

Cloud TV – How operators make use of a global technology trend

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Cloud TV currently ranks very high on service providers' priority list. Why run Head Ends, dedicated networks and complicated software on proprietary hardware when everything can be moved into the cloud? Why going through the hassle of building a complicated end-to-end architecture when a service can be outsourced to a private or even the public cloud? In the following article, these questions will be looked at under the aspects of quality, technology and business.

1. Cloud TV and broadcast quality

When referring to service quality, any land line based TV distribution technology has to be benchmarked against direct-to-home satellite quality. There is nothing more reliable than 36,000 km of more or less uninterrupted transmission, only interrupted by solar eclipses every now and then and by clouds and heavy rain. In this context, „cloud“ doesn't really have positive connotation: clouds are the enemy of satellite distribution. Since the early 60s, Satellite broadcasters, together with satellite operators have started to establish a network of redundant and highly reliable geo-stationary satellites that spans the entire Clarke belt, making this region the most populated one in space. These satellites are supplied with broadcast signals from an array of geo-redundant and highly protected teleports. These teleports are normally placed in regions where they suffer from the least amount of clouds. This is either in sunny regions or, at least, in high mountain regions. Greek operator OTE, an affiliate of Deutsche Telekom, operates two teleports, one in Nemea on the Peloponnese peninsula and one in Northern Greece next to the historical site of Thermopylae. Each of these teleports can deliver to various satellites and they are connected by a fully redundant fibre network.

Such technology allows reaching availabilities in the range of 99,999x% of the time, resulting in yearly outage times that can be measured in minutes only. When comparing land line based transmission, reaching a similar quality and availability is by far more complicated, not to say impossible. The sheer fact that there are several tenths of active and passive technical elements in the delivery chain indicates that even if these elements would have space-proven technology, the resulting end-to-end quality would never reach the one of satellite.

Before elaborating more deeply on how to deliver such quality, let's understand why this quality delivery is of such a high importance. Why would a service that

is partially for free and is made to deliver customers entertainment and news be something that requires building networks that achieve space technology's reliability? The answer is quite simple: it is because TV, from a consumer perspective ever was and will ever remain a zero tolerance service. There aren't many more annoying things like an interrupted TV transmission while, let's say an important football match is in its decisive stage or while some really important things happen in the world and consumers want to be up to date. They have invested in rather expensive TV screens, they have signed up for a monthly pay-TV service and they have got used over many years that TV is normally available to them. Any degradation of availability has significant consequences on customer satisfaction and in times when cord cutting has become a given, there is a direct link between bad quality and customer churn. Before the emergence of mobile telephony, voice used to be the service with the highest quality requirements, called „life line quality“ but nowadays, when the consumer always has a second or even third option to communicate, it is actually TV which has become the service which requires the highest quality of all.

Given these rather stringent quality requirements and given the fact that land line based networks are kind of a quality bottleneck in themselves, the question whether Cloud TV would actually further deteriorate the TV experience is a valid one.

2. Cloud TV and its technical feasibility

Another aspect of assessing Cloud TV as a candidate for future implementation is technological feasibility. While nowadays cloud computing is a given and is in place for thousands of different use cases, mass market cloud based live TV transmission is still in its infant stage. When it comes to broadcast TV the main parameters that define technical feasibility are latency and peak traffic capability. Latency is a generic reason for

customer dissatisfaction since the consumers expect the fastest possible delivery for TV, especially when it comes to live sports events. Peak traffic is a phenomenon that describes the necessity for TV service providers to establish an infrastructure that can serve a huge amount of TV subscribers with the same content simultaneously. While normally TV audiences are rather split across a number of main channels, during highly attractive sports and other events such as Saturday night family shows they might reach more than 50% of the audience, leading to massive traffic load on the networks.

Cloud technology does not automatically come with low latency or with high transmission capacity. Originally designed for best effort Internet traffic and uncritical latency requirements, cloud technology in the past years had to undergo a certain development that made it fit for the challenges of TV transmission. Consequently, the sheer technical requirements to Cloud TV are a challenge in themselves.

