

Policy Brief: Understanding Facebook

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About This Project

I created this policy brief for IS270 Systems and Infrastructures to provide a concise summary of findings intended to guide policy makers about a topic or issue. The reason I chose Facebook for my topic is because I am an avid user (and still am) of this particular social media platform. I wanted to look more into the company's infrastructure and learn more about how they are using the information they gather from me. Through this project, I learned a lot about user privacy and the commodification of information. It really opened my eyes and now makes me think twice about who I give my information to, where it goes, and how it is utilized.

Understanding Facebook



With over 2 billion active users, Facebook is the most dominant social media platform in the world. What started as humble beginnings, has evolved into a technological and cultural phenomenon. This brief discusses the technical aspects of Facebook, how it has climbed to the top of the social media realm, and why it remains there.

Overview

- The massive amount of information Facebook handles on a daily basis requires complicated systems for storage, computation, and processing as well as a multi-tiered architecture.
- Facebook has an interoperable system that consists of an application programming interface, or API, that allows computer programmers and developers to create new and inventive applications to enhance user's experiences when browsing the web.
- Facebook is constantly evolving in many ways to maintain their dominance in the world of social media and although they have monopolistic tendencies, they are not technically a monopoly.
- Facebook claims that it self regulates, however some feel that self regulation is not enough.
- Facebook has a new target in its crosshairs: online dating.

Background

Mark Zuckerberg founded Facebook in 2004 while he was a student at Harvard University. The platform was very basic with the ability to display text and pictures and be housed on a single server¹. Originally, Facebook was exclusively for college students. In 2006, Facebook became available to anyone with a valid email address and became the openly accessible application the world knows today. Through innovative technologies, design, and marketing (over the past 15 years), Facebook has become the gold standard of social media platforms.

¹ "The Facebook Data Center FAQ."

Technology

For Facebook to be able to deliver its services to billions of people all over the world, vast amounts of infrastructure and programming are required.

Architecture

Facebook's architecture consists of a front-end, a back-end, and servers to hold the incredible loads of data. The front-end is the part of Facebook the user interacts with. If a user were to click on a link, upload a photo, or watch a video, they would be dealing with the front-end of the architecture². Facebook is known as a LAMP website: Linux, Apache, MySQL and PHP. These systems make up the front-end and each performs a unique function. Linux is an operating system that allows users to run multiple applications at the same time, Apache is an open source web server, MySQL is a database management system, and PHP is a web programming language. The back-end consists of the applications and servers that are far removed from the client and it processes the input and allows it to be displayed and interacted with. The back-end consists of Scribe (a logging system that logs input sent from the front-end), Thrift (exchanges information between applications that use different computer languages), Hadoop (database management application service), and Haystack (a photo storing system)³.

Access

Facebook is free to use; however, it is a network reliant application. A user must be connected to the internet via a Wi-Fi connection, local area network connection, or through the user's mobile network service to interact with Facebook. Facebook can be accessed through personal computers, laptops, tablets, smart TVs, smart phones, or any other client with network connectivity.

Interoperability

Facebook's application programming interface, or API, gives programmers the ability to develop applications to interact with the Facebook interface. For example, businesses can put a "Like us on Facebook" button on their page to gather customer information and promote their brand. For

² "I Don't Speak Your Language."

³ Barrigas et al., "Scalability of Facebook Architecture."

businesses that encourage patrons to create an online account through their website, businesses have the option to let customers “Login through Facebook” which is more convenient for the customer and allows businesses to acquire even more information about their clientele.

Storage

Information such as a user’s pictures are not stored on the user’s device, they are stored on Facebook’s servers, also known as the cloud. When a user uploads a photo, the user is dealing with the front-end of the platform’s architecture. The front-end receives the input from the client and sends it to the back-end for processing and storage. The photo travels from the hard drive of the user’s client, to one of Facebook’s many servers. Facebook has seven data centers across the United States, as well as three internationally in Ireland, Sweden, and Denmark⁴. Apart from the original copy on the user’s device, there is no way to know exactly where the recently uploaded photo is stored.

