

filed a lawsuit against Amazon alleging it improperly used proprietary technology.¹⁹⁷⁸ At the Subcommittee’s sixth hearing, Representative Ken Buck (R-CO) said that allegations that Amazon incorporated features demonstrated to it by Vocalife’s founders during an investment meeting “are serious, especially because the size and scope of these practices couldn’t happen without Amazon’s monopolistic control of the marketplace.”¹⁹⁷⁹

Prior to Amazon’s acquisition of Ring, Amazon invested in Ring through the Alexa Fund, and internal emails about meetings during this time demonstrate how Amazon is able to obtain crucial insights into young companies. Amazon was able to learn about Ring’s “roadmap, future products, [and] two acquisitions they have done.”¹⁹⁸⁰ While Amazon often denies public reporting that it steals and copies technology from young startups, Amazon’s emails suggest that it does replicate some of the startups it meets with or invests in. An email out of Amazon’s Lab 126 regarding Ring indicated that Amazon “could easily replicate all of their hardware to be better, [and] operate in a more secure and robust infrastructure, for a LOT less than [the] cost of buying them.”¹⁹⁸¹ In the same email chain, Amazon employees wondered “if we move forward with due diligence, then decide not to buy [Ring], could we have legal issues if we go into the market by ourselves as a competitor and materially impact their business?”¹⁹⁸²

5. Amazon Web Services

a. Overview

Amazon Web Services (AWS) is considered the pioneer of cloud computing and has sustained a first-mover advantage for over a decade.¹⁹⁸³ AWS officially launched in 2006 featuring two of its core IaaS offerings, Simple Storage Service (S3) and Elastic Compute Cloud (EC2).¹⁹⁸⁴ While Amazon.com was AWS’s first customer, in the early 2000s AWS began creating cloud offerings for third-party merchants, who could use AWS to “build online shopping sites on top of Amazon’s e-commerce engine.”¹⁹⁸⁵ For AWS, meanwhile, this partnership with third parties gave the company

¹⁹⁷⁸ *Id.*

¹⁹⁷⁹ CEO Hearing Transcript at 102 (statement of Rep. Ken Buck (R-CO), Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary).

¹⁹⁸⁰ Production from Amazon, to H. Comm. on the Judiciary, AMAZON-HJC-00214240 (Oct. 18, 2017) (on file with Comm.).

¹⁹⁸¹ *Id.* at AMAZON-HJC-00220705 (Nov. 4, 2017).

¹⁹⁸² *Id.* at AMAZON-HJC-00220703 (Nov. 4, 2017).

¹⁹⁸³ Ron Miller, *How AWS Came To Be*, TECHCRUNCH (July 2, 2016), <https://techcrunch.com/2016/07/02/andy-jassys-brief-history-of-the-genesis-of-aws/>.

¹⁹⁸⁴ *What’s New*, AMAZON WEB SERVICES (Oct. 4, 2006), <https://aws.amazon.com/about-aws/whats-new/2006/>.

¹⁹⁸⁵ *Id.*

experience in creating well-documented APIs for internal developers.¹⁹⁸⁶ Over the next few years, AWS rolled out additional programs to expand its network of third-party software vendors and implementation partners, including AWS Marketplace¹⁹⁸⁷ and the AWS Partnership Network (APN) in 2012.¹⁹⁸⁸

Over the last decade, AWS has also secured significant government contracts. Most notably, in 2014 AWS signed a \$600 million Commercial Cloud Services (C2S) contract to build the AWS Secret Region, a cloud offering tailored for the U.S. intelligence community.¹⁹⁸⁹ The deal marked the largest cloud infrastructure contract at the time and signaled the government's shift from investing in on-premise server capacity to cloud services.¹⁹⁹⁰ Today, AWS boasts work "with over 6,500 government agencies" and states that Amazon has been "among the first to solve government compliance challenges facing cloud computing," while also "consistently help[ing] our customers navigate procurement and policy issues related to adoption of cloud computing."¹⁹⁹¹