3. Commercial viability of Cloud TV

The third aspect of Cloud TV is a commercial one. Simply said, any cloud based solution is of no added value if it not really cheaper to acquire it and even cheaper to operate and maintain it. TV technologies like settop boxes are continuously breaking new performance records and related silicon allow ultra high quality video signal processing while at the same time they enable to execute attractive user interfaces and applications on a TV screen. Remarkably, these extra performances go along with an ongoing cost decrease, making it a real challenge for Cloud TV to be fully competitive.

4. Challenges and promises of Cloud TV

As elaborated above and amongst many more, Cloud TV basically faces three challenges:

- Can it deliver the expected „zero tolerance” quality of comparable broadcast networks?
- Is it technically able to deliver simultaneously to a mass market audience in time?
- Do the numbers add up for both technology vendors and service providers?

Cloud TV promises to be able to all of this and even more: it suggests giving service providers additional flexibilities in deploying user experiences over the cloud. It also promises enhanced security due to the „always on” nature of its connectivity, thus allowing fighting the weaknesses of card based encryption technologies.

Any responsible commercial and technical manager at a service provider must take Cloud TV into serious consideration, be it for any specific promise or, even better, for all of them together. In the past years, Deutsche Telekom has significantly invested in examining Cloud TV's technical and commercial capabilities

and has come to the conclusion that cloud will become one of the central elements of its future network and services strategy.

5. DT to launch Pan-European network, including Cloud TV

During Mobile world Congress 2015 in Barcelona, Deutsche Telekom's CEO Tim Höttges and his board colleague Claudia Nemat, responsible for Europe & Technology across Central and Southern European subsidiaries, have publicly launched the so called Pan-IP programme. This programme will allow Deutsche Telekom to migrate all of its activities across the EU footprint continental multi-service operation that delivers what customers would expect from the leading European telecom operator. Cloud is an essential building block of this Pan-IP migration and particularly Cloud TV is at its leading edge.

5.1. History, Present and future of DT's TV platforms

Driven by organic growth and accelerated through acquisitions of different European operations, DT has ended up in around 2011 with a rather diversified infrastructure in which each and every country ran its own platform, sourced from different technology and service vendors and locally operated by dedicated TV operational resources. At the beginning of the IPTV roll-out, this so called „zoo” of platforms brought considerable advantages: it allowed growing fast with highly specialized technology and it facilitated the building of powerful locally relevant entertainment brands. The shortcomings of such a zoo became obvious when the originally deployed legacy platforms approached their end of life (mainly Ericsson, Microsoft and Accenture) and had to be replaced and at the same time the amount of settop box climbed up to 52, acquired from over 25 vendors. It is no secret that such a platform zoo is a costly endeavour, though. Both, the initial acquisition cost, originating from low purchasing volumes as well as dedicated local operations were leading to a significant number of commercial and technical challenges. Therefore, in 2013, Deutsche Telekom decided to harmonize its TV technology platform „zoo” and establish a common architecture for all operations. The vehicle that drives this harmonization is called the International TV Service Center, an entity of around 50 highly qualified TV engineers from seven countries who work together in a virtual team, spanning from Slovakia over Hungary, Croatia, Montenegro, Macedonia and Romania down to Greece. Magyar Telekom has been honoured to host the TV Service Center (TV SC) and since now 2,5 years, all platform development and production is done from this team.

Consequently, the TV SC also got the task to start thinking about how Cloud TV could be introduced as an instrumental part of the big Pan-IP programme, paving the way for the overall „cloudification” and virtualization of all Telekom products across the entire European footprint.

Currently, the TV SC is in a first important consolidation phase in which legacy platforms will be replaced by a common architecture, called „NextTV”. This architecture, for the first time ever, has allowed sourcing an identical settop box (the so called Eurobox) from the consumer electronics market and, due to increased volumes of identical hardware, significant efficiencies have been achieved, dropping settop box prices by more than 50% and leading to massive amounts of operational and development synergies in all countries. NextTV, on the other hand, is only the first necessary but not sufficient step towards a fully „cloudified” TV production. Since each and every country will run its own local version of the same platform, serving the Euroboxes locally and integrated with the local IT infrastructure, we cannot yet speak of a Cloud TV deployment. Only in a second step, when the production of the TV service is moved out of the individual country operations and produced in centralized data centres, Cloud TV is possible.

