IN THE UNITED STATES DISTRICT COURT FOR THE
EASTERN DISTRICT OF VIRGINIA
Alexandria Division

UNITED STATES OF AMERICA, et al.,	)	
	)	
Plaintiffs,	)	
	)	
v.	)	1:23-cv-108 (LMB/JFA)
	)	
GOOGLE LLC,	)	
	)	
Defendant.	)	

MEMORANDUM OPINION

After a bench trial, the Court found that defendant Google LLC ("Google") violated Sections 1 and 2 of the Sherman Act by "willfully engag[ing] in a series of anticompetitive acts to acquire and maintain monopoly power in the publisher ad server and ad exchange markets for open-web display advertising," and by unlawfully tying its publisher ad server ("DFP") and ad exchange ("AdX") "together through contractual policies and technological integration, which enabled the company to establish and protect its monopoly power in these two markets." United States v. Google LLC, 778 F. Supp. 3d 797, 873 (E.D. Va. 2025) [hereinafter Google]. The Court also found that Google "further entrenched its monopoly power by imposing anticompetitive policies on its customers and eliminating desirable product features." Id. These actions "depriv[ed] rivals of the ability to compete," and "substantially harmed Google's publisher customers, the competitive process, and ultimately, consumers of information on the open web." Id.

After Google was found liable for these violations, the parties engaged in four months of additional discovery to address what remedies needed to be included in the Final Judgment. Once discovery was completed and trial briefs were filed, the Court conducted an 11-day bench trial during which the parties presented the testimony of 26 witnesses and submitted over 100 exhibits and multiple demonstratives, followed by the filing of post-trial briefs and their proposed post-trial final judgments ("PFJs").[1] The majority of the parties' proposed behavioral remedies are not seriously contested and, with the resolution of the areas of disagreement that this Memorandum Opinion will resolve, the parties should be able to propose a Final Judgment with the appropriate amount of detail.

The core dispute in the remedies phase of this litigation is whether the parties' essentially overlapping behavioral remedies are sufficient to restore competition to the open-web display publisher ad server and ad exchange markets injured by Google's Sherman Act violations, or whether—in addition to those behavioral remedies—there must be structural remedies, which Plaintiffs propose would consist of the divestiture of Google's ad exchange, AdX; the open-sourcing of the decision-making algorithm in Google's publisher ad server, DFP (the "Open-Source Auction"); and the contingent divestiture of "DFP Remainder," which refers to the functionality of DFP that remains after the creation of the Open-Source Auction.

In Google's view, the parties' substantially overlapping behavioral remedies are more than sufficient to address the anticompetitive harms identified in the liability opinion and to restore and maintain competition in the relevant ad tech markets. These behavioral remedies go far beyond an injunction that prohibits Google from enforcing any policies or contract terms that tie DFP to AdX, and bars it from implementing related anticompetitive policies. Instead, they include affirmative, forward-looking remedies that will foster much-needed competition in the open-web display ad exchange and publisher ad server markets. These behavioral remedies fall into three general categories: (1) interoperability and data-sharing remedies, (2) anti-discrimination remedies, and

[1] The parties' post-trial briefs include Plaintiffs' Post-Trial Brief, [Dkt. No. 1810], and Google's Post-Trial Remedies Brief, [Dkt. No. 1811]. The parties' proposed post-trial final judgments include Plaintiffs' Proposed Final Judgment ("Plaintiffs' PFJ"), [Dkt. No. 1814-1], and Google's Proposed Final Judgment ("Google's PFJ"), [Dkt. No. 1811-2].

(3) prohibitions regulating Google's buy-side bidding behavior. Google and Plaintiffs both propose the establishment of a Monitor and Technical Committee to oversee Google's compliance with the Court's Final Judgment, and while Google asks that the Final Judgment last for a term of 6 years, Plaintiffs seek a 15-year period.

Although Plaintiffs propose many of the same behavioral remedies identified by Google, they argue that behavioral remedies will not resolve the harms of Google's anticompetitive conduct and argue that only structural remedies can provide the assurance needed to restore competition in the open-web display ad exchange and publisher ad server markets. Plaintiffs base this position on their lack of trust in Google given Google's history of anticompetitive conduct. Plaintiffs also urge the Court to impose specific anti-circumvention, anti-retaliation, and other administrative remedies.

For the reasons discussed in this Memorandum Opinion, the Court finds that structural remedies are neither realistic nor needed and that the parties' substantially overlapping behavioral remedies as modified in this Memorandum Opinion will be sufficient to "effectively pry open to competition" the ad tech markets that were injured by Google's unlawful conduct, and prevent Google from reverting to anticompetitive conduct in these markets. Int'l Salt Co. v. United States, 332 U.S. 392, 401 (1947).

