



A Quarter Century of Streaming Video

To understand the future, we have to reframe the past. The “Streaming Wars” did not, in fact, begin in 2019. They didn’t begin with the entry of Amazon, Facebook, YouTube, Microsoft, and Apple in the early 2010s, either. Or in 2007, which saw the launches of Netflix (as a streamer) and Hulu.

As early as 1993, it was possible to stream live video over the Internet, with the first public demonstration of this functionality coming from Xerox PARC in Palo Alto, California; the occasion was a concert performed by the band Severe Tire Damage. Two years later saw the first public video call over the Internet, and by 1996, such capabilities were available to any American with America Online and a \$100 webcam. In 1997, DOCSIS 1.0 launched, enabling the delivery of internet data over coaxial cables laid for telephony and pay TV, and a year after that, 1998, the first IP-based TV system went live in Phoenix, Arizona. Though they did not require IP-based delivery, digital video recorders first emerged in 1999 (TiVo), enabling consumers to digitally record live TV for playback at a later time. KaZaA, a peer-to-peer filesharing service likened to “Napster” but for all files, most notably video, launched in 2001.

Netflix began working on its streaming service in 2000. This was barely a year and half after launching its DVD subscription offering, but executives expected that within two decades, streaming would become the best way to deliver a “DVD” nationally. The rationale was calculable. A truck carrying a DVD across the country, for example, might have the bandwidth of a thousand DVDs and the latency of three days. And in the average year, these values did not change (in fact, latency was typically worsening due to traffic). In contrast, the bandwidth, latency, and deployment of US broadband was growing rapidly, and it was possible to figure out when it would be more efficient (and reliable) to use the Internet versus a mixture



...a few dollars. Netflix's plan then was to deploy a Roku-like box with an estimated sales price of \$300 that subscribers could buy in order to download movies while they were sleeping (or at work) for local (not streaming) playback. Eventually, these plans were scuttled. By 2005, Netflix decided that national broadband costs and latency would soon be sufficient for standard definition streaming, with its service launching in 2007 as a free-to-access service with its DVD subscription. By 2010, Netflix decided its service was reliable enough to exist as a standalone offering. The following year, Amazon launched Instant Video, as well as its originals development program.

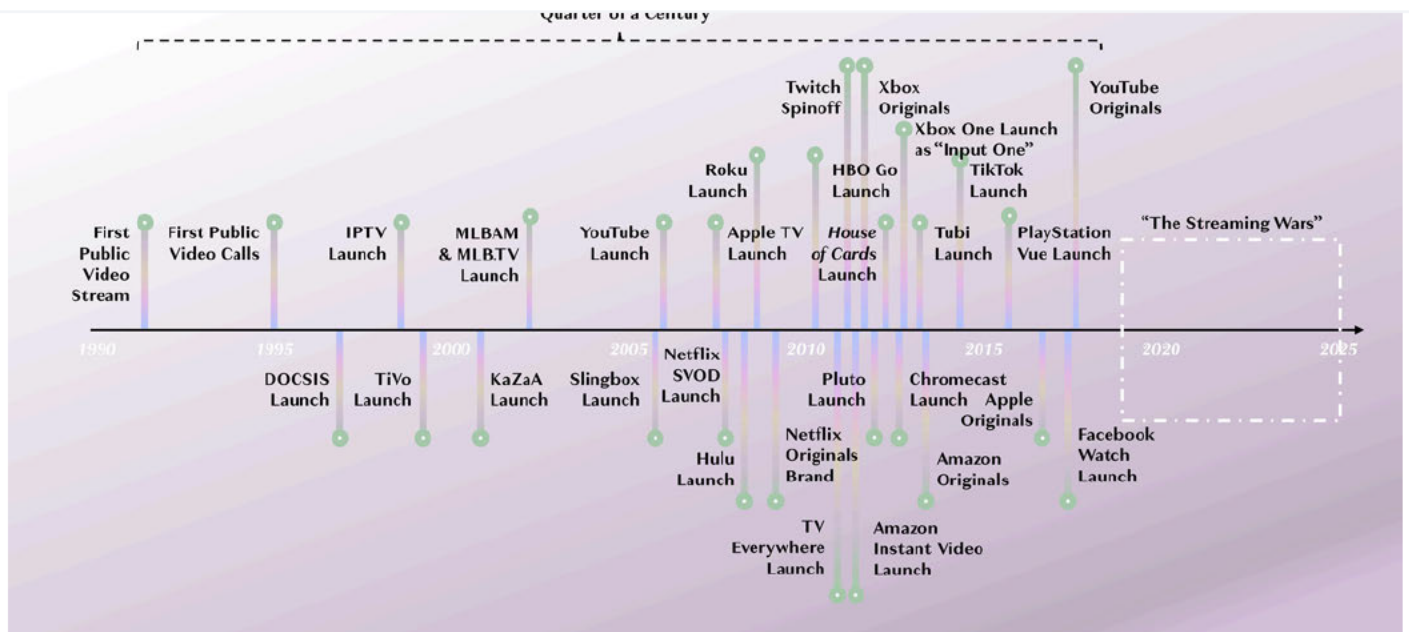
And while Netflix built out its streaming technology, another company actually beat the company to national distribution of streaming video - and live, geo-targeted video, too. In 2002, Major League Baseball released its MLB.TV subscription service, offering baseball fans the only way to watch hundreds of games per year. The first match, Yankees vs. Rangers, was watched live by 30,000 viewers in 60 countries. By the time *House of Cards* premiered, MLB.TV had amassed nearly 2 billion live streams and 4mm subscribers. In the years to come, MLB spun out its streaming technology division as BAMTech, which went on to become the primary live streaming technology provider in American sports, as well as the backend for services such as HBO Go and Now. In 2016, Disney bought a third of BAMTech for \$1B, and another 42% in 2017 for \$1.6B, taking full control in 2022.