Figure 1 describes how the TV platform landscape in Europe will migrate from the „zoo” to the pan-European, cloud based deployment.

Several trials have been conducted to test the technical viability of Cloud TV. One of them was a first-off in Southern Europe: as early as 2012, OTE, Deutsche Telekom’s Greek foothold, has successfully tried out a completely cloud-based user interface, centrally produced in its Berlin-based T-Laboratories, using a cloud infrastructure to Greek test households on low performance HDMI dongles. A year later, this experiment was successfully enhanced on Hrvatski Telekom’s Pan-IP experimental „Terastream” network infrastructure in Zagreb.

After both tests have delivered positive results, the TV SC is now in a decisive phase of planning and build-

ing Cloud TV over its Pan-IP target architecture. The time horizon will include a stepwise deployment over the coming 4-5 years.

6. Cloud TV: just another a block in a bigger Cloud picture

Let’s recall the three challenges of Cloud TV: quality, technical feasibility and economical viability and have a look at how Pan-IP will tackle them.

After careful analysis of customer expectations, internal demands and Deutsche Telekom’s business partners’ requirements, a conclusion was taken that if cloud is deployed, it shall be done in a holistic way, tearing down a large number of historical walls that have existed over many years. To some extent, reasons for such walls are to be found in the organic and inorganic growth that led to fragmentation and to another extent a lot of technical hurdles still had to be overcome before the new Pan-IP ideas could actually materialize.

6.1. Cloud is tearing down the „Service Wall”

Every service that was historically deployed by telecom providers had its own innovation history, its own timing and its own deployment cycle. This by nature has led to service silos. Fixed or mobile voice, data and TV services were developed, sold and operated separately. The ongoing trend to offer triple, quadruple or even quintuple services is actually demanding more tightly integrated services, allowing seamless offers to consumers.

Newly emerging OTT service providers without a long lasting service history show that integrated services have significant advantages in terms of a holistic customer experience and bundled services as a default.