AWS contributes immense value to Amazon's overall business. In each quarter since Amazon began publicly reporting its financials for cloud, AWS has accounted for an outsized share of Amazon's operating profits. While AWS contributes to less than 15% of Amazon's annual revenue, it consistently accounts for over 50% of the company's operating income. In 2017, AWS accounted for over 100% of Amazon's operating income, due to losses in the company's international business.¹⁹⁹² In the first quarter of 2020, AWS accounted for 13.5% of Amazon's total revenues yet 77% of its operating income.¹⁹⁹³

¹⁹⁸⁶ Ron Miller, *How AWS Came To Be*, TECHCRUNCH (July 2, 2016), <https://techcrunch.com/2016/07/02/andy-jassys-brief-history-of-the-genesis-of-aws/>.

¹⁹⁸⁷ *Introducing AWS Marketplace*, AMAZON WEB SERVICES (Apr. 19, 2012), <https://aws.amazon.com/about-aws/whats-new/2012/04/19/introducing-aws-marketplace/>.

¹⁹⁸⁸ Jeff Barr, *Announcing the AWS Partner Network*, AWS NEWS BLOG (Apr. 17, 2012), <https://aws.amazon.com/blogs/aws/announcing-the-aws-partner-network/>. (in beta).

¹⁹⁸⁹ Frank Konkel, *Federal Cloud Spending Trends Toward All-Time High*, NEXTGOV (Sept. 12, 2018), <https://www.nextgov.com/it-modernization/2018/09/federal-cloud-spending-trends-toward-all-time-high/151221/>.

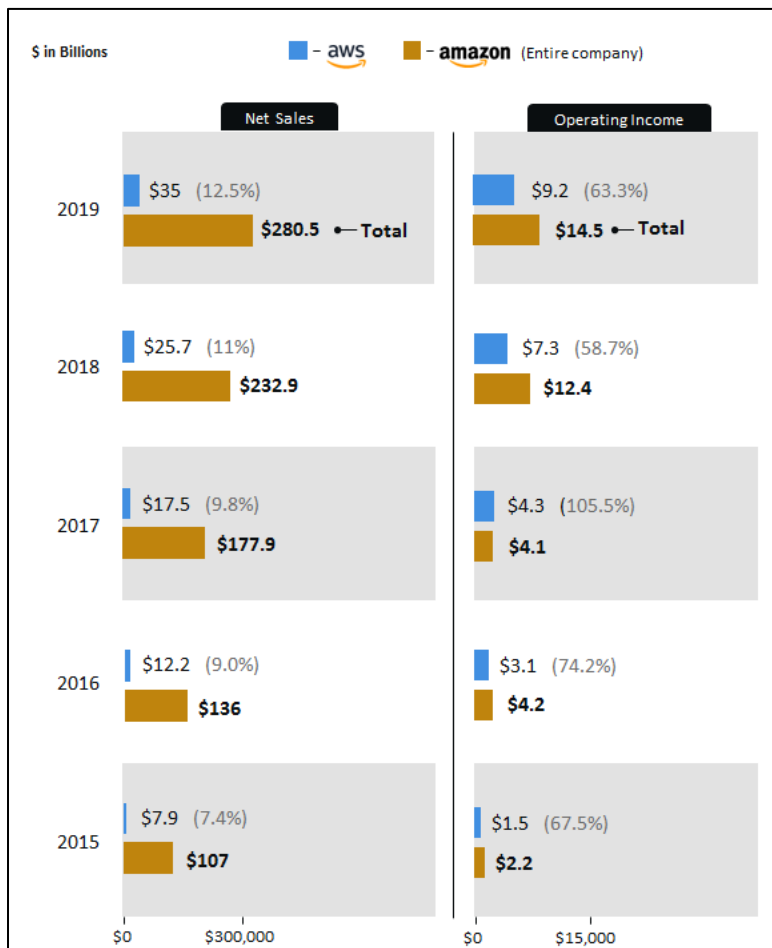
¹⁹⁹⁰ *Id.*

¹⁹⁹¹ *The Trusted Cloud for Government*, AMAZON WEB SERVICES, <https://aws.amazon.com/government-education/government/> (last visited Sept. 30, 2020).

