



THE EVOLUTION OF TV

TV's Migration to the Cloud







In our Evolution of TV series, “7 Dynamics Transforming TV,” introduced the shift of TV over the internet. Here, in Part 4, we explore the impact of the cloud on TV’s transformation. Everything we know about TV delivery and viewing is about to change.



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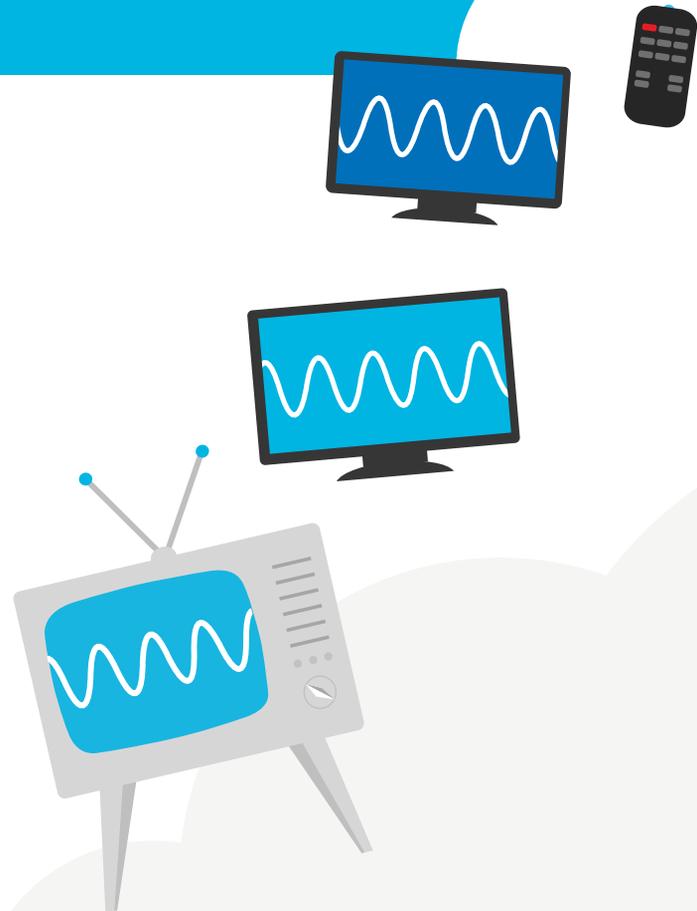


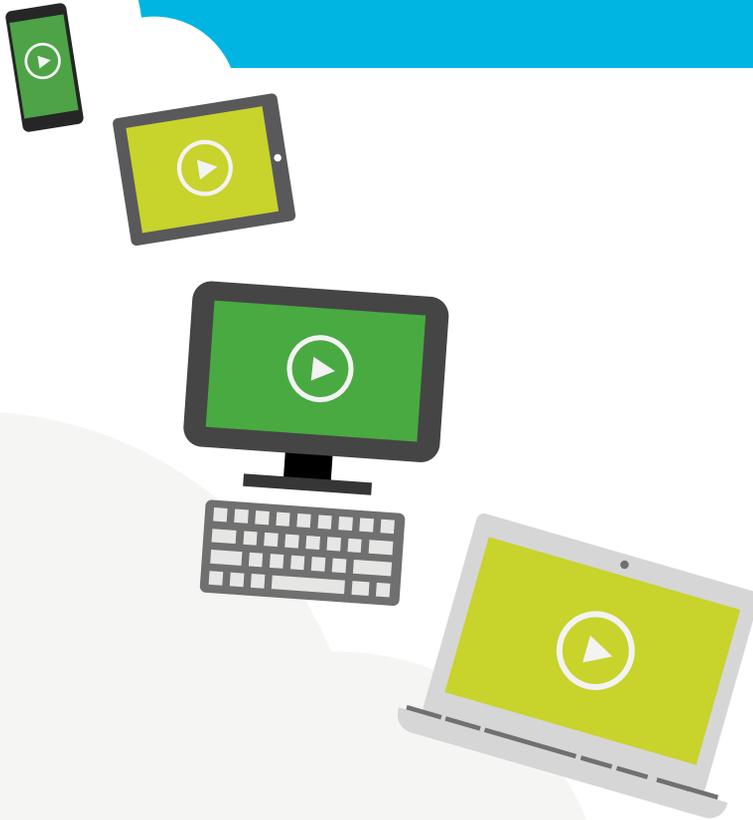
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Everything from the way we watch TV to how it's distributed is changing. The delivery and production of the TV content we're viewing—and sometimes binge-watching on so many screens—is on the cusp of industry-wide innovation as TV delivery shifts from over the air, satellite, or cable to the internet. To support TV programming over the internet, those responsible for delivering the content—the programmers and distributors—are beginning to migrate their operations to a more flexible, agile environment: the cloud. The migration of TV to the cloud means taking many of the functions currently served by dedicated hardware and localized software and moving them to distributed computing and storage environments.