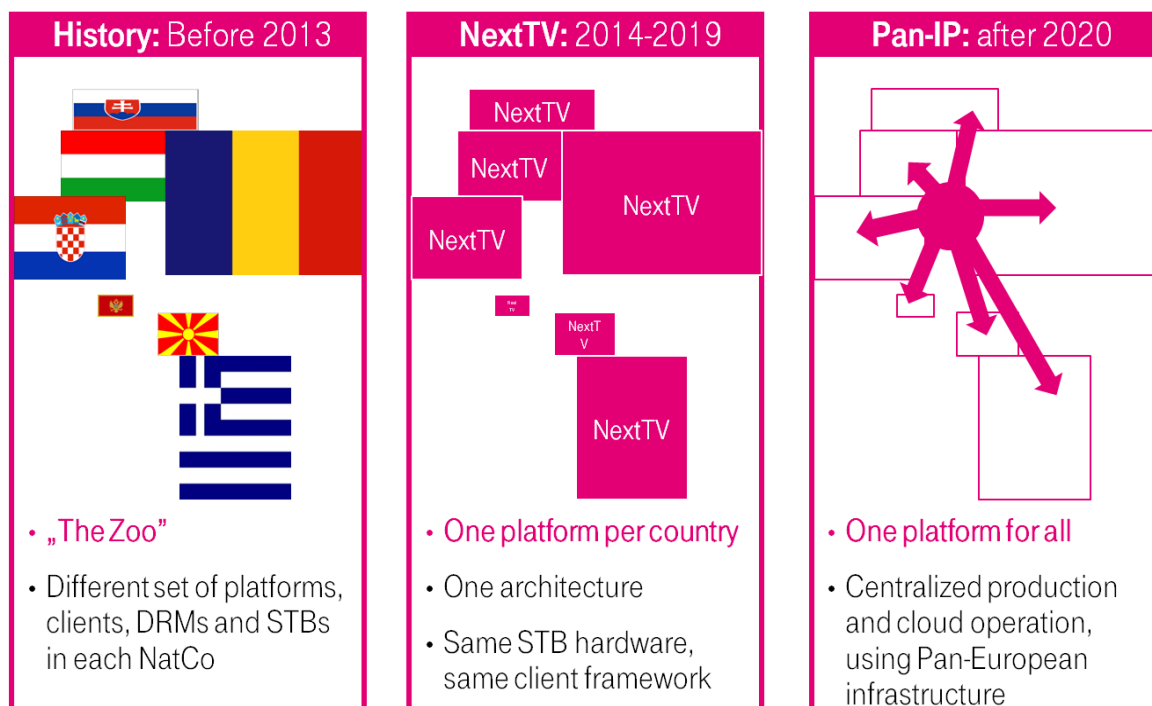


Figure 1. High-Level cloudification roadmap

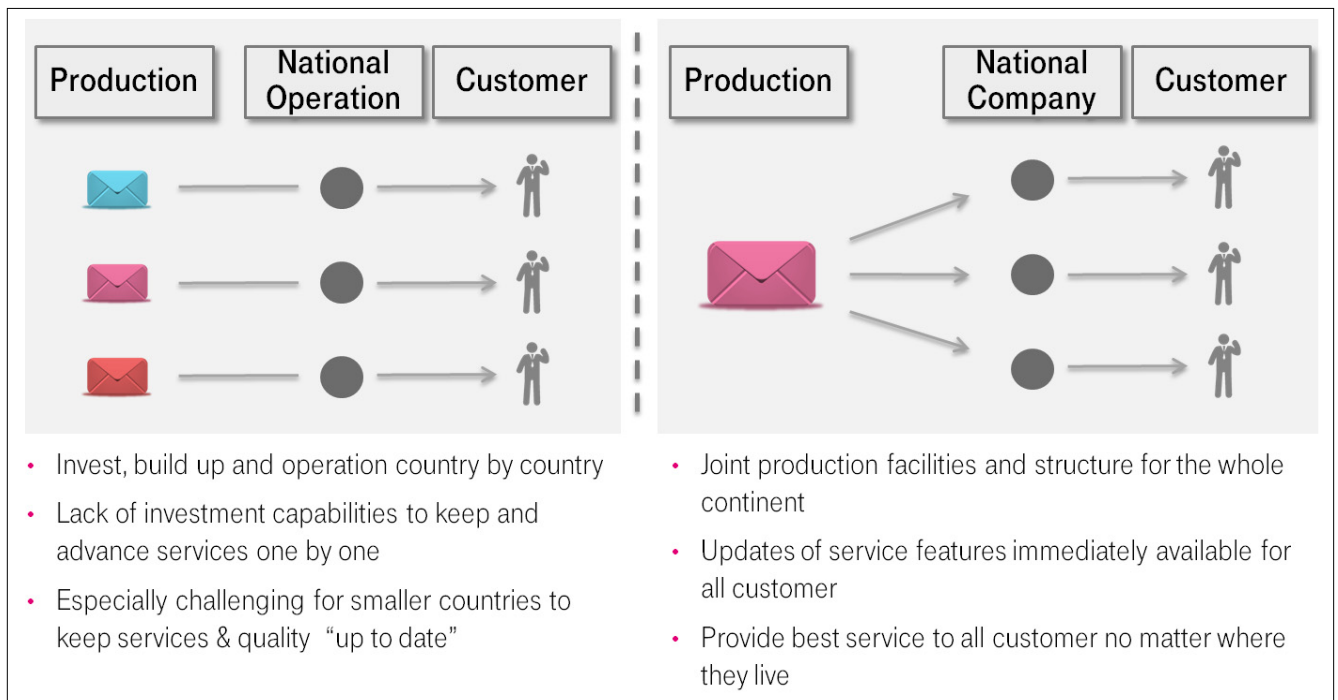


Figure 2. Integrated service setup

Deutsche Telekom’s Pan-IP programme foresees that any given service will be a modular element that is centrally produced and cloud-delivered, no matter whether it is a voice, a data or a video service. This will definitely lead to more enjoyable and more consistent customer experience, increasing consumers’ loyalty and readiness to pay.