¹⁹⁹² Amazon.com, Inc., Annual Report (Form 10-K) 26 (Feb. 1, 2018), https://s2.q4cdn.com/299287126/files/doc_financials/annual/Amazon_AR.PDF.

¹⁹⁹³ Amazon.com, Inc., Quarterly Report (Form 10-Q) 17 (Apr. 30, 2020), <http://d18rn0p25nwr6d.cloudfront.net/CIK-0001018724/708a19c5-7d8c-4fc9-ab37-bfaa7a31629b.pdf>.

Contributions to Amazon's Revenue and Operating Profit over Time¹⁹⁹⁴



Profits earned through its cloud services enable Amazon to invest heavily into expanding its cloud operation, as well as to support its other lines of business. Several market participants expressed concerns to Subcommittee staff that Amazon uses its high and steady profits from AWS to subsidize these other lines of business, including its retail operation.¹⁹⁹⁵ In an internal document produced in response to the Committee's requests for information, Amazon instructs its employees to rebut this claim by referring to it as a "myth."¹⁹⁹⁶ However, Amazon failed to produce the financial data that would have enabled Subcommittee staff to make an independent assessment.¹⁹⁹⁷

¹⁹⁹⁴ Prepared by the Subcomm. based on Amazon.com, Inc., Annual Report (Form 10-K) (2015-2019), <https://www.sec.gov/Archives/edgar/data/1018724/000101872419000004/amzn-20181231x10k.htm>

¹⁹⁹⁵ Submission from Source 48, to H. Comm. on the Judiciary, 8 (Nov. 8, 2019) (on file with Comm.).

¹⁹⁹⁶ Production of Amazon, to H. Comm on the Judiciary, AMAZON-HJC-00216209 (Aug. 24, 2018) (on file with Comm.).

¹⁹⁹⁷ Letter from Hon. Jerrold Nadler, Chairman, H. Comm. on the Judiciary, Hon. Doug Collins, Ranking Member, H. Comm on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, to Jeff Bezos, CEO, Amazon.com, Inc., 2 (on file with Comm.).

b. Market Power

As discussed earlier in this Report, AWS is the largest provider of cloud computing services, capturing approximately 24% of the U.S. spend in 2018 on cloud computing services, including IaaS, PaaS, and SaaS.¹⁹⁹⁸ AWS represents close to half of global spending on cloud infrastructure services, with three times the market share of Microsoft, its closest competitor.¹⁹⁹⁹ Its growth continues to soar. In the first quarter of 2020, AWS crossed \$10 billion in quarterly revenue while growing 33% on an annualized basis.²⁰⁰⁰

Amazon has a “lion’s share of the government cloud infrastructure market.”²⁰⁰¹ Exact data on AWS’s share of government cloud expenditure is opaque because most of AWS’s public sector revenue comes through subcontracts, which are harder to track, and contracts related to the intelligence community, which are listed as classified spending and are rarely reported. Market participants, however, emphasize that AWS is considered a major player in federal cloud contracts.²⁰⁰²

In its submissions to the Subcommittee, Amazon describes itself as a relatively small player representing “less than 1% of IT spending globally and less than 2% in the United States.”²⁰⁰³ Amazon states that AWS competes with a large array of offerings including on-premise computing.²⁰⁰⁴ In other contexts, however, Amazon has highlighted its leading position, describing itself as the “largest cloud software marketplace” and the “only cloud provider with existing classified infrastructure.”²⁰⁰⁵

Through a careful review of Amazon’s internal documents and other evidence during the investigation, Subcommittee staff found that Amazon has a dominant position in cloud computing. Amazon’s dominance in cloud computing traces in part to its first-mover advantage and the high fixed

¹⁹⁹⁸ Letter from David Zapolsky, Gen. Counsel, Amazon.com, Inc., to Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 6 (July 26, 2019) (on file with Comm.).

¹⁹⁹⁹ *Id.*; Press Release, Katie Costello, Gartner, *Gartner Forecasts Worldwide Public Cloud Revenue to Grow 17.5 Percent in 2019* (Apr. 2, 2019), <https://www.gartner.com/en/newsroom/press-releases/2019-04-02-gartner-forecasts-worldwide-public-cloud-revenue-to-g>.