In our Evolution of TV series, we've been discussing the complexities and opportunities of seven dynamics associated with the transformation of television. Here we'll dig into the third of those dynamics, moving TV to the cloud, and how this shift could bring significant changes to the way TV is delivered and consumed.





The reasons for migrating TV to the cloud are simple. First and foremost, it's about cost savings for programmers and distributors. But this is far from the only reason: Gains in efficiency, ability to streamline operations, and ease of scalability are also key factors. Traditional production and distribution workflows (for example, encoding and transcoding, which is the conversion of files between formats, and stream packaging where content is prepared for multi-screen delivery) can now happen in the cloud without the need for distributors, programmers, broadcasters, or local station groups to bring in localized hardware.

In short, migrating TV to the cloud not only affords programmers and distributors cost savings and efficiency but also enables innovation that could change TV as we know it today into a far more dynamic, personalized, and addressable medium.

Here are a few examples of cloud migrations that programmers and distributors are starting to implement:



Subscription Services: Until now, TV broadcasters and cable programmers have relied on TV distributors to provide the subscription infrastructure needed to access their programming. The cloud removes this barrier, making it easy for TV programmers to offer subscription-based services directly to the viewer.



Transcoding: Some programmers and distributors are now using software-based transcoding via the cloud instead of hardware transcoders to convert digital files into the desired formats.



Encoding: Similarly, software-based encoding can be used to convert TV signals into the desired digital formats as an alternative to hardware encoders. This is particularly beneficial for broadcasters with many local station groups. They can have all local station groups send their signals to one cloud farm instead of requiring that each station group to have its own encoder.



Broadcast automation: Parts of broadcast automation, such as messaging ownership of ad breaks, ad signaling, and dynamic ad insertion, are becoming cloud-side functions.



Stream packaging: The preparation of TV content for multi-screen delivery is moving to the cloud, where it can sit closer to the content delivery network (CDN) and reduce latency between getting a signal to the cloud and distributing that signal to consumers.



Signal distribution between partners: Rather than deliver their signal directly to individual TV distributors, programmers are sending it to the cloud, where it's encoded and packaged in all of the various flavors distributors want. Some programmers are creating a high-quality mezzanine version, which their distributors can use as an acquisition endpoint. Others are producing a fully packaged adaptive bitrate stream that's primed for dynamic ad insertion.



Signal acquisition between partners: On the flip side, distributors working with programmers may begin to ask for a single type of mezzanine version or fully packaged adaptive bitrate stream from each of the many programmers that they work with. This allows them to streamline operations in the cloud around the one requested version.



Storage and archiving: Every minute of a live broadcast and every video-on-demand (VOD) asset can be stored and archived in the cloud.



Migration to the cloud enables innovation

Often, when the cloud changes the way that people and businesses get things done, it starts with a pursuit of business advantages such as cost savings, efficiency gains, elasticity, and the ability to scale. Once these things are achieved, the agility inherent in cloud deployments almost inevitably leads to further, sometimes disruptive, innovation. And this is why TV programmers and distributors have to take note and be aware of the changing landscape. Of all the benefits of TV's migration to the cloud, agility and the flexibility to innovate may prove most interesting.