Design

The user-friendly interface of the original “Facemash” appealed to college students which allowed Mark Zuckerberg to design his platform based on what his fellow students wanted: personal profiles and the ability to upload photos. Zuckerberg’s goal was to design an online social graph. He wanted real people with real relationships. Facebook encourages users to strengthen their existing connections versus creating new ones⁵. This design feature set Facebook apart from past social media platform competitor Myspace (which encouraged getting as many “friends” as possible) and helped Facebook rise to the top.

Issues and Challenges

Many people question why and how Facebook became so dominant and whether it is a monopoly. The amount of information the platform has access to also brings about ethical dilemmas.

⁴ Hoefflinger, *Becoming Facebook*.

⁵ Vogelstein, “How Mark Zuckerberg Turned Facebook Into the Web’s Hottest Platform | WIRED.”

Competition

One could argue that Facebook is a monopoly in social media. However, just because it seems Facebook is monopolizing the market, does not make it an actual monopoly. A monopoly is defined as “exclusive ownership through legal privilege, command of supply, or concerted action⁶.” It is true that Facebook has command of supply, but it does not have exclusive control. Although they are not as popular as Facebook, there are other competing social media applications. In a congressional hearing, Mark Zuckerberg state that the “average American uses eight different apps” per day to connect to their friends⁷. The social media market is competitive; however, Facebook has a history of trying to control the competition. When other social media platforms became popular, Facebook simply bought them out. Instagram came into the market in 2010, focused on photo and video sharing, and surpassed one million users in just its first two months. In 2012, Facebook bought Instagram for approximately one billion dollars, eliminating the competition⁸.

WhatsApp is a popular mobile messaging service that grew in popularity very quickly. It was launched in 2009, and by 2013 had about 200 million active users. In 2014, Facebook purchased WhatsApp for 19 billion dollars⁹. It can seem like actions of this nature confirm Facebook’s absolute control, however there are some things even Facebook cannot buy. Snapchat is a multimedia messaging application where users can communicate with each other and create video and picture compilations known as Snapchat stories¹⁰. In 2013, Facebook attempted to buy Snapchat for 3 billion dollars and Snapchat refused¹¹.

Vine was an application that allowed users to record 7 seconds of video at a time to create miniature stories or movies. At the time, Facebook had a stipulation in its API platform policy that restricted developers from replicating “core functionality that Facebook already provides¹².”

⁶ “Monopoly | Definition of Monopoly by Merriam-Webster.”

⁷ Sun, “Is Facebook a Monopoly?”

⁸ “The History of Social Media.”

⁹ “WhatsApp.”

¹⁰ “Snapchat.”

¹¹ Gallagher, “Copycat: How Facebook Tried to Squash Snapchat | WIRED.”

¹² Constine, “Facebook Ends Platform Policy Banning Apps That Copy Its Features | TechCrunch.”

Facebook felt that Vine's features were too analogous to some of the features on Facebook and restricted the Facebook API from Vine. Many apps rely on Facebook's API to build a following and gather users' information. With this move, Facebook was able to eliminate Vine as a competitor. As of late 2018, Facebook has removed the stipulation from its platform policy¹³.

Whenever rival platforms introduce new features, Facebook tends to copycat those features to suppress the competition. Instagram pioneered photo filters in social media and once Facebook acquired Instagram, those same filters became available on Facebook. In 2015, Periscope came to the market as the first live streaming app. It was the live streaming standard until Facebook Live launched in 2017. Periscope simply could not compete with the amount of users Facebook had already established¹⁴. Once Facebook failed to acquire Snapchat in 2013, Snapchat's signature "stories" feature became available on Facebook, Facebook Messenger, Instagram, and WhatsApp¹⁵.

Data Leaks

The interoperability of Facebook encourages developers to use Facebook's API to spark innovation and open the market to new applications. However, people have taken advantage of this API to acquire and leak user data. In March of 2018, it was discovered that British political consulting firm, Cambridge Analytica, illicitly harvested data from approximately 87 million users to influence political campaigns¹⁶. In the wake of this as well as other massive breaches of confidence of its users, Facebook has been forced to restrict its API. Most notably, apps are no longer allowed to automatically post on user's profiles. Before this restriction, users with both a Twitter account and Facebook account were able to have their tweets automatically posted onto their Facebook page. Now, the only way to have Twitter posts appear on a Facebook page is to use the share function on Twitter and manually input the link into Facebook¹⁷.