I. Procedural Background

In its liability opinion, the Court found that Google had "violated Section 2 of the Sherman Act by willfully acquiring and maintaining monopoly power in the open-web display publisher ad server market and the open-web display ad exchange market" (Counts I and II), and had "unlawfully tied its publisher ad server (DFP) and ad exchange (AdX) in violation of Sections 1 and 2 of the Sherman Act" (Count IV). Google, 778 F. Supp. 3d at 810. The Court dismissed

Count III after finding that Google did not violate Section 2 of the Sherman Act as to the advertiser ad network market (Count III). Id. at 873.[2]

Two relevant product markets—the worldwide publisher ad server market for open-web display advertising, and the worldwide ad exchange market for open-web display advertising—were found to constitute "distinct relevant product market[s]." Id. at 834, 837. Having determined the relevant product markets, the Court found that Google possessed monopoly power in these two markets. Id. at 850-56. Specifically, the Court found that DFP had "a durable and 'predominant share of the [publisher ad server] market' . . . protected by high barriers both to entry and expansion," id. at 850 (quoting United States v. Grinnell Corp., 384 U.S. 563, 571 (1966)); and that AdX charged a durable supracompetitive take rate of 20% for each open-web display transaction for over a decade and maintained a high share of the open-web display ad exchange market, which was fortified by high barriers to entry. Id. at 852.

Two of the key ways in which Google was able to acquire and maintain monopoly power over the publisher ad server and ad exchange markets was through tying DFP to AdX, which essentially "lock[ed] publishers into exclusively using Google's sell-side ad tech tools rather than those offered by competitors," and "leveraging its tied ad tech tools to engage in a series of acts that diminished rivals' scale, thwarted their ability to compete, and harmed customers."[3] Id. at 856-

[2] The factual findings and legal conclusions from the liability trial are incorporated into this Memorandum Opinion. This brief background summary is intended to provide context for the remedies decision.

[3] During the liability trial, Plaintiffs argued that Google anticompetitively acquired and maintained monopoly power over the two relevant ad tech product markets by acquiring DoubleClick and Admeld. Google, 778 F. Supp. 3d at 858. Both of those acquisitions were approved by the relevant regulators. Id. at 858-59. Although these acquisitions helped Google gain monopoly power in the two relevant ad tech product markets, the Court found that Plaintiffs "failed to show that the . . . acquisitions were anticompetitive . . . when viewed in isolation." Id. at 858. Rather, it was Google's

65. As to the AdX-DFP tie, the Court found that Google's structure of AdX and DFP amounted to an unlawful tying under Section 1 of the Sherman Act and that the AdX-DFP tie violated Section 2 of the Sherman Act "by effectively limiting its programmatic open-web advertisers in AdWords to bidding for inventory from publishers that used AdX and DFP," "despite knowing that its advertiser customers would benefit from AdWords' bidding for open-web display ad inventory on non-Google exchanges[;]" "[b]y forcing Google's publisher customers to use [AdX,] a product they would not necessarily have otherwise used[;] by making it difficult for rival publisher ad servers to compete on the merits[;] and by significantly reducing rivals' market share. . . ." Id. at 863-64 (internal quotation marks and citation omitted).

The Court also found that anticompetitive policies including First Look, which "required publishers using DFP to offer AdX a first right of refusal for each impression," id. at 864; Last Look, a DFP feature "which gave AdX the ability to see competing exchanges' bids in an otherwise sealed auction before AdX would bid," id.; and Unified Pricing Rules, which replaced Last Look and "took away publishers' ability to set higher price floors on AdX than on third-party exchanges," id. at 865; constituted anti-competitive conduct because these policies "decreased product quality and harmed competition by further entrenching Google as the dominant company in open-web display advertising[,] . . . despite customer complaints. . . ." Id. at 864.

II. Factual Background

Both parties have proposed remedies that segment open-web display advertising into different transaction types. See, e.g., Plaintiffs' PFJ §§ VII(I), IX(C), IX(F); Google's PFJ §§ III(3)(c), VI.OO. Furthermore, since the conclusion of the liability trial, there have been substantial developments that have affected the relevant product markets—particularly, market

treatment of those products after acquisition that eventually resulted in the monopolistic conduct at issue in this litigation. See id. at 859-65.

trends in open-web display advertising, and the rise of artificial intelligence ("AI"), and supply-path optimization. These developments are discussed below.

