directorate General (DG) for Communications Networks, Content and Technology (CONNECT) published a green paper on convergence in audiovisual media¹. The current document is a response to this green paper, prepared by a group of media networking specialists in TNO, the Netherlands Organisation for Applied Scientific Research. At TNO, we have been advising broadcasters, SMEs, network operators, equipment vendors and policy makers on the developments in the converging media-internet-telecom web for years. We base our advice on our expertise acquired in a series of European and national research projects on media networking. TNO is also an active contributor in a series of standardisation bodies that have a key role in the technological underpinnings of convergence, including ETSI, DVB, the Open IPTV Forum and the HbbTV forum.

We welcome the Commission's initiative to publish the green paper and support its objective to stimulate broad public discussion of the implications of convergence in media creation, distribution and consumption. In this document, we take the opportunity to respond the public consultation questions on interoperability and standards for connected TV (section 3) and on accessibility for persons with disabilities (section 4). In section 5, we address potential privacy concerns introduced by the technical opportunities in connected devices to track the viewing behaviour of viewers. Before we go into these topics, we first position connected TV in the wider picture of the converging media-internet-telecom value web in section 2.

¹ European Commission Green Paper "Preparing for a Fully Converged Audiovisual World: Growth, Creation and Values", Brussels, COM(2013) 231 final, 24 April 2013, available at https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/convergence_green_paper_en_0.pdf

2. The converged media-internet-telecom value web

Connected TVs² provide a very visible example of the convergence between media, internet and telecom into a single value web. We write *value web* rather than *value chain* as a key outcome of the convergence is that there are multiple, parallel routes that video content can take between its creation and its consumption. Figure 1 shows some of the routes for the delivery of catch-up TV, in particular the distribution of Eurovision Song Contest videos to viewers in the Netherlands. This figure is from an on-going project at TNO that studies the interdependencies in the media-internet-telecom value web. The study is based on desk research and contributions of key stakeholders from across the value web, such as broadcasters, TV service providers, ISPs and CPE vendors, some of which also co-fund the project.

