**Netflix: Falling from Grace**

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Netflix has grown to become a household name since its inception as a competitor to traditional brick-and-mortar video rental companies. The term “Netflix” has been adopted as a verb or an overarching catch-all to video streaming services as a parallel to someone saying, “Google it.” It is also used as “a euphemism for inviting someone over to their place to engage in sexual activity” with the phrase, “Netflix and chill” (Urban Dictionary). Netflix has been engrained into everyday culture due to its popularity and widespread appeal through its vast array of entertainment options from television shows, movies, and original content. It has been a shining example of a cloud computing solution, but their reign as a champion of streaming services may be coming to an end. **Without customer-favorable pricing and policies, cloud computing solutions will lose customers and become less-desirable services.** This paper will examine the purpose and history of Netflix, its service and deployment models, and how its current shift in their business model may be detrimental to what made it successful in the first place.

**Purpose and History of Netflix**

According to Comparably, the Netflix’s mission statement “is to grow our streaming subscription business domestically and globally” with the vision to “[become] the best global entertainment distribution service”. An interpretation of these statements can be paraphrased to the following: provide value and profit to shareholders through being a premier entertainment service to subscribers.

On the “About” page of Netflix.com, the company initially started off as a DVD rental and sales website in 1997 and transitioned into a subscription-based service in 1999. Adding a personalized recommendation service in 2000, it quickly gained enough market value to make an initial public offering (IPO) in 2002. After adding a profile feature in 2005, allowing users to create customized movie lists, they reached Five million subscribers in 2006. Finally in 2007, Netflix arguably became a cloud service by allowing subscribers to stream movies and TV shows from their internet browser. This feature was extended to other platforms such as Xbox the following year. This feature was again extended to mobile devices in 2010 and expanded to Canada, making it an international service.

After further international expansion and the addition of Netflix-produced original content in 2013, the company saw exponential growth in membership. Netflix states that it reached 25 million subscribers in 2012, 50 million in 2014, and 100 million in 2017. In 2021, subscribers surpassed 200 million.

This meteoric rise in Netflix’s popularity can be attributed to a variety of factors. It disrupted the brick-and-mortar video rental stores by eliminating late fees, it added flexibility to subscribers by allowing them to watch content on-demand from a multitude of devices, and had a variety of content options. Additionally, it disrupted regular television through an added quality of life feature of providing ad and commercial-free content (The Media Lab). Such features were available at a reasonable cost, starting at $11.99 from 2013-2015, $13.99 in 2017, $15.99 in 2019, and $17.99 in 2020 for premium plans. They also offer lower-cost plans for basic and standard that offer less streaming resolution and less screens to simultaneously stream content. However, there is concern among customers as the price for the premium plan was raised to $19.99 at the beginning of 2022 and the cost gap between service levels has closed from the standard plan being 66% cost of premium subscriptions in 2013 to 76% today (The Verge). This rapidly-increasing price point and gap-closing between service levels, among other things, may contribute to loss of customers and result in reduced market share of this cloud service.

**Service Model: Software as a Service (SaaS) via Infrastructure as a Service (IaaS)**

Netflix’s service offering follows the National Institute of Standards and Technology (NIST) SP 800-145 of meeting the five essential characteristics of a cloud platform. It defines the characteristics of a cloud platform as having on-demand self-service, broad network access, resource pooling, rapid elasticity, and being a measured service. A user can provision resources independently without the need for interaction with the provider, meeting the requirement for on-demand self-service. The service is also accessible “over the network using standard methods” (p. 2) through browser, mobile, and other devices via the internet, meaning it has broad network access. Next, the resource pooling characteristic is met due to the service’s multi-tenant usage, allowing multiple users to use the same physical hardware infrastructure that supports Netflix. The allocation of resources to users that the software’s back-end supports meets NIST’s definition of rapid elasticity. Finally, users must pay a subscription fee which makes Netflix a measured service. Since all five of NIST’s characteristics are met, Netflix can be considered a cloud service.

Also, according to SP 800-145, Netflix meets the criteria of being a SaaS. SaaS is “the capability provided to the consumer is to use the provider’s applications running on a cloud infrastructure” (p.2). It is also accessible from various client devices, the customer does not manage the infrastructure, and users are able to modify some “user-specific application configuration settings” (p.2), namely customized movie lists and profiles. SaaS also supports multi-tenancy and since Netflix is managed by a single entity, the same software updates and releases would be pushed to all customers.