²⁰⁰⁰ Jordan Novet, *AWS Tops \$10 Billion in Quarterly Revenue for the First Time*, CNBC (Apr. 30, 2020) <https://www.cnbc.com/2020/04/30/aws-earnings-q1-2020.html>.

²⁰⁰¹ David Ramel, *AWS vs. Azure Heats Up in Federal Market*, WASH. TECH. (Sept. 14, 2018) <https://washingtontechnology.com/articles/2018/09/14/aws-vs-azure-public-sector.aspx>.

²⁰⁰² Interview with Source 31 (May 27, 2020).

²⁰⁰³ Letter from David Zapolsky, Gen. Counsel, Amazon.com, Inc., to Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 6 (July 26, 2019) (on file with Comm.).

²⁰⁰⁴ *Id.*

²⁰⁰⁵ Complaint at 5, *Amazon Web Servs, Inc. v. United States*, 147 Fed. Cl. 146 (2020) (No. 1:19-cv-01796), <https://www.courthousenews.com/wp-content/uploads/2019/12/amazon-trump-cafc.pdf>.

costs and economies of scale associated with this market.²⁰⁰⁶ But evidence suggests that Amazon has also taken steps to lock in and extend this dominance in ways that risk harming customers, businesses, and the broader public.

Network effects incentivized Amazon to build out AWS offerings quickly. As with other sectors of the digital economy, the value of Amazon's cloud offerings increases with the number of businesses and customers that use it. Introducing more services and partnership programs draws more customers, attracts more developers and implementation partners, which, in turn, draws additional customers.²⁰⁰⁷

AWS is considered to have the largest collection of cloud offerings. Its AWS Management Console and supporting technologies span many categories, including storage and computing, databases, migration services, and machine learning tools.²⁰⁰⁸ Many of these products are based on open-source software or on the technology of companies that Amazon acquired.²⁰⁰⁹ In addition to selling cloud offerings directly, AWS also runs a cloud marketplace where third-party vendors can list their products. The AWS Marketplace enjoys over 1,300 vendors as of 2018, and over 9,000 products, functioning as the largest cloud marketplace in the sector.²⁰¹⁰

The widespread adoption of AWS's developer certification programs, partner networks, and student programs has meant that there are far more engineers familiar with AWS technology than with any other platform.²⁰¹¹ Several market participants listed the availability of AWS-trained engineers as a reason for selecting AWS over other cloud vendors and as a barrier for switching platforms or attempting to multi-cloud.²⁰¹²

High switching costs reinforce Amazon's dominance in the cloud market.²⁰¹³ A cloud-based application company interviewed by Subcommittee staff explained these costs:

We've looked at other services (Google, Microsoft, Oracle) but we've relied on AWS for so long that we couldn't just flip a switch, and we've run down a lot of engineering problems with AWS . . . There are other providers we could go to, but it would take

²⁰⁰⁶ See *infra* Section IV.

²⁰⁰⁷ Production of Google, to H. Comm. on the Judiciary, GOOG-HJC-04260401 (Aug. 25, 2016) (on file with Comm.).

²⁰⁰⁸ *AWS Marketplace*, AMAZON WEB SERVICES, <https://aws.amazon.com/marketplace> (last visited Sept. 30, 2020).

²⁰⁰⁹ CEO Hearing at 6 (response to Questions for the Record of Jeff Bezos, CEO, Amazon.com, Inc.).

²⁰¹⁰ *AWS Marketplace*, AMAZON WEB SERVICES, <https://aws.amazon.com/marketplace> (last visited Sept. 30, 2020); Brad Lyman, *See What's New for AWS Marketplace Sellers*, AWS PARTNER NETWORK BLOG (Mar. 9, 2018), <https://aws.amazon.com/blogs/apn/see-whats-new-for-aws-marketplace-sellers>.

²⁰¹¹ Interview with Source 25 (June 10, 2020).