Certainly there are lessons for TV programmers and distributors to learn from other industries where migration to the cloud proved beneficial for users and game-changing for the traditional players in the space. Two examples of this—that Google saw firsthand—are word processing and automobile navigation systems.



Word processing: Efficiency gave people a reason to try something new, and innovation turned them into loyal users.

The initial appeal of word processing in the cloud rather than on localized software was that it was more efficient for people: They could work on any device with a web browser. But to truly compete with localized software, efficiency across screens wasn't enough, so cloud-based word processing solutions had to innovate. And they did. They drastically improved the way people collaborate on shared documents to the point that now, teams often prefer a cloud-based solution. Google Drive and its application suite of Docs, Sheets, and Slides is a testament to that, growing to serve over 190 million active users in under three years' time.

Automobile navigation systems: It didn't take long for unexpected innovations to become the norm.

Navigation systems used to operate locally. They were based on data published to discs, which would need to be replaced from time to time to remain current with new road construction and points of interest. Then navigation data moved to the cloud, making discs unnecessary and real-time updates the new norm. But navigation system vendors didn't stop there. They also innovated to provide drivers with even more useful data and services. Google Maps, for example, provides



estimations of the fastest way to get from point A to point B with real-time traffic information. And with Waze, an app that connects users with one another, you'll know exactly where to find the cheapest gas station on your route thanks to your fellow drivers. Now, it's hard to imagine using a navigation system without real-time traffic data.

The migration of TV to the cloud effectively transforms every screen in your home into a TV screen: smartphones, tablets, laptops, connected TVs, and even some set-top boxes. Once gains in audience reach, efficiency, cost savings, and scalability across screens are achieved, change accelerates and a world of possibilities emerges.



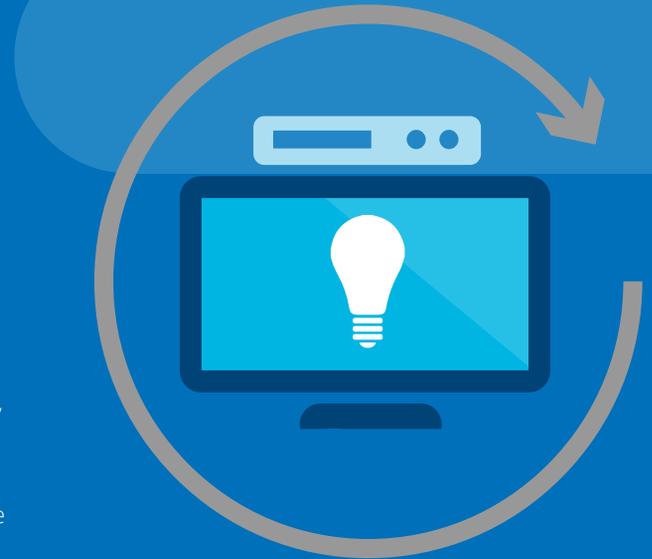
Innovation necessitates agility

With innovation comes an increased need for agility. Migration to the cloud means that organizations can rapidly respond to changing market conditions and new opportunities.

Take TV set-top deployment cycles (how often a cable box is updated, for example). Here, innovation is fueled at a relatively slow pace of change. In other words, there's innovation, but it lacks agility. Historically, if a TV distributor wanted to create a new user experience, it would first have to develop a new set-top box, which could take years. Then it would need to deploy the new set-top box to all of its users, which could take a few more years. (Think about it. When was the last time you got a new cable box? Chances are, it's been a while.) Under this type of hardware deployment model, the TV distributor pursues innovation slowly.

By contrast, if the TV distributor can update the user interface (UI) to a set-top box via the cloud, it can pursue a cycle of innovation that's orders of magnitude faster than under the hardware deployment model. This is innovation fueled by agility. For example, Google Fiber set-top boxes are IP based. This means the team is able to push software updates continually to all users, providing them with enhancements to the guide, fixes to viewing-quality issues, and improvements to the user experience. UI updates over the internet allow distributors to try new ideas quickly and learn what works best.