Interestingly enough, in order to provide the SaaS cloud service model to subscribers, Netflix is a customer of IaaS services from Amazon Web Services. According to *Netflix & Amazon Kinesis Streams Case Study*, “Netflix uses Amazon Web Services (AWS) for nearly all its computing and storage needs, including databases, analytics, recommendation engines, video transcoding, and more—hundreds of functions that in total use more than 100,000 server instances on AWS.” SP 800-145 defines IaaS as a “capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software” and where “the consumer does not manage or control the underlying cloud infrastructure. But [the consumer] has control over operating systems, storage, and deployed applications” (p.3). AWS provides excellent scalability to fit Netflix’s needs of fluctuating bandwidth demands from subscribers through Amazon’s Kinesis Data Streams (KDS) (*Netflix & Amazon Kinesis Streams Case Study*).

Based on this knowledge, there are multiple layers of both Cloud Providers and Cloud Consumers in Netflix’s business model. A Cloud Provider being “the entity responsible for making a service available to interested parties” and the Cloud Consumer being the person which “uses a service from a cloud provider” (SP 500-292, p.5-6). Netflix is a Cloud Consumer of AWS, their Cloud Provider. Netflix is also a Cloud Provider to their subscribers, the Cloud Consumers.

**Deployment Model: Public Cloud**

According to DCD in 2016, after a 7-year transitionary period, “Netflix…completed its [shift] to the public cloud”. Initially, they had in-house data centers which followed the traditional IT infrastructure model to provide their SaaS cloud offering. To determine if Netflix meets the NIST definition of Public Cloud deployment model, we can refer to SP 500-292. All of Netflix’s features are equally accessible by their subscribers depending on their service level (basic, standard, or premium). It is also available to their subscribers over the internet, a public network. Additionally, it was determined that the infrastructure of the service is completely maintained by the hosting party. Since SP 500-292 defines a public cloud as “one in which the cloud infrastructure and computing resources are made available to the general public over a public network” (p. 10), Netflix is a Public Cloud to their subscribers.

**Deployment Model: Private Cloud**

In the *Netflix Case Study* article, it states that Netflix uses AWS EC2 G4 instances “to Build VFX Studio in the Cloud for Artists Globally”. The EC2 G4 instances provide high-speed services for graphics-intensive operations. Using the NICE DCV remote desktop and streaming application provided by AWS, Netflix has created a cloud-based global visual effects (VFX) studio for artist collaboration. Since this “cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers” and is owned by AWS yet managed by Netflix, this meets the SP 500-292 definition of an Outsourced Private Cloud (AWS is the hosting company aka the cloud provider).

**Deployment Model: Is it a Hybrid Cloud?**

Some might argue that Netflix could meet SP 800-145 definition of a Hybrid Cloud due to the layering of their SaaS offering via AWS’s IaaS services. NIST defines a Hybrid Cloud as “a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability” (p.3). Netflix’s SaaS offering to subscribers is done via AWS EC2 instances (*Netflix & Amazon Kinesis Streams Case Study*) which is considered a Public Cloud deployment model (*Selecting the right cloud for workloads*).

Since there is data portability between AWS IaaS services and Netflix SaaS services that “are bound together by standardized or proprietary technology” (SP 800-145, p.3), one criterion is met for being a Hybrid Cloud deployment. With AWS being an IaaS and Netflix as a SaaS, but both being public clouds, these cloud infrastructures are not distinct from each other and therefore do not meet the definition of a Hybrid Cloud. It is simply a linear layering of two identical deployment models and is not a Hybrid Cloud from a subscriber perspective.

In the course of researching this information, there wasn’t any data found on the extent of Netflix’s Public and Private Cloud interfacing. But referring back to *Netflix & Amazon Kinesis Streams Case Study* stating that “Netflix uses Amazon Web Services (AWS) for nearly all its computing and storage needs”, it can be reasonably inferred Netflix uses AWS to such an extent that many of these models most likely interface with each other. Since there is “a composition of two or more distinct cloud infrastructures” and employees most likely have access to the public and private cloud infrastructures, from an employee perspective, Netflix is a Hybrid Cloud deployment model.

**Problems Facing Netflix**

*Competition*

With the success of Netflix, many other services have entered the entertainment-streaming market. Customers have transitioned from traditional media to favorability to on-demand over the internet (OTT) media. The three largest streaming services, in terms of subscribers, are Netflix, Amazon Prime Video, and Disney+ (Wikipedia). Each provides a unique offering of on-demand content choices, and each will be favored by consumers based on their content variety and quality, low price point, lack of ads, and “intuitive user interface(s)” (Wroan).

*Pricing*

According to KPMG, lower prices are preferred by consumers when selecting a streaming service. As indicated earlier, Netflix has steadily increased their subscription pricing and is now $19.99 for the premium service and justified the most recent increase to “continue to offer a wide variety of quality entertainment options” (The Verge). After the price increase was enacted on 14 Jan 2022, the stock value dropped from $525.69 on the increase date to $359.70 on 26 Jan (Yahoo! Finance), indicating that the increase was not a grounded business decision for subscriber-retention. It is reasonable to infer that much of the value that Netflix provided to its customers, and therefore contributing to its high market cap, was the relatively low and competitive price point. Just an increase of $2 was enough to make the company lose 200,000 subscribers in Q1 of 2022 (TechCrunch) and 31.5% of its stock value.