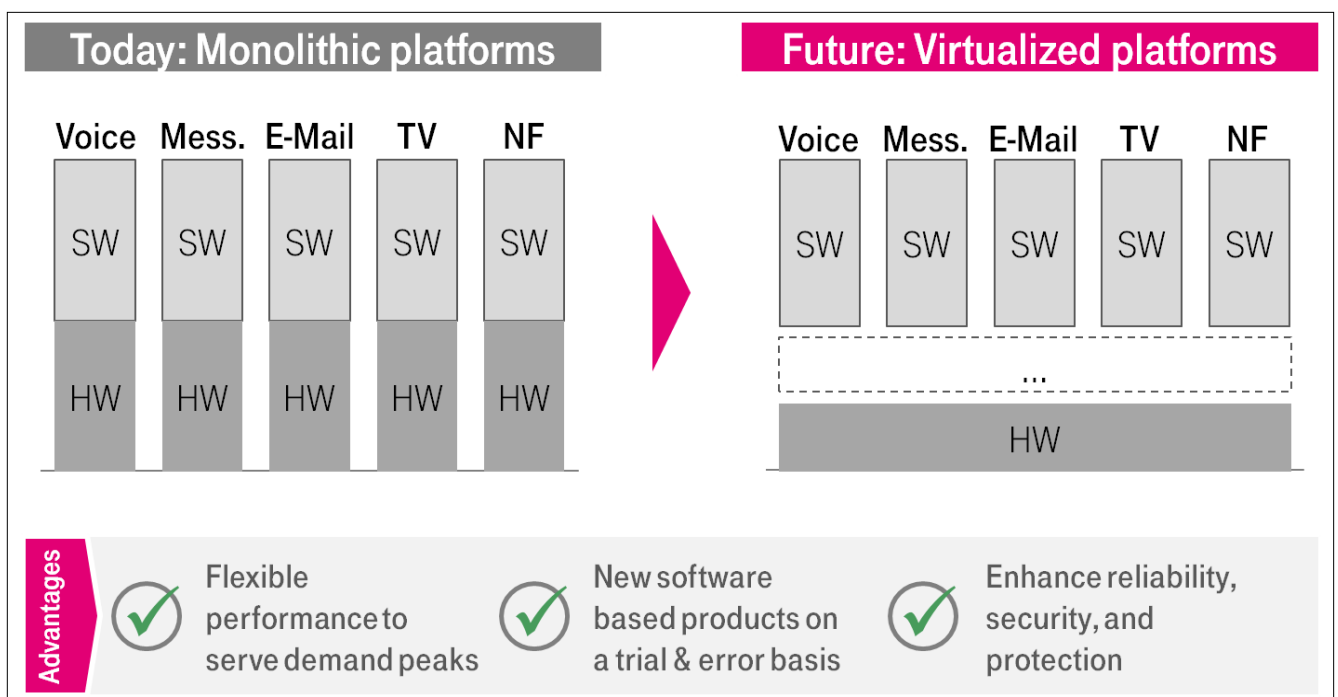
6.2. The fall of the „Technology Wall”

Since a couple of years an increasing amount of tasks which originally were performed by dedicated si-

licon and specialized hardware was replaced by software based solutions. Nowadays almost anything can be solved by highly dynamic software running on rather standardized but extremely powerful hardware.

As shown in Figure 3, there is basically no need for service providers to purchase, plan, build and operate different types of hardware in their data centres. Thus a ubiquitous hardware infrastructure becomes the basis for multiservice platforms that can deliver all kind of services out of the same core. In addition, this allows a seamless integration of customer care, billing