TV distributors that take advantage of the agility of the cloud to pursue an agenda of innovation could bring significant change to the way TV is delivered and consumed. Let's explore some of the possibilities.



Virtual MVPDs will shift TV industry dynamics

Multi-channel video programmers, or MVPDs, are service providers that offer multiple channels of linear video programming for a fee. (Note that the term MVPD as used here doesn't necessarily match that which is found in federal law such as the Communications Act of 1934.) Traditional MVPDs include cable operators (Comcast or Time Warner), direct broadcast satellite providers (DirecTV or DISH Network), and even telecommunications companies such as AT&T. Typically, only one or two MVPDs compete in a given town

due to old monopoly franchise laws and practices as well as high deployment infrastructure costs. As TV programming moves toward internet-based services, a new kind of TV distributor is emerging: the virtual MVPD, which can reach and compete in every market via the internet. Over time, the lines may blur between virtual and traditional MVPDs. Today, virtual MVPDs attract consumers by offering competitive options and the ability to time shift. Sometimes they can even deliver suites of TV programming to any device—tablet, smartphone, or TV—at a better price point than the traditional players offer.



There are two flavors of virtual MVPDs: opportunistic and challenger. The opportunistic virtual MVPD is an existing satellite or cable TV distributor that expands to operate over the internet. The challenger virtual MVPD moves directly into the virtual MVPD business from a nontraditional background, perhaps with proximity to (but not directly from) TV distribution. DISH Network's announcement of Sling TV in the U.S. is an example of the opportunistic variety of virtual MVPD. More recently, Sony launched a virtual MVPD of the challenger variety with its PlayStation Vue subscription service. In the future, these new virtual MVPDs have the potential to be full-fledged competitors that will compete side by side with digital cable, fiber-optic cable, satellite TV, and a-la-carte options.



Unlike traditional MVPDs (digital cable, fiber-optic cable, and satellite TV providers), virtual MVPDs can operate almost entirely in the cloud. This means they can take advantage of the benefits of the cloud, which include:

Efficiency gains:

The virtual MVPD can streamline every aspect of TV delivery over the internet because it doesn't have to support legacy systems.



Cost savings:

Distributors can choose to keep costs down and pass those savings on to consumers. For example, Sling TV has no carriage agreements with CBS, ABC, Fox, NBC, or PBS, so the company can offer its services at a lower fee. But the reverse is also true. The migration to the cloud also enables broadcast and cable networks to reach audiences directly and offer unbundled programming to viewers. For example, CBS and HBO recently announced that viewers can now subscribe to their new CBS All Access and HBO Now services directly without a cable or satellite subscription.



Ability to reach every market and scale:

It's difficult to know how popular a new virtual MVPD service will be when it launches or how fast it will grow. Generally speaking—and distribution rights permitting—a cloud-based TV distribution infrastructure is not limited by some of the constraints of physical TV delivery. The cloud's ability to scale up and down as needed can accommodate the national or global reach of a virtual MVPD via the web.



Agility:

Based on a model in which both TV delivery and consumption happen via the cloud, there's very little friction to slow down the innovation of virtual MVPDs.



A radically different viewing experience

The good news is that the cloud enables any pay-TV provider to innovate—regardless of whether it's a virtual MVPD, broadcast network, cable network, or not. And nearly every aspect of the viewing experience is ripe for innovation. It's impossible to predict exactly how all of this will shape up, but getting there means questioning the current TV viewing experience as we know it.



Linear programming: A linear TV experience is just that: channels of content, which are played back-to-back against a 24-hour schedule. It's a proven format that's been successful in pushing TV content and supporting the discovery of programs. Events such as live sports and spoiler-free airings of anticipated shows will always have a home in linear TV. The question is, are there other ways to watch within non-linear viewing environments?