A. Open-Web Display Advertising Transaction Types

In identifying the world-wide ad exchange and publisher ad server markets as the relevant markets of Google's monopoly power, the Court defined the scope of these markets as limited to "open-web display ads," or "display ads that run on websites that use third-party ad tech infrastructure to match advertisers' ads to publishers' inventory." Google, 778 F. Supp. 3d at 821 (citation omitted). Display advertising can be further categorized into "direct" and "indirect" transactions. See Remedies Defendant's Trial Exhibit ("RDTX") 1220 at 1.

Direct transactions, also known as direct sales or direct purchases, are those "in which a publisher sells its inventory directly to an advertiser (i.e., not through third-party intermediaries, or in which the role of third-party intermediaries is lessened)." [Dkt. No. 1309-1] ("Parties' Joint Glossary") at 6; see also RDTX 1220 at 2. By contrast, indirect transactions are those "in which a publisher sells an impression indirectly to an advertiser (i.e., through third-party intermediaries)." Parties' Joint Glossary at 7; see also RDTX 1220 at 3 (indirect transactions are those that "allow open-web publishers to sell remaining ('remnant') ad space on a page not allocated to direct deals to advertisers using ad tech products."). Indirect transactions "happen during the short period of time when a user loads a website," and "can occur through auctions." Id.

Direct transactions emerged as an early form of online advertising, and continue to be used by advertisers and publishers today. Google, 778 F. Supp. 3d at 815 ("In the early days of the Internet, online advertisements were typically sold through 'direct deals.'"). There are two types of direct transactions: "programmatic direct" deals and "non-programmatic direct" deals. "Programmatic" refers to "media or ad buying that uses technology to automate and optimize, in real time, the ad buying process." RDTX 1220 at 4-5. Programmatic direct deals allow "publishers to 'negotiate direct-sold campaigns while taking advantage of programmatic technology.'" Id. at 4 (quoting Google Ad Manager Help, Ways of transacting in Ad Manager); see also Parties' Joint Glossary at 7. Non-programmatic direct deals involve manual negotiation and deal execution between the publisher and advertiser. RDTX 1220 at 4. Once the publisher and advertiser agree on the terms of the deal, the advertisement is sent to the publisher, the publisher manually uploads the advertisement to its publisher ad server, and the publisher ad server serves the advertisement on the publisher's website. Id.

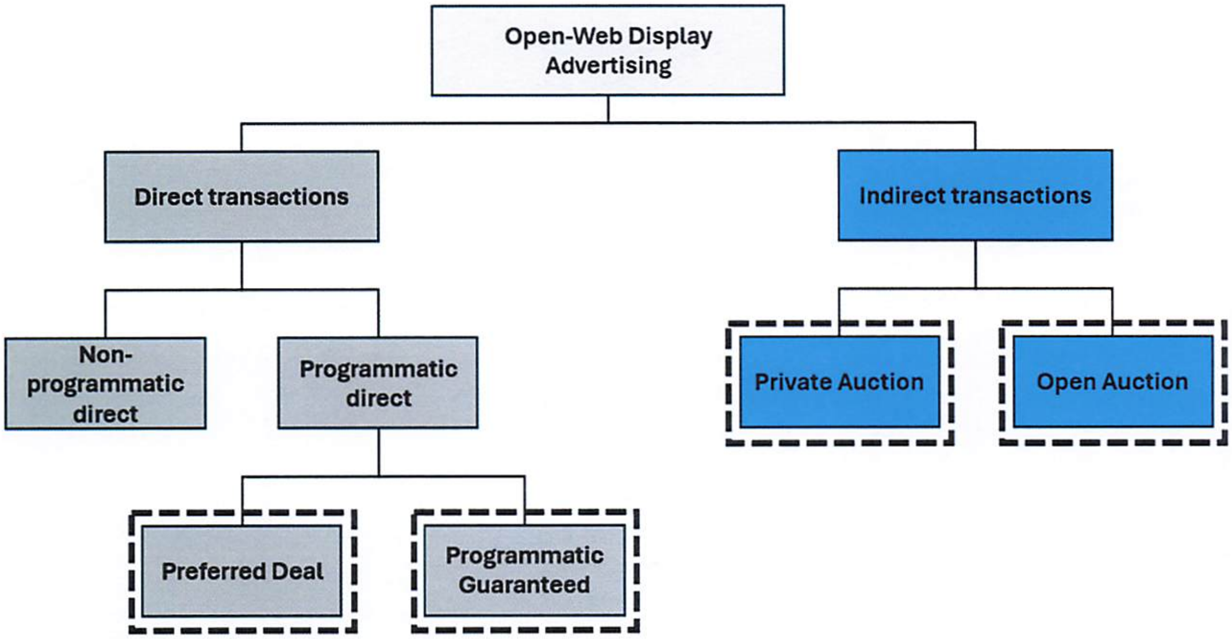
Programmatic direct transactions include programmatic guaranteed deals and preferred deals. Id. at 5. In programmatic guaranteed deals, the publisher and the advertiser agree on a fixed price for ad inventory that is then reserved—or guaranteed—for the given buyer. Id.; see also Google Ad Manager Help, Programmatic Guaranteed vs. Preferred Deals (last visited August 31, 2026), https://support.google.com/admanager/answer/7637485; Parties' Joint Glossary at 7. Programmatic direct deals are functionally equivalent to non-programmatic direct deals but are delivered using programmatic technology. See Rem. Tr. Sept. 22 AM 119:15-120:12 (Whitmore (Advance Local)) ("Programmatic guaranteed is a deal type that . . . looks almost exactly like a direct deal, meaning that it is negotiated between buyer and seller, buyer and agency. . . . It is using programmatic pipes in order to deliver the deal, but . . . in every other way, it functions like a direct deal.").