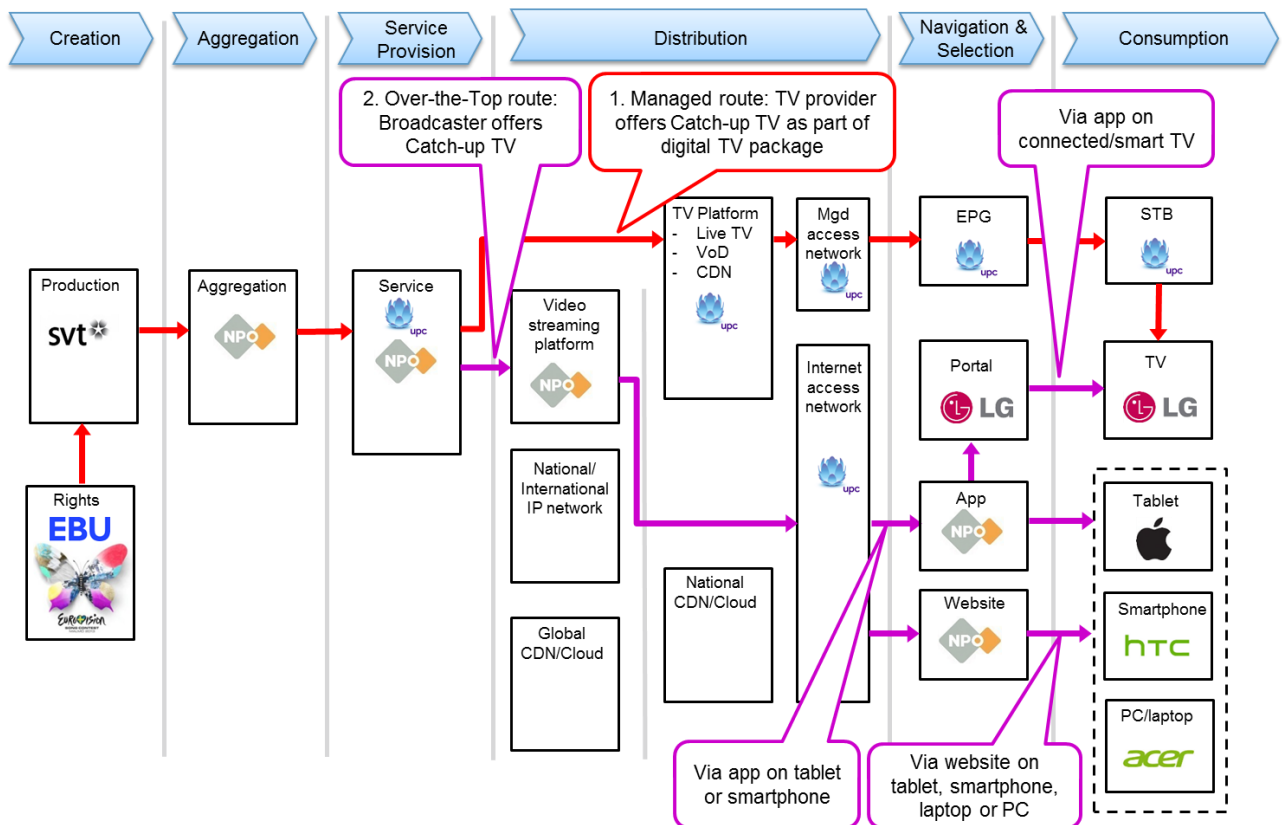


Figure 1. Value web with routes for managed and over-the-top delivery of catch-up TV content from the Eurovision Song Contest. Note: routes and company logos shown are only for illustration purposes.

² In this contribution, we use the European Commission's definition of connected TV from http://ec.europa.eu/avpolicy/info_centre/a_z/index_en.htm: "In a narrow sense Connected TV refers to TV sets that can be connected to the Internet, In a broader sense the term refers to the emergence of a range of technical solutions that bring linear TV and the Internet world closer together, e.g. TV sets with added internet connectivity, set-top boxes delivering audiovisual content 'over-the-top', audiovisual services provided via tablet computers or smartphones."

Just as in traditional media value chains, the video content is created, aggregated, distributed and consumed, resulting in a familiar flow from left to right in the figure. These four main activities are found in the top of the figure in blue, together with two new activities which prove to be important in the converged value web: service provision and navigation & selection. But rather than links in a chain, these six activities now correspond to zones in the value web, with several zones showing multiple parallel routes passing through them.

In the creation and aggregation zone on the left, the figure still shows a single route. The European Broadcasting Union (EBU) owns the rights to the Eurovision Song contest format. The 2013 edition has been produced by Swedish public broadcaster SVT. In the Netherlands, the song contest was broadcasted live by the public broadcaster NPO as a part of the linear programming on one of its channels. After the live broadcast has occurred, there are two main routes for the distribution of the videos from the contest.

- The first route, in red, is what we call the *managed route*. Here, a TV service provider, such as UPC in the Netherlands, offers a catch-up service as a part of its digital TV package. The consumer buys access to the catch-up service through his TV subscription. UPC distributes the catch-up TV using its own TV platform and managed network. The consumer can select the catch-up TV video from the Electronic Program Guide (EPG) running on the Set-Top Box (STB) supplied to him by UPC. In this example, the STB is hooked up to a connected TV from LG.
- The second route is the *over-the-top (OTT) route*, shown in purple. In this route, users go to the NPO website or download an NPO app for their smartphone, tablet or smart TV to access the catch-up service. Thus, the service is offered by the broadcaster, NPO, rather than by the TV service provider, UPC. For the purposes of this example, we assume that NPO plays out the OTT catch-up videos itself. The videos are then further distributed over the Internet. In this example, we assume that the consumer buys both his TV service and his internet access service from UPC in a so-called triple play package. This means that the OTT catch-up video is delivered to the consumer over the UPC Internet access network. Note that in this triple-play case, UPC's network provides the connectivity for both the managed route and the OTT route to the consumer's home. Consumers can choose from many devices to navigate, select and view the OTT catch-up TV. They can watch videos by visiting the NPO website on their PC, laptop or tablet or download the NPO app for their smartphone or tablet. There is also an NPO catch-up TV app for the LG smart TV. And, of course, within one household, two or more of these modes of consumption can be used in parallel.