*Policies*

Referring back to KPMG, customers also heavily preferred ad-free OTT on-demand services. Traditionally, Netflix has relied on ad-free content which contributed to its exponential subscriber growth. But even with their loss of subscribers and 31.5% loss of value following the price increase, on 19 Apr 2022, Netflix announced in a shareholder meeting that they would introduce ad-supported plans (TechCrunch). This announcement directly contradicts KPMG’s findings of customer preferences. But this announcement may have been overexaggerated due to poor messaging. This research paper’s author clearly remembers the fervor the announcement caused on online forums, the vast majority of which was negative reception of the news. But there was a lack of clarity that distinguished an ad-supported plan versus the perception that all subscriptions will now include ads. Regardless, stock value dropped yet again from $348.61 on announcement day to $226.19 the following market close, a 35% loss of company value in a single day (Yahoo! Finance).

Along with that same announcement that may have been another contributor to such a loss in market cap: a crackdown of password sharing. CNBC stated, “more than 100 million households are using a shared password”, and Netflix will begin “charging an additional fee to add “sub account” for up to two people outside the home”. This crackdown is a first among major streaming services and based on the negative shareholder reception, other streaming services will unlikely follow. But once again, there is a lack of clear messaging from Netflix with regards to how they intend to define password sharing and consequences for password sharers (CNBC). This market loss indicates that password sharing is popular among subscribers, and the crackdown of it will contribute to further subscription loss.

*Data Breaches*

Although data and privacy breaches are a concern for many people, they do not seem to have a major effect on a company’s stock value. The author of this paper, a Netflix subscriber, has been a victim of such a data breach of Netflix with a recent unauthorized access of his account from Buenos Aries. Netflix has been surprisingly consistent with protecting customer data, but there are still multiple articles advising people if their account has been breached. The most publicized major data breaches through 2021 were outlined in a Firewall Times article, and all were based on the actions of people rather than a failure in technology. For instance, a Netflix employee released details on a comedian’s contract with Netflix in Oct 2021 following a controversial comedy special. In May 2021, a cybersecurity platform, found security failures in Netflix’s, along with other companies’, backup data, potentially exposing sensitive information. The vulnerability was patched with updated security standards. Also in Feb 2021, a large amount of subscriber data that included login credentials for Netflix was leaked onto a hacker forum. Surprisingly, none of these incidents had an effect on Netflix’s market value as their stock continued to rise after these breaches/vulnerabilities were made public (Yahoo! Finance).

Based on the lack of recent articles on Netflix data breaches and taking into account the 2021 breaches, then comparing this information with stock value, we can make some assumptions. Either customers won’t cancel their subscriptions if their data is leaked because they don’t care (therefore not affecting the market value of a company), or the breaches were so minor and they didn’t personally affect customers. Since research hasn’t shown a major breach that included customer credit card information and due to lack of recently-publicized security failures, the data is inconclusive on whether or not data breaches affect Netflix subscriber count.

**Conclusion and Summary**

It has been demonstrated that Netflix uses a SaaS model for subscribers and an IaaS model with patronship to AWS. Netflix uses a combination of Public and Hybrid Cloud deployment models and each deployment model depends on the intended cloud consumer, whether it be a subscriber (Public Cloud) or an employee (Hybrid Cloud). Netflix’s relationship with AWS’s IaaS offering has created a streamlined SaaS offering to their customers that is supported by their creation of an internal Hybrid Cloud deployment. However, what made Netflix turn into a household name is showing signs of decline due to competition, pricing, and policies. Cloud providers must be very careful and diligent when designing their business models around a misplaced pursuit of profit by squeezing customers for money. Customer-hostile policies and pricing may result in extraordinary market cap loss. Customer-favorable policies result in shareholder benefit and has been shown, at least in the case of Netflix, to not be mutually exclusive.

Netflix pioneered an extraordinary and revolutionary service and became an outstanding company that took its place among popular culture (The Media Lab). But their recent misguided pursuit of profits plummeted their stock value from a $700.99 high in Nov 2021 to $178.89 at the writing of this paper (22 June 2022), a 74.5% loss in just seven months. Based on the paraphrasing of their mission statement (“provide value and profit to shareholders through being a premier entertainment service to subscribers”), it is clear that Netflix has fallen as a premier entertainment service. This is due to neglecting their subscribers’ values and consequentially has lost value and profit for their shareholders. The correlation, and arguably causation, of squeezing customers for money results in lost profit/revenue (despite excellent cloud infrastructure) is cautionary tale that needs to be heeded by all Cloud Providers.

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