A key challenge to linear programming is viewer interest. When one show ends, the viewer may choose not to continue watching. Nonlinear viewing could eliminate or significantly ease this issue by providing alternative TV experiences. On-demand TV is already a mainstay, but there are other options as well.

Nonlinear programming would provide viewers with a more customized TV experience. For example, pay-TV providers could change the user interface so viewers could skip shows. So when a show comes on that the viewer doesn't like, she can simply jump to the next program on the stream. Another alternative would be to allow viewers to create their own programming stream or discover another viewer's curated stream much like the way playlists work in the music industry. Programmers could also use algorithms to analyze patterns in viewership to provide a list of shows based on viewer tastes or even moods (think: a happy stream). Another option would be the ability to manage a queue of content.

Breaking free from linear programming isn't a new concept for internet-based content. Similar experiences are already being used for online video and radio. The TV industry has some catching up to do as we migrate to cloud TV.



DVRs: With DVRs, TV viewers select shows they want to watch at a later date and store them on the DVR's hard drive. But if TV shows are always available in the cloud, does the DVR become obsolete? If pay-TV providers move DVR storage to the cloud, doesn't this become an on-demand service that requires users to preselect their media? Most consumers would likely prefer to automatically have direct on-demand access to programs than have to push a button somewhere to obtain it. In the future, pay-TV providers who prioritize the user experience may have to completely rethink the role of DVRs in their ecosystem.

From the distributor's point of view, the need to differentiate between DVR and on-demand content may have more to do with content rights than anything else. This reality highlights the value (and importance) of agility. Companies that can be agile when it comes to things like negotiating permissions will have an easier time innovating. With the "right" content rights, the DVR experience could be replaced with an on-demand experience that gives viewers a choice in how to pay for content. This could mean watching ad-supported content or paying for ad-free content.



TV ad experience: Not all TV viewers are the same. Some binge-watch while others watch infrequently. Some engage with commercials; others don't. In our previous piece in this series, we talked about a programmatic approach to buying and selling TV advertising in order to reach viewers with relevant ads. With TV programming in the cloud, marketers would be able to customize an ad specific to an individual, which would probably make a viewer more likely to engage.