The example in Figure 1 considers catch-up TV services offered by TV service providers and broadcasters, which already leads to a rich set of possible routes and consumption modes. However, this set of routes is by no means exhaustive. For example, some TV service providers also bring their catch-up service to tablets and smartphones, using their Internet access networks to stream video from their TV platforms to their apps running on these devices. Furthermore, the OTT routes can also be provided over mobile networks, thus adding mobile network providers to the picture. Figure 2 shows another relevant additional route:

videos from the Song Contest are also available on YouTube via a dedicated Eurovision 2013 channel. Thus, a third service provider for this content is available in parallel to the two discussed earlier: consumers can also watch the Eurovision videos by visiting the Youtube website or by using the YouTube app for their smartphone, tablet or smart TV. In the YouTube route, the videos are played out from Google's global cloud infrastructure and distributed further over the Internet access network.

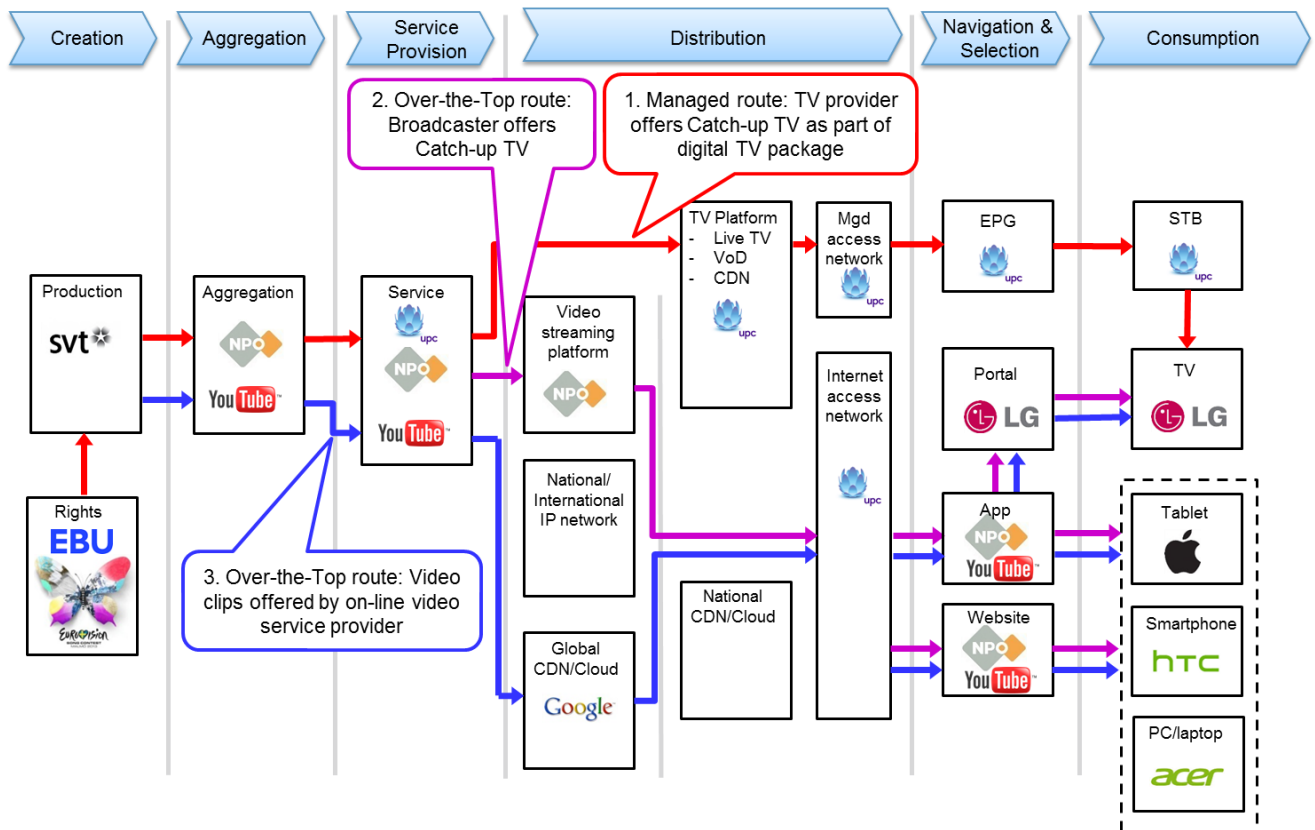


Figure 2. Value web for delivery of catch-up TV content from the Eurovision Song Contest, with additional over-the-top route originating from on-line video service provider (in blue). Note: routes and company logos shown are only for illustration.