²⁰¹² Interview with Source 126 (June 29, 2020).

²⁰¹³ See *infra* Section IV.

work. We could also build some functionality internally, but that would also take a lot of work.²⁰¹⁴

For cloud-based application developers, whose entire product is dependent on AWS, the fears of lock-in are even greater. One marketplace participant said:

“[A]ny transition of the cloud services currently provided by AWS to another cloud service provider would be difficult to implement and would cause us to incur significant time and expense and could disrupt or degrade our ability to deliver our products and services. Our business relies on the availability of our services for [users] and advertisers.²⁰¹⁵

Amazon has also taken steps to lock-in its position, including through long-term contracts, volume minimums, and the use of fees to move data to other cloud providers, which are also known as egress fees. In submissions to the Subcommittee, numerous market participants noted that AWS often seeks multi-year contracts during negotiations.²⁰¹⁶ These contracts are also commonplace in companies’ investor statements. For example, according to Lyft’s 2020 investor filing, they agreed to pay “an aggregate of at least \$300 million between January 2019 and December 2021 on AWS services.”²⁰¹⁷ According to Slack’s investor filing, in 2018 it committed to a five-year contract with minimum annual commitments of \$50 million.²⁰¹⁸

Subcommittee staff also uncovered evidence that Amazon sometimes requires a volume agreement when a large company seeks to negotiate lower prices. In an internal email discussion on this topic, a senior executive at AWS wrote that Amazon has “a private rate card which has a commit level for bandwidth pricing. Rates at or above the private rate card are pre-approved. Anything below that has to be first approved by me and then the price goes to service GM.”²⁰¹⁹

When an Amazon customer chooses to move data to another cloud provider, they are charged an egress fee. Market participants told Subcommittee staff that they view these fees less as a cost for

²⁰¹⁴ Interview with Source 111 (Apr. 6, 2020).

²⁰¹⁵ Submission from Source 32, to H. Comm. on the Judiciary, Source 32-000009 (Oct. 29, 2019) (on file with Comm.).

²⁰¹⁶ *Id.* at Source 32-000017.

²⁰¹⁷ Lyft, Annual Report (Form 10-K) 7 (Feb. 28, 2020), <https://investor.lyft.com/static-files/981ad93a-5d97-4f7f-8937-5682ca83cba7>.

²⁰¹⁸ Slack, Registration Statement (Form S-1) 90 (Apr. 26, 2019), <http://d18rn0p25nwr6d.cloudfront.net/CIK-0001764925/b6da15ae-25c5-4447-ba38-c287bf11e624.pdf>.

²⁰¹⁹ Production of Amazon, to H. Comm. on the Judiciary, AMAZON-HJC-00206893 (May 11, 2017) (on file with Comm.).

Amazon to transport data and more as friction imposed by Amazon for switching providers, noting that Amazon charges egress fees even when data is staying locally within the same data center.²⁰²⁰

The COVID-19 pandemic has underscored the centrality of cloud computing to the functioning of an increasing swath of businesses—highlighting how cloud services have come to resemble critical infrastructure. Reporting by *The Information* in April 2020 discussed how the major cloud providers are facing requests from many customers for financial relief, while the demand for cloud computing has increased.²⁰²¹ As this reporting noted, “AWS has been the least willing to offer flexible terms on customer bills, according to numerous customers. That stands in contrast to Microsoft and Google which have shown some flexibility, partners say.”²⁰²²

c. Merger Activity

Amazon has acquired a significant number of cloud computing firms over the past decade. Although a full discussion of this activity is beyond the scope of this Report, Amazon’s acquisition activity in the cloud market appears to be part of a broader trend among dominant cloud providers to make serial acquisitions, any one of which may seem insignificant but which collectively serve to solidify and expand their dominance.²⁰²³ In some instances AWS has acquired cloud technologies that previously integrated with multiple clouds, only for AWS to make it an AWS-specific product after acquisition, foreclosing competitors and increasing consumers’ switching costs.²⁰²⁴

d. Competitive Significance of AWS to Amazon’s Other Lines of Business

Amazon’s dual role as a dominant provider of cloud infrastructure and as a dominant firm in other markets creates a conflict of interest that Amazon has the incentive and ability to exploit.