Figure 3. From Silos to Common Hardware



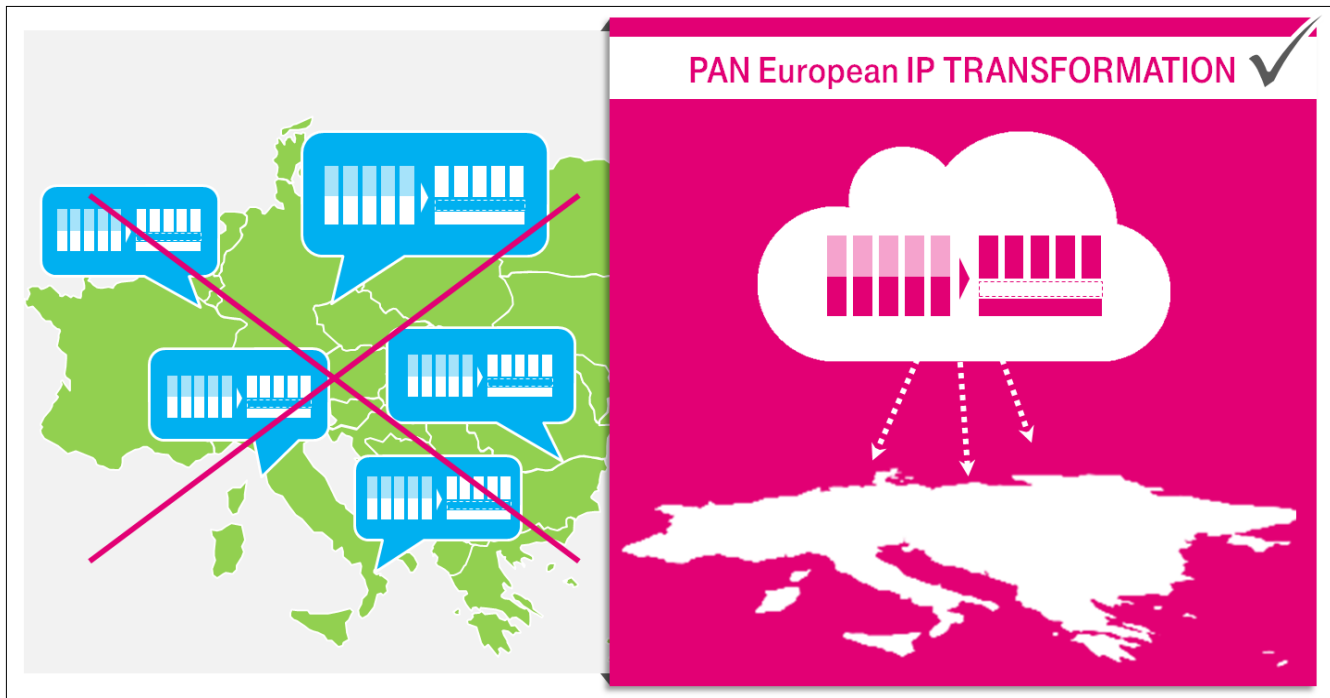


Figure 4. Internationalization and pan-European consolidation

and management services, enabling a unique customer experience across all kind of networks, services and terminals.

After years of experimenting and testing, Deutsche Telekom is totally convinced that the technical hurdles of introducing a multiservice cloud technology can be overcome.

6.3. The end of the geographical limitations

As described above, combined services and common hardware and strong reasons to introduce centralized and cloud based services. Adding geographical consolidation into the equation helps to solve the commercial challenge in a significant way. Instead of deploying a centralized but rather small common hardware platform in each and every country, a pan-European consolidation makes utter sense, both from a capital investment point of view – purchasing more of the same at cheaper prices – and from an operational cost viewpoint. Deutsche Telekom's Central- East and Southern European footprint includes some rather small countries like Macedonia and Montenegro, just to mention two, where the upfront investment into central platforms has always been a commercial challenge. Centralizing those investments into a larger data centre and using an international cloud distribution allows new economies of scale and will make Deutsche Telekom even more successful in the future.

7. Summary

While the historical challenges of TV delivery (quality, technology and cost efficiency) remain unchanged, the emerging cloud technology, combined with an international large scale footprint create a compelling event

for Deutsche Telekom to embrace a significant paradigm shift and invest in a future roll-out of a pan-European cloud based infrastructure. Cloud TV will be one of the central blocks in this approach. The International TV Service Center, hosted by Magyar Telekom in Budapest, is one of the early pioneers of deploying a vision that has been publicly announced in March 2015 during Mobile World Congress.

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THOMAS STANEKER is Head of Deutsche Telekom's European TV Service Center which plans and builds TV solutions for DT's subsidiaries in Central and Eastern Europe. His first 20 years at Alcatel included various positions in R&D, International Product Management and Worldwide Product Marketing. He joined Deutsche Telekom in 2005 and – after positions in Innovation, Strategy and Marketing – he is now „back to the roots“, heading one of the largest and most skilled groups of TV technology experts in the region. Being one of the worldwide IPTV pioneers, Thomas is fully dedicated to successfully developing innovative TV products for his customers and to actively contribute to enhance DTAG's leading position in Pay-TV.

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