We would like to point out three important messages that follow from this example:

1. In the converged media-internet-telecom value web, there can be multiple routes for the delivery of the same content from the same content provider or aggregator to the same consumers.
2. These multiple routes are often associated with multiple providers of video services (in the example: a TV service provider, a broadcaster and an on-line video service provider), thus blurring the lines between these actors.
3. All routes for delivery of video content depend on the availability of resources from multiple actors in the web. This leads to a multitude of interdependencies between the actors in the value web.

Some of the dependencies in the value web are well known as they already existed in the pre-Internet era when there still was a video distribution value chain rather than today's value web. For example, the TV service providers depend on the content from broadcasters and other creators of content. However, as can be seen from the figures, other actors such as on-line video service providers now also depend on content creators. Vice versa, broadcasters depend on the TV service providers for distribution of their content. On one hand, this dependency has become weaker with the emergence of the OTT routes for content distribution (although this can in turn lead to other dependencies on on-line video service providers). On the other hand, the broadcasters remain dependent on the Internet access networks of network operators. There are also new dependencies. For example, many actors depend on the app stores of device makers for making their apps available to their customers, who increasingly use tablets and connected TVs to watch video. This dependency can sometimes be circumvented by providing services through web pages, which increasingly provide native video playback support, but often in a slightly less user-friendly way than can be achieved with an app.

As discussed in more detail in the next section, actors typically do not depend on only one app store or platform. Instead, they generally need to develop apps for multiple platforms to match the variety of smart phones, tablets and connected TVs used by their customers. This is where interoperability and standards for connected TVs come into play.

As a last example, in the navigation & selection segment, broadcasters and content creators increasingly depend on content recommendations generated by apps and smart devices to reach their intended audiences. In some cases, these parties can generate recommendations themselves with their own apps; in other cases they depend on other actors' apps or the position of their content in other actors' portals or content stores.

As can be seen from the figures, it is not straightforward to assess the consequences of the introduction of new regulation, or the removal of existing regulation, on the overall balance in the value web for video. The many interdependencies between actors can lead to situations in which a rule that seems to make sense at one position in the web can have adverse consequences in other parts. It is crucial to recognize that the mere existence of many parallel routes for the delivery of video content has not removed the interdependencies between actors and has even created new ones. Thus, a systematic analysis of the interdependencies between actors in the value web is called for. We foresee that the best approach for such an analysis starts from the so-called strategic assets that actors have, such as content, a network, a large customer base or a strong brand. TNO's observation is that all actors try to build on the strengths of their own assets but, at the same time, are led to share their assets with other actors by business considerations or regulation. Regulation affects the ways in which actors can use their own assets and can rely on other actors' assets, which implies that regulation affects the balance in the value web.

3. Response to question on interoperability and standards for connected TV

Date
6 August 2013

Page
6/10

Question from the green paper:

- (6) Is there a need for EU action to overcome actual or potential fragmentation and ensure interoperability across borders? Is there a need to develop new or updated standards in the market?

The arrival of the connected TV has brought a range of new opportunities for media services aimed at “the large screen in the living room”. What started with simple access to catch-up TV services and premium video on demand, now covers a multitude of broadcast TV related services, but also new and novel media services offered by parties that are not part of the “traditional” TV value web. We distinguish between two approaches in which connected TV is used to provide services:

- connected TV as a platform to enhance the services offered by TV broadcasters
- connected TV as a platform that provides access to media services outside the scope of the traditional broadcasters. Examples of services include Youtube, Netflix and Vimeo.

These two complementary approaches must be kept in mind when considering interoperability and standards for connected TV.