Amazon’s dominance in cloud computing alongside its integration across an array of businesses—online retail, music and video, and smart home devices—creates a core conflict of interest. Cloud computing customers like Netflix and Target are in the position of competing with Amazon while also relying on AWS. Firms in their position effectively have to choose between switching to one of the alternative cloud infrastructure providers or funding their primary

²⁰²⁰ Interview with Source 7 (May 27, 2020).

²⁰²¹ Kevin McLaughlin & Amir Efrati, *AWS Holds the Line on Cloud Bills as Customers Ask for Relief*, THE INFO. (Apr. 17, 2020) <https://www.theinformation.com/articles/aws-holds-the-line-on-cloud-bills-as-customers-ask-for-relief>.

²⁰²² *Id.*

²⁰²³ See *infra* Section IV.

²⁰²⁴ Ron Miller, *Update: Amazon Has Acquired Israeli Disaster Recovery Service CloudEndure for Around \$200M*, TECHCRUNCH (Jan. 8, 2019), <https://techcrunch.com/2019/01/08/amazon-reportedly-acquired-israeli-disaster-recovery-service-cloudendure-for-around-200m/>. See also *CloudEndure deprecation*, GOOGLE CLOUD, <https://cloud.google.com/compute/docs/deprecations/cloudendure> (last visited Oct. 4, 2020).

competitor.²⁰²⁵ One venture capitalist described Amazon as “useful but dangerous” because “it’s hard to predict what Amazon wants to get into . . . you can’t know.”²⁰²⁶ Similarly, a business-to-business application developer told Subcommittee staff that they felt pressure to switch their entire product to Microsoft Azure because of its client’s concerns with Amazon’s anticompetitive conduct in the online retail sector.²⁰²⁷

Amazon acknowledges that cloud customers that are also its competitors are wary of using AWS. One internal document had guidance on how to discuss the issue with customers. An FAQ sheet listed: “What do you say to customers who are worried that using AWS services will support Amazon's competitive growth in the retail space?” Amazon’s sample answer stated, “How can you afford to not compete with the best possible tools in such a tough market like retail?”²⁰²⁸

Subcommittee staff also spoke with market participants that expressed concern about how this conflict of interest shapes Amazon’s behavior in its other lines of business. For example, in 2015 Amazon kicked Google Chromecast and Apple TV—direct competitors with the Amazon Fire Stick and Fire TV cube—out of its retail store.²⁰²⁹ AWS is also positioned to use customer and seller data from one line of business to inform decisions in other lines of business, analogous to its conduct in Amazon Retail. At least one market participant who spoke with Subcommittee staff had evidence that AWS engaged in this cross-business data sharing.²⁰³⁰ In another internal document with guidance for staff on “AWS Competitive Messaging,” employees were advised to offer the following response:

- Q. Walmart is warning its suppliers that they don’t want them to be running on AWS because they don’t want Amazon.com, a competitor of Walmart’s, to have access to their data. How are you addressing that?
- A: Even though Amazon’s consumer business has no access to any customer data in AWS, I can understand why Walmart would be paranoid in making sure that

²⁰²⁵ Christina Farr & Ari Levy, *Target Is Plotting a Big Move Away From AWS As Amazon Takes Over Retail*, CNBC (Aug. 29, 2017), <https://www.cnbc.com/2017/08/29/target-is-moving-away-from-aws-after-amazon-bought-whole-foods.html>; See also *Netflix on AWS*, AMAZON WEB SERVICE, <https://aws.amazon.com/solutions/case-studies/netflix/> (last visited Sept. 30, 2020).

²⁰²⁶ Interview with Source 146 (May 28, 2020).

²⁰²⁷ Interview with Source 126 (June 29, 2020).

²⁰²⁸ Production of Amazon, to H. Comm. on the Judiciary, AMAZON-HJC-00216210 (Aug. 24, 2018) (on file with Comm.).