In 2005, YouTube, a streaming service based on video that would only be distributed on the Internet, was founded. By 2010, it was the most popular video service in history. 2005 also saw the first Slingbox, which encoded local video (typically pay-TV service to a household) for retransmission over the Internet (i.e., to the user outside their home). In September 2006, Apple announced the Apple TV device, which debuted on January 9, 2007, six days before Netflix announced its streaming service, with Hulu announcing in March and launching in October. In

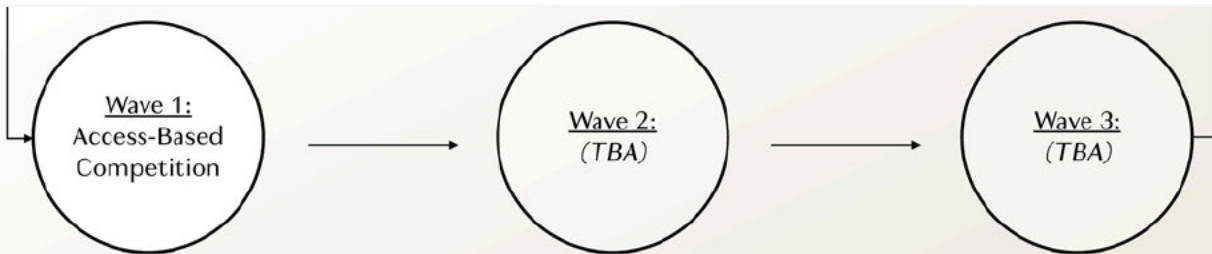


2012 saw the aforementioned creation of Xbox Entertainment Studios. A year later, Microsoft released the Xbox One, which aspired to be “input one” for all content on the TV, pay TV included, even though the service would have to be bought from a traditional pay-TV provider. In 2013, YouTube launched paid channels from signature pay-TV partners such as National Geographic, but most of these didn’t make it to 2015. Music.ly/TikTok was founded in 2014, with the first virtual multichannel video programming distributor (MVPD), PlayStation Vue, following in 2015. In 2015, YouTube also launched YouTube Red, its first platform-wide subscription offering, which made all YouTube videos ad-free and included a smattering of premium original series, such as *Cobra Kai*. By 2017, YouTube had exited the original programming game (with *Cobra Kai* finding a new home in Netflix) but maintained YouTube Red as a nearly ad-free subscription offering called YouTube Premium (which was \$2 more despite the loss of premium original content). YouTube had also launched its own *virtual* multichannel video programming distributors (vMVPD), YouTube TV. 2017 also included Facebook, the world’s most popular website, launching Watch, with its own high-budget original programming. As mentioned earlier, Apple TV’s first original TV slate arrived the same year.