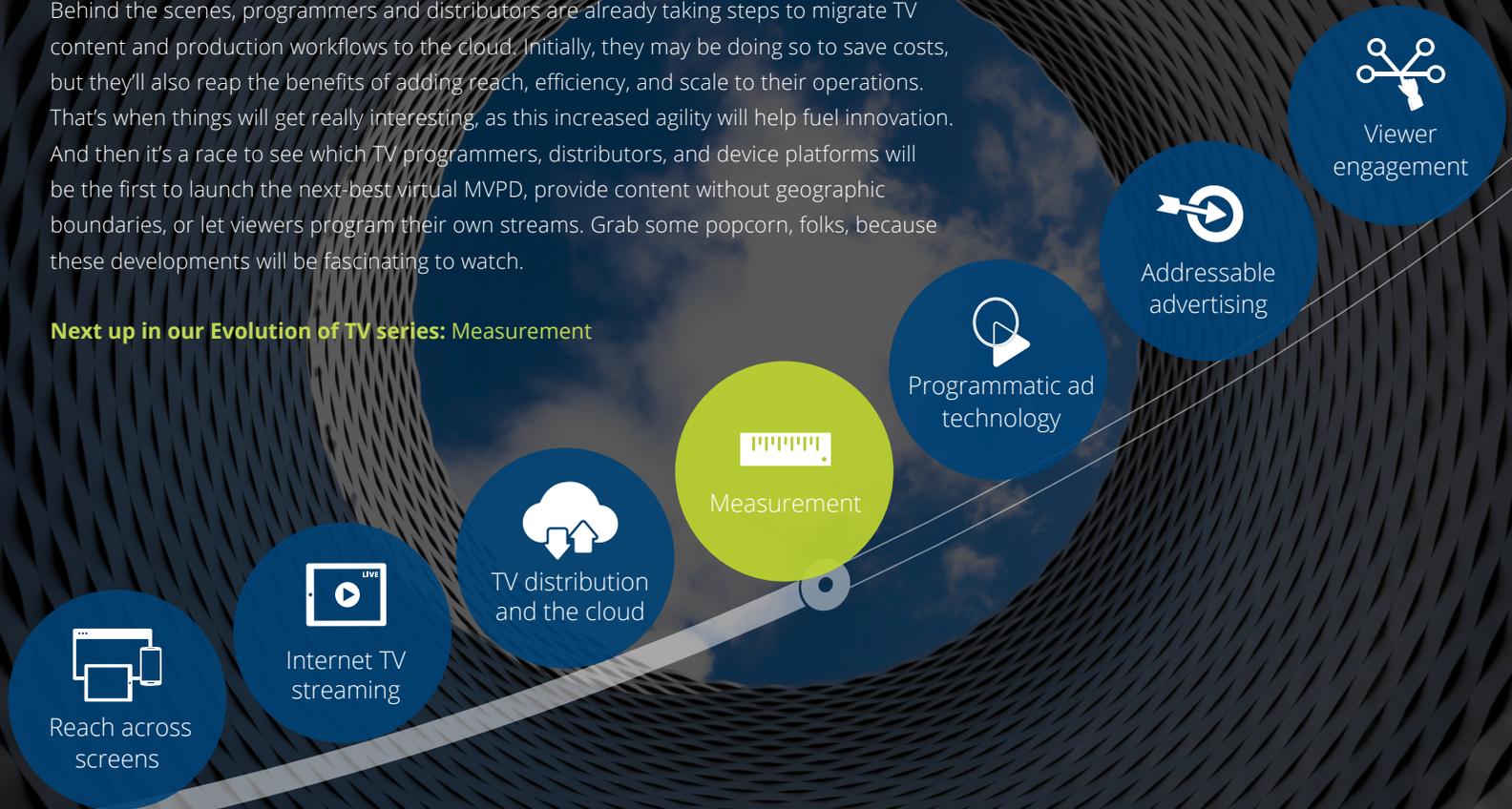
If you've streamed (and binge-watched) a favorite series recently, you've probably been subjected to the same ad over and over ... and over. Marketers will want to think about frequency as well as user choice when developing nonlinear ad experiences. For example, should there be a cap on the number of TV ads served to a viewer? Should a heavy TV viewer get fewer ads per hour than a light TV viewer? Should viewers who engage with ads receive fewer ads? Can a TV viewer choose his or her own ad experience based on interest? Is it possible for a viewer to have a say in the type of ads he receives?



The migration of TV to the cloud

Behind the scenes, programmers and distributors are already taking steps to migrate TV content and production workflows to the cloud. Initially, they may be doing so to save costs, but they'll also reap the benefits of adding reach, efficiency, and scale to their operations. That's when things will get really interesting, as this increased agility will help fuel innovation. And then it's a race to see which TV programmers, distributors, and device platforms will be the first to launch the next-best virtual MVPD, provide content without geographic boundaries, or let viewers program their own streams. Grab some popcorn, folks, because these developments will be fascinating to watch.

Next up in our Evolution of TV series: Measurement



Google's video solutions

for Programmers, Distributors & Publishers

- Ad server:  doubleclick for publishers by Google
- Supply side platform:  doubleclick ad exchange by Google
- Ad network:  Google AdSense
- Mobile apps monetization:  AdMob by Google
- Ad exchange:  doubleclick ad exchange by Google
- Premium programmatic video marketplace:  Google partner select
- Content distribution partner:  YouTube
- Cloud infrastructure:  Google Cloud Platform

for Advertisers & Agencies

- Digital marketing platform:  doubleclick digital marketing by Google
- Ad creative:  doubleclick studio by Google  Google Web Designer
- Demand side platform:  doubleclick bid manager
- Ad server:  doubleclick campaign manager
- Ad exchange:  doubleclick ad exchange by Google
- Ad network:  Google Ads
- Premium programmatic video marketplace:  Google partner select
- Media partner:  YouTube



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