¹³ Cyphers and O'Brien, "Facing Facebook."

¹⁴ "The History and Rise of Live Video Streaming."

¹⁵ Gallagher, "Copycat: How Facebook Tried to Squash Snapchat | WIRED."

¹⁶ "Cambridge Analytica."

¹⁷ Zeman, "Facebook Breaks Twitter Feature By Changing Its API."

Regulation

On their website, Facebook has a list of things that are not allowed to be posted on their website. Things such as promoting acts of violence and criminal behavior, acts of bullying or sexually explicit content, hate speech, false news and spam, and posts that violate intellectual property laws¹⁸. While these rules and regulations are thorough, they are very difficult to enforce in real time. Many social media sites like Facebook, Twitter, and Instagram rely on users to report on inappropriate content. Facebook and Instagram regulate nudity and sexual content much stricter than Twitter. “Twitter allows some forms of graphic violence and/or content in Tweets marked as containing sensitive media¹⁹. Facebook self regulates this in contrast to Twitter by stating in their community standards: “we restrict the display of nudity or sexual activity because some people in our community may be sensitive to this type of content²⁰.”

In April 2018 at a congressional hearing, when Mark Zuckerberg was asked if Facebook was a media company, Zuckerberg replied: “I consider us to be a technology company²¹.” One could argue that the reason Zuckerberg said this is because media companies are much more highly regulated than tech companies. Media companies are mandated to follow rules set forth by the Federal Election Commission and must disclose sponsors of political ads²². To subvert this technicality, the U.S. Senate proposed the Honest Ads Act in 2017 which requires online companies that post political ads to “disclose how advertisements were targeted as well as how much the ads cost.” The major issue with the Honest Ads Act is that it would conflict with the Communications Decency Act which states that “no provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider.” This essentially protects websites from being held liable for what users post²³.

¹⁸ “Community Standards.”

¹⁹ “The Twitter Rules.”

²⁰ “Community Standards.”

²¹ Romano, “Don’t Ask Whether Facebook Can Be Regulated. Ask Which Facebook to Regulate.”

²² Romano.

²³ “Honest Ads Act.”

When Mark Zuckerberg was brought before the Senate Judiciary and Commerce committees, the biggest issue brought up was the harvesting of 87 million Facebook users' information for the purposes of influencing the 2016 presidential election. The committee wanted to know how Facebook will prevent this from ever happening again²⁴. Senator Mark Warner drafted a paper entitled "Potential Policy Proposals for Regulation of Social Media and Technology Firms" which outlines possible regulations that could be put on digital communication technologies. These regulations include limiting disinformation, preventing massive amounts of user tracking for the purposes of marketing, and preventing platforms from using artificial intelligence to dominate the market²⁵. The main concern for politicians is Facebook's massive reach over the voting populace and how influential the platform can be.

The Future

Facebook has a history of building relationships, and now wants to take those relationships to the next level.

Online Dating

A new feature Facebook plans to release to the world is a dating service to compete with popular dating apps like Tinder and Bumble. The dating app has been designed for users to create a separate profile from their original Facebook profile to keep users' friends and family from seeing personal dating activity. The very first users for this app were Facebook employees. Facebook employees were encouraged to test out their own design by creating fake profiles and inputting fake information to find bugs and problems with the user interface. The process of employees testing out their own products is known as "dogfooding" and is very common in the tech world²⁶. Facebook has tested its dating app internationally in Columbia, Canada, and Thailand to gather user feedback. However, there is currently no information on when Facebook Dating will be available in the United States²⁷.

²⁴ Arjun, "Facebook CEO Mark Zuckerberg Testimony Key Points."

²⁵ Bowles, "Sen. Mark Warner's 15 'common Sense' Rules for Social Media Platforms."

²⁶ Newton, "Facebook Has Started Internal Testing of Its Dating App."

²⁷ Matsakis, "Facebook Dating Is Rolling Out. Here's How It Differs From Tinder | WIRED."

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