In preferred deals, the publisher and the advertiser negotiate on the price for the publisher's ad inventory that the advertiser can optionally buy, see RDTX 1220 at 5, and the advertiser is given an initial, or preferred, opportunity "to buy an impression (i.e., an ad space), but the purchase or sale is not guaranteed." Rem. Tr. Sept. 29 AM 93:11-16 (Sheffer (Google)); see also Parties' Joint Glossary at 7. If the advertiser bids at the agreed-upon price when the impression becomes available, it beats any open auction or private auction bids, even if those bids are higher; however, if the advertiser chooses not to purchase the impression, it then becomes available to open auction and private auction bids. RDTX 1220 at 5.

As described in the liability opinion, indirect transactions emerged in the early 2000s as an alternative way for publishers to fill unsold ad space inventory, allowing a larger pool of buyers (advertisers) to bid on available ad space in real time auctions. Google, 778 F. Supp. 3d at 815-16. Today, the ad tech industry recognizes two types of auctions used for indirect transactions: private auctions and open auctions. RDTX 1220 at 6-8. In private auctions, publishers invite specific buyers (advertisers) to an auction and control which advertisers are able to bid on the publishers' ad inventory.[4] Id. at 7-8; Rem. Tr. Sept. 29 AM 93:19-25 (Sheffer (Google)) ("[A private auction transaction] is a digital advertising transaction in which an impression is offered to a limited set of buyers, advertisers selected by a publisher or small group of publishers."); Parties' Joint Glossary at 7. In open auctions, publishers allow a wider range of buyers to bid on their ad inventory. RDTX 1220 at 8; see also Parties' Joint Glossary at 7. Bids from an open auction may compete with bids from a private auction either concurrently, or subsequently if the available ad inventory is not filled in the private auction, as determined by the publisher. RDTX 1220 at 8.

A visualization of the different transaction types for open-web display advertising is shown below. The four open-web display advertising transaction types that are included in the parties' proposals—programmatic direct transactions (preferred deals and programmatic guaranteed deals) and indirect transactions (private auction and open auction)—are highlighted in dotted lines.

[4] Private auctions are also called Private Marketplace deals in the ad tech industry. Rem. Tr. Sept. 29 AM 93:19-25 (Sheffer (Google)); Parties' Joint Glossary at 7 (using "private auction" and "private marketplace" as interchangeable terms).



Transaction types included in the parties' proposed remedies

Both parties have proposed remedies that apply to specific transactions types within "open-web display ads."[5] For example, Plaintiffs would require an AdX divestiture that includes both direct and indirect transactions, see Plaintiffs' PFJ, §§ IV(11), VI; and would also require the Open-Source Auction to include functionalities that decide between "Direct Demand" and "Indirect Demand," see id. §§ IV(33), VII. Plaintiffs would also have "DFP Remainder" send direct and indirect demand to the Open-Source Auction. Id. § VII(I). Both parties proposed that rival ad servers and Prebid would have access to AdX real-time bids for all indirect transactions,

[5] Google initially proposed that sales of open-web display inventory be limited to open auctions, and excluded "private auctions, preferred deals, programmatic guaranteed, and similar transactions for which only a subset of buyers are eligible to compete." See [Dkt. No. 1664-1] at §§ III(1)-(4), VI(S), (GG). During his direct examination, Tim Craycroft, Google's Vice President and General Manager of YouTube Ads, App Ads, and Display Ads, committed "to enlarge the definition" of qualifying open-web display advertising in Google's proposal. Rem. Tr. Sept. 25 PM 138:5-10 (Craycroft (Google)). Google's PFJ accordingly expanded the scope of its remedies to include open auction and private auction deals, as well as programmatic guaranteed and preferred deals. See Google's PFJ §§ III(3)(c), VI.OO.

including private auction and open auction deals.[6] Plaintiffs' PFJ §§ IX(A)-(B); Google's PFJ §§ III(1)(a)-(b), III(3)(b). Both parties would also provide for those publishers who continued to use DFP as their publisher ad server the choice to route direct transactions, including programmatic guaranteed and preferred deals through Prebid. Plaintiffs' PFJ § IX(C); Google's PFJ § III(3)(c).