²⁰²⁹ Barb Darrow, *Why Cloud Users Should Care That Amazon Just Kicked Apple TV to the Curb*, FORTUNE (Oct. 2, 2015), <http://fortune.com/2015/10/02/why-aws-users-should-care-that-amazon-nixed-apple-tv/>.

²⁰³⁰ Interview with Source 126 (June 29, 2020).

their data is private. So, I think it's a pretty reasonable expectation for them to ask their suppliers to encrypt that data in AWS.²⁰³¹

Engineers and market participants have also raised concerns that AWS employees may have access to Amazon's Key Management Services (KMS), which customers can use to store encryption keys.²⁰³² If an employee were able to access a customer's encryption keys, they could potentially see the contents of a customer's application, including proprietary code, business transactions, and data on their user's. In response to questions from the Subcommittee, Amazon said that the company's "policies prohibit employees from accessing and reading customer keys in KMS. KMS is designed such that customer keys in the service cannot be retrieved in plain text (unencrypted) form by anybody, including AWS employees."²⁰³³ Even if AWS employees can never access the content of their customers applications, AWS tracks a host of commercially sensitive metrics, including any changes in demand for storage and compute services, the components of their application's architecture, the requests to a specific database per second, database size, and the types of requests.²⁰³⁴ One industry expert told Subcommittee staff:

They don't need to see the encrypted content of a movie to see that there are a ton of requests to particular data. If Netflix announced five new movies this weekend and there's a ton of data to five new objects. So, you don't need all the information to know what's happening.²⁰³⁵

Finally, AWS provides Amazon with unparalleled insights into the trajectory of startups using its services, information that it can use to guide acquisitions and to replicate promising technology. Data that AWS collects on cloud computing customers can provide unique business intelligence, information that investors, other firms, and entrepreneurs lack.

A report from 2011 published in *Reuters*, profiling the AWS Start-up Challenge, describes cases where AWS has used insights gleaned from its cloud computing service to inform its venture capital investment decisions.²⁰³⁶ Adam Selipsky, then Vice President of AWS, told *Reuters*, "AWS has great relationships with many young companies and there have been cases where we've been able to

²⁰³¹ Production of Amazon, to H. Comm. on the Judiciary, AMAZON-HJC-00216213 (Aug. 24, 2018) (on file with Comm.).

²⁰³² Interview with Source 146 (May 28, 2020).

²⁰³³ CEO Hearing at 17 (response to Questions for the Record of Jeff Bezos, CEO, Amazon.com, Inc.).

²⁰³⁴ Interview with Source 146 (May 28, 2020); Innovation and Entrepreneurship Hearing at 44 (response to Questions for the Record of Nate Sutton, Assoc. Gen. Counsel, Competition, Amazon.com, Inc.).

²⁰³⁵ Interview with Source 146 (May 28, 2020).

²⁰³⁶ Alistair Barr, *Amazon Finds Startup Investments in the 'Cloud.'* REUTERS (Nov. 9, 2011), <http://www.reuters.com/article/amazon-cloud-idUSN1E7A727Q20111109>.

help with investment opportunities.”²⁰³⁷ Today, one way Amazon leverages AWS is through relationships with startups. The AWS Activate program provides startups with free credits, technical support, and training.²⁰³⁸

Subcommittee staff interviewed a startup and beneficiary of AWS Activate that had engaged in partnership conversations with Amazon. During these discussions, the startup shared information about how its product was built with AWS. Within a few years, the startup learned that Amazon had introduced a replica product. This company said that Amazon “had so many incentives. Rate cuts, and free services. Not having a lot of resources, it’s hard to turn that down. But fast forward, we basically helped them build their offering that they copied from us.”²⁰³⁹

As part of its investigation, the Subcommittee asked Amazon whether it uses or has ever used AWS usage patterns or data to inform its investment decisions. Amazon responded:

AWS uses data on individual customers’ use of AWS to provide or improve the AWS services and grow the business relationship with that customer. This data may inform AWS’s decisions about how AWS invests in infrastructure, such as data centers, edge networks, hardware, and related software solutions in order improve the customer experience.²⁰⁴⁰

Amazon’s response leaves unclear whether it would view it appropriate to use a firm’s AWS data to develop products competing with that firm, so long as Amazon could identify some benefit to the broader “customer experience.”