In a 2012 study, TNO and iMMovator have investigated to what extent the connected TV landscape provides or offers opportunities to SMEs in the Netherlands to offer novel media services³. This study showed a considerable fragmentation in platform features and supported technologies, confirming observations in the green paper. The green paper mentions the Smart TV Alliance, the Open IPTV Forum and the work on the HbbTV standard as efforts that address this fragmentation. In our study with iMMovator, we have also identified that these options *could* reduce fragmentation. There are a number of remarks to be made on the role of standards in the reduction of fragmentation:

Fragmentation is not only caused by differences in technical solutions, but also by differences in business and process arrangements.

Fragmentation regarding connected TVs is not purely caused by technological differences. We have identified that connected TVs and related platforms from different vendors:

- have different business models and arrangements;
- have different branding and look and feel requirements;
- have different procedures and requirements for application submissions;
- have different criteria for application acceptance.

³ M. Prins et al., “How-to-Boek “Connected TV”, Kansen voor het MKB” TNO report 35657, 31-03-2012, www.immovator.nl/files/images/Connected_TV_HtB_v1.0_0.pdf (*in Dutch*)

So, while technical standardisation certainly helps to reduce implementation costs for service developers, there are many other factors that determine whether a service can be deployed on different connected TV sets.

Due to the rapid changes in the connected TV ecosystem, enforcement of standards is likely to impede innovation in technology and services.

We strongly believe that the EU should not enforce a standard for connected TV, at least not at this point in time, for two main reasons. First, the connected TV market is developing rapidly. We believe that enforcement of a specific standard for connected TV will impede innovation in technology and services. Second, several standards already exist and have been adapted in several countries on a voluntary basis. The Hybrid Broadcast Broadband TV (HbbTV) standard is an example of such a standard. It is an open standard that anyone can contribute to and implement.

A downside that is inherent to the nature of the HbbTV specification is that it is closed, in the sense that new entrant service providers cannot deploy HbbTV services, as the broadcaster for a specific channel has control over the applications that can be accessed through the app that is linked to that channel. The HbbTV standard does not provide the option for the consumer to access a TV service by entering a URL which links to a third party service, nor a method for third party services to signal their availability to the consumer via HbbTV implementations. In theory, third party service providers could gain access through an agreement with the broadcaster, as the broadcaster's HbbTV application could link to another party's applications. HbbTV also provides a way for TV service providers to offer apps on their own channel(s), and through their portal, they can link to third party service providers. In spite of these options, HbbTV currently does not provide a low-barrier entry for new players, a concern mentioned in the green paper. On the other hand, there are numerous other routes to provide media on a TV screen, or on other devices like tablets, smart phones and laptops, which could be used by new players, as can be seen from the figures in the previous chapter. These routes rely on standards and business arrangements as well. This means that a "one-size-fits-all" standardisation approach is unrealistic.

The existence of multiple DRM systems introduces fragmentation as well but some convergence is visible

As mentioned in the Green Paper, DRM is a challenge in providing TV services across several European countries or even within a single country. Several countries that have adopted the HbbTV specification have made national recommendations on DRM systems, to ensure correct operation and interoperability across broadcasters and TV brands^{4,5}. The French and Dutch specifications are even compatible. While this approach does not directly solve

⁴ Broadcast Engineering.com, "France unleashes TNT 2.0 to heal fragmented world of connected TV". 11-06-2011, available at <http://broadcastengineering.com/news/france-unleashes-tnt-20-heal-fragmented-world-connected-tv>

⁵ Specification for use of HbbTV in the Netherlands, "HbbTV Forum Nederland", version 1.0, 01-05-2013, available at http://hbbtv.nu/wp-content/uploads/2013/06/130501_Approved_HbbNL_Spec_1.0.pdf

DRM interoperability across all European country borders, these developments lead to more elements of DRM systems being common across such systems. Protected file formats and encryption have been standardized by ISO/IEC MPEG, and HbbTV references this so-called Common Encryption (CENC). This MPEG standard allows media to be encrypted once while being compatible with several DRM systems, much like Simulcrypt did for conditional access in broadcast systems. The approach is similar to the one adopted by UltraViolet⁶, where the lack of a single DRM standard is mitigated by a common encrypted packaging format and service providers supporting multiple (DRM) systems for license distribution. This can go a long way to making the differences invisible to consumers

The access of consumers to services via Connected TVs is dependent on technical interoperability but also on business arrangements and decisions