B. The Open-Web Display Advertising Market

Overall, the digital advertising market is growing: in 2023, global digital ad spend reached $424 billion, and it is projected to grow to over $605 billion by the end of 2027. Rem. Tr. Sept. 24 PM 40:3-6 (Crisci (Pls. Expert)). Although open-web display advertising is not growing at the same rate, it is "growing in a growing market," id. at 40:8-18 (Crisci (Pls. Expert)), and open-web display advertising "is a multibillion-dollar market" on its own, totaling "tens of billions of dollars per year," Rem. Tr. Sept. 30 PM 14:4-5 (Goel (PubMatic)). Notably, spending on open-web display advertising "has remained stable over time," [Dkt. No. 1810] at 6, maintaining a "30 percent share of ad format revenues," Rem. Tr. Sept. 24 PM 40:17-19 (Crisci (Pls. Expert)).

Open-web display advertising—and the tools that facilitate it—continues to remain important for both publishers and advertisers. See [Dkt. No. 1810] at 5-7. During the remedies phase, publishers testified that open-web display advertising is an important source of revenue for their digital business. See, e.g., Rem. Tr. Oct. 6 AM 43:11-23 (Wheatland (Daily Mail)) ("[T]oday, something like 50 to 60 percent of all of [Daily Mail's] digital revenue is generated through display ads. So it's over half of our digital revenue [and] is very important to us. And we don't see that importance changing any time soon."); Rem. Tr. Oct. 1 PM 58:7-59:2 (Douglas (wikiHow)) (stating that the majority of wikiHow's revenue comes from advertising, and specifically display

[6] Prebid, discussed in further detail in Section IV(B)(2)(a) below, is a consortium of "non-Google industry members and open-source advocates" that developed header bidding, an open-sourced technical solution that allows "publishers using DFP to solicit real-time bids from multiple ad exchanges." Google, 778 F. Supp. 3d at 828.

advertising, and that open-web display advertising is "an important part of [wikiHow's] business as [the] business exists today"). Advertisers similarly testified that open-web display advertising continues to be important to their business. Rem. Tr. Sept. 23 AM 74:20-22 (Lambert (Omnicom)) ("I will continue to purchase as much [open-web display advertising] as I possibly can.").

Despite the continued prevalence of open-web display advertising in the ad tech industry, it is undisputed that growth in open-web display advertising has slowed considerably, relative to other ad formats such as retail media, streaming, native, audio, and AI chats. See [Dkt. No. 1811] at 29. Taking Google's AdWords as a representative sample, indirect open-web display advertising has been steadily shrinking as a share of impressions over the last few years. In January of 2019, over 40% of AdWords impressions were indirect open-web display advertising; however, in June of 2025, only 11% of AdWords impressions were indirect open-web display. Rem. Tr. Sept. 25 PM 87:5-21 (Craycroft (Google)); see also RDTX 901; Rem. Tr. Sept. 23 AM 75:9-12 (Lambert (Omnicom)) ("I see [open-web display advertising] slowing down."); Rem. Tr. Sept. 23 PM 76:24-25 (Dederick (The Trade Desk)) ("So sitting on the buy side and evaluating ads to buy, [open-web] display marketplace is pretty anemic. . . .").

By contrast, "new emerging growth formats"—which include retail media, CTV, and new types of owned-and-operated formats such as YouTube shorts and TikTok—"have been the emerging trends." Rem. Tr. Oct. 1 AM 38:14-18 (Goodwin (Def. Expert)); see also Rem. Tr. Sept. 30 AM 114:21-115:3 (Jayaram (Google)); Rem. Tr. Sept. 23 AM 132:12-133:13 (Lambert (Omnicom)) ("Other formats are growing in popularity and certainly in . . . prioritization from [an advertising] client's standpoint."). For example, in the same time period from January 2019 to June 2025, YouTube's share of all of the impressions that AdWords served, excluding Search, increased from just under 30% to over 50%. See RDTX 901. This trend can be explained by user behavior: as individuals shift their attention from the open web to other digital platforms such as mobile applications and social media