There’s a dozen or more hallmarks one could place in the above history—TV Everywhere and HBO Go launched in 2010, the first signature streaming-only TV series in 2013, Chromecast in 2013—but the point is, a lot was happening before we get to the supposed start of the streaming wars in 2019. More than a quarter century of streaming video, even.



The quarter century I just summarized is what I call “access-based competition.” It is the first “wave” in a new entertainment technology, and it is initiated by key innovation in the delivery of content. The most obvious example is the audio industry’s evolution from live-only performance, to radio broadcast (NBC radio), then physical media (Atlantic Records), then download (MP3s), followed by streaming (Spotify). This involved the shift from pay-and-enjoy to ad-supported free-to-listen, then pay-to-own for an entire album, then pay-to-own an individual single, then all-you-can-eat subscription access to literally tens of millions of tracks. Video is broadly similar, as it developed from movies to broadcast TV, then basic cable, followed by premium cable and VHS arriving more or less concurrently, and streaming video.



Defining Problem:
 "Being the Best Way To Get Content to Consumers"

Defining Characteristics:

- Kicked off by innovation in access or pricing
- Led primarily through new market entrants
- Limited competitive intensity, focused on cannibalization of old modality
- Distributors dominate economics
- Growth driven by distribution tactics + awareness
- Constant business model/content/device experimentation and discovery

To be clear, the media industry is always in a process of improvement [because media is technology](#). Streaming bitrates and audio compression are always improving, for example, while TVs continue to increase their resolution (50% of US households now have 4K televisions) and refresh rates, despite also growing their screen size per dollar. But every so often, there are improvements in how consumers access content that are so fundamental, and so much *better*, that they reset the medium, with the effect of producing new winners, destroying some old ones, changing business models (and pricing models along with them), and, without question, altering content as well.

To return to examples, compare the shift from audio cassette to CD with that from CD to digital download or digital download to streaming. The switch from cassette to CD added audio quality, usability (track jumping), capacity, and space but did not business model or content much, nor who made the content and sold it. CD to digital download was an utter transformation, leading to new devices (MP3 players) and sellers (iTunes), while breaking apart the album bundle into singles. In 1999, the high-water mark for CD sales, 99.3% of the 10.7B tracks sold in the United States were via album. By 2014, fewer than 70% were by album, with total track sales down 75% to 2.6B, with individual track sales up from 75MM to 1.2B. On-