A connected TV manufacturer typically provides consumers with an interactive portal to navigate and select media applications and web based media services. The set of services (or apps) that can be accessed by consumers are determined by the TV manufacturer, so unless the TV offers an (unrestricted) web browser, a consumer will not be able to access services from a third party that the platform provider has no agreement with. An advantage of this approach is that the portal provider can provide quality assurance and make sure that the services that are offered provide a minimal quality (and do not “break” the TV). A potential drawback is that the consumer is limited in his choice of services and applications. New entrants may experience this drawback as well, as they depend on an agreement with the TV manufacturer to make their service available on a connected TV. In this context, it is important to note that there are also other routes for service providers to provide their services than via the TV manufacturer’s connected TV portal. First, there are alternative portals, such as those on set-top boxes (STBs), game consoles and other media devices that can be connected to the TV via standard HDMI. Second, there are other devices that consumers use for consuming TV content, such as tablets, that can be used by new entrants. Obviously, these alternative routes also introduce dependencies for service providers but the good news is that at least there are alternatives. Another class of alternatives, which is still in an early stage, combines the navigation and selection of content on smartphones and tablets with the playback on the TV screen. In this approach, the control of the service is performed by an app on the tablet or smartphone, while the role of the TV is reduced to the play-out of the content provided by an external media box or HDMI dongle, or retrieved by the TV itself from the Internet. Finally, connected TVs tend to have an open Internet browser, but such browsers usually do not provide full support for (protected) content playback.

Because of the multitude of routes and interdependencies between application and TV service providers, broadcasters and device makers, the assessment of whether the rise of connected TV leads to new gatekeeper positions is not

⁶ UltraViolet “101” Overview, version 1.3, 11-12-2012, available at <http://www.uvuwiki.com/>

straightforward and requires an analysis that takes the whole value web into account.

Date
6 August 2013

Page
9/10

4. Response to question on accessibility for persons with disabilities

Question from the green paper:

(26) Do you think that additional standardisation efforts are needed in this field?

In the previous section we elaborated on interoperability and standards for connected TV. In this section we reflect on accessibility functions for TV services for persons with disabilities. TNO has been involved in several projects related to offering new accessibility features, including novel services for hearing impaired consumers or people with visibility impairments.

Our observation is that additional standardization efforts are currently not needed in this field. The connected TV standards provide sufficient flexibility and freedom for broadcasters and service providers to develop broadcast related services for persons with disabilities. However, we foresee that the choices made in the actual implementation of the standards (e.g., choice of specific profiles for Picture-in-Picture settings) are crucial. These choices should not constrain the development of new accessibility services, such as advanced subtitling services, voice-over services, avatar-based and traditional signing services.

It is important to note that connected TV platforms have a role that goes beyond the offering and distribution of individual services, including accessibility services. They also have a role as *platforms for service innovation* for broadcasters, content providers and TV service providers. If one only considers the individual services, there is a risk that one misses the innovation potential that connected TV platforms offer.

5. Privacy considerations

Watching TV used to be an activity that one could do in a private setting, without others being able to determine or identify what end users are watching. Connected TV solutions, including HbbTV, provide all the required tools to report back on a user's TV consumption and behavior to service providers, the TV manufacturers and broadcasters. There are clear incentives for these parties to use such technologies. This may be beneficial to the customer, for example if the information is used to provide personalized recommendations or for the detection of service degradation. However, we expect that the ability to *watch TV without being tracked* is valuable for consumers. We believe that consumers should have a right to choose, and if they wish, to watch TV without anyone knowing and recording their choices and preferences. Therefore, any tracking should always be

done with the user's consent. We also believe that programming should not be rendered inaccessible if a user chooses to opt out. Obviously, opting out may mean that certain functionality, notably receiving recommendations, is not available.

Date
6 August 2013

Page
10/10

Background information on TNO

TNO is an independent research organisation whose expertise and research make an important contribution to the competitiveness of companies and organisations, to the economy and to the quality of society as a whole. TNO's unique position is attributable to its versatility and capacity to integrate this knowledge. Innovation with purpose is what TNO stands for. We develop knowledge not for its own sake but for practical application.

TNO is registered in the European Union's Transparency Register under ID 40524063921-20.