Prior to 2017, Amazon also required that AWS customers agree “not to assert any intellectual property claim against any AWS service used by that customer.”²⁰⁴¹ Amazon removed that condition from the AWS online customer agreement on June 28, 2017.²⁰⁴²

In addition to creating a significant information advantage for Amazon, AWS may also reinforce its market power in other ways. Because startups often rely heavily on AWS, Amazon is a natural choice when pursuing a sale or seeking investment. In an internal email produced to the Subcommittee, Peter Krawiec, Amazon’s Vice President of Worldwide Corporate Development, recapped a meeting with a recently acquired company, noting that the company was, “[s]uper excited

²⁰³⁷ *Id.*

²⁰³⁸ AWS Activate, AMAZON WEB SERVICES, <https://aws.amazon.com/activate/> (last visited Sept. 30, 2020).

²⁰³⁹ Interview with Source 126 (June 29, 2020).

²⁰⁴⁰ Innovation and Entrepreneurship Hearing at 45 (response to Questions for the Record of Nate Sutton, Assoc. Gen. Counsel, Competition, Amazon.com, Inc.).

²⁰⁴¹ *Id.* at 43.

²⁰⁴² *Id.* at 42.

about Amazon and relieved that Walmart will not be the buyer. Engineering team thrilled that they won't have to unplug from AWS under a Walmart world."²⁰⁴³

e. Conduct

The leading position AWS enjoys in the market traces in part to its first-mover advantage, network effects, and steep investments that the company made in building out the physical infrastructure on which cloud resides. However, AWS has also engaged in a series of business practices designed to maintain its market dominance at the expense of choice and innovation. Through a combination of self-preferencing, misappropriation, and degradation of interoperability, Amazon has sought to eliminate cross-platform products with Amazon-only products. Amazon's conduct has already led several open-source projects to become more closed, a move driven by a need for protection from Amazon's misappropriation. If unchecked, Amazon's tactics over the long-term risk solidifying lock-in and diminishing the incentive to invest. Because cloud is the core infrastructure on which the digital economy runs, ensuring its openness and competitiveness is paramount.

i. Misappropriation of Data

As described earlier in this Report, cloud platform vendors compete by expanding their first-party cloud offerings, such as those offered through the AWS Management Console.²⁰⁴⁴ Market participants note that one way AWS has expanded its offerings is by creating proprietary versions of products that have been developed under open-source licenses.²⁰⁴⁵

Open-source licenses allow software to be freely used, modified, and shared.²⁰⁴⁶ Open-source software can run on any infrastructure, local machine, server room, or on the cloud, reducing lock-in to a specific hardware vendor.²⁰⁴⁷ Companies based on open-source software bring in revenue by selling additional features under proprietary licenses or services.²⁰⁴⁸ In recent years, open-source development has been a leading model for software development, attracting significant venture capital investment.²⁰⁴⁹

²⁰⁴³ Production of Amazon, to H. Comm. on the Judiciary, AMAZON-HJC-00225832 (June 15, 2018) (on file with Comm.).

²⁰⁴⁴ See *infra* Section IV.

²⁰⁴⁵ Interview with Source 152 (Apr. 15, 2020).

²⁰⁴⁶ *Open Source Licenses by Category*, OPEN SOURCE INITIATIVE, <https://opensource.org/licenses/category> (last visited Sept. 30, 2020).

²⁰⁴⁷ Nicholas Loulloudes et al., *Enabling Interoperable Cloud Application Management Through an Open Source Ecosystem*, 19 IEEE INTERNET COMPUTING, 54 (2015), <https://ieeexplore.ieee.org/document/7111887>.

²⁰⁴⁸ Max Schireson & Dharmesh Thakker, *The Money in Open-Source Software*, TECHCRUNCH (Feb. 9, 2016), <https://techcrunch.com/2016/02/09/the-money-in-open-source-software/>.

²⁰⁴⁹ Interview with Source 152 (Apr. 15, 2020).