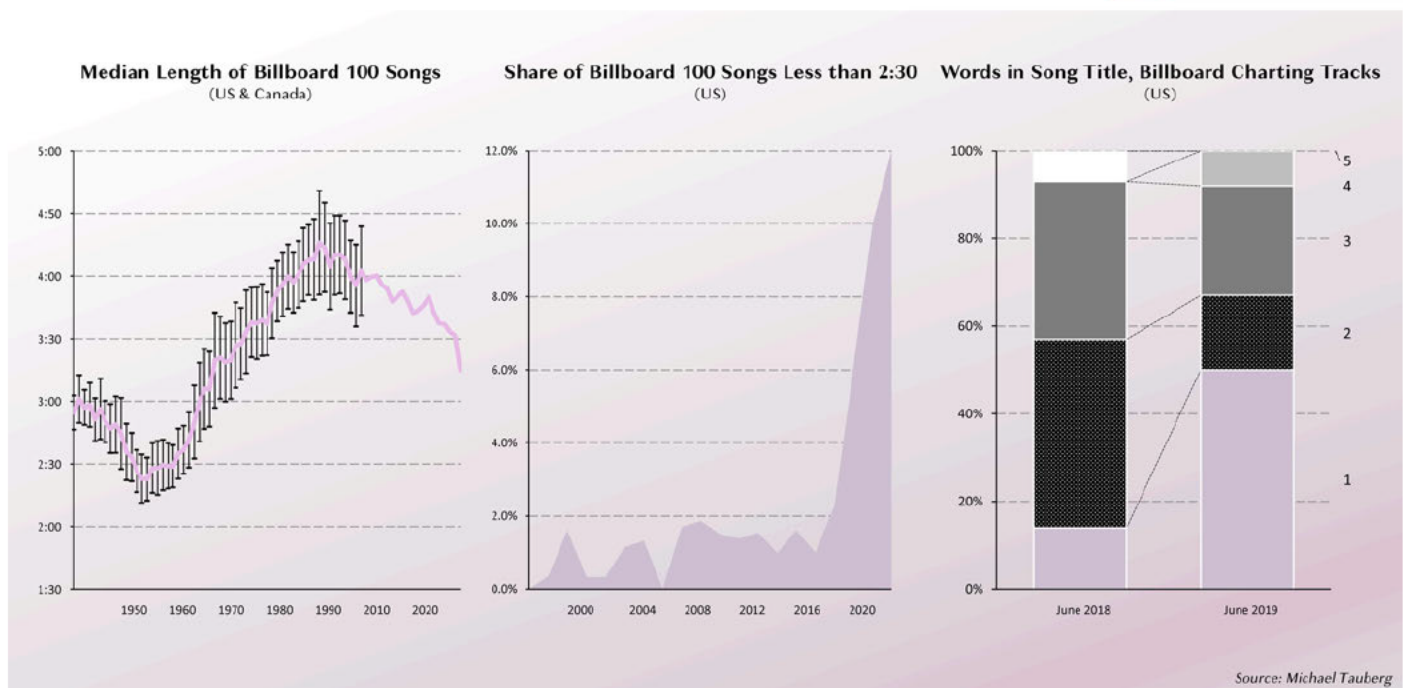


...and royalties to rights holders shifted from a cut of each track purchased to their pro-rata share of all tracks streamed by all users. Each of these shifts also changed what it meant to be a “hit” as well as what hits sounded like and how they were structured and produced. The rise of pay-per-stream, has led to dramatic shortening of tracks (better for a 2:30 song to be played twice than to be 5:00 long), while touchscreen search and voice-based assistants have encouraged shorter and simpler song titles.

As Technology Changes, Music Changes



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For a while, some posited that satellite TV would be such a shift. DirecTV and Dish could deliver far more channels to the home than cable-based providers and reach every TV in the home, irrespective of which corner it might be placed in—and without tearing up drywall. And unlike every other pay-TV provider, DirecTV was nationwide and available to nearly every single home. Yet satellite video did not alter the economics, packaging, or really, the core experience of watching TV. And only three years after DirecTV launched came DOCSIS, offering electronic programming guides and more channelspace, with IPTV following not long after. This compressed the benefits of satellite TV, which was still struggling to



At first, the “access wave” is slow to develop. There is a lot of testing to figure out which business model is optimal, what the new access modality will change and not change, and so on. Access pioneers also have many tailwinds. For instance, their focus is on early adopters, who are generally more technologically savvy, curious, and wealthy, which means that products can be more complex, their benefits less certain and their prices high. And because there’s no expectation of imminent, let alone significant profits, the lack of them confirms little, and venture funding will plow behind growth. For these reasons, technical and commercial models that prove to be unsustainable or inferior to competing approaches can endure for some time.

Crucially, growth during the access wave comes primarily through the cannibalization of customers from the old access model, decidedly not through hand-to-hand combat against the leaders of the new one. Reed Hastings long argued that the effect of any new streaming entrant was modest compared to the fact that 90% of television viewing remained in the traditional pay-TV system. Shifting customers from that channel to the over-the-top (OTT) one was more important than beating Amazon or Hulu to the next hit series, and relied primarily on market awareness and technology, not greenlights. Customer churn also tends to be low during the access wave, while acquisition costs are modest and content offerings relatively unfragmented. This means the lifetime value of the average customer is high, and those customers benefit from incredible value, too. In other words, it’s relatively easy for everyone to be happy. And thus this state cannot last for very long.

Next Chapter

The Commodification of Access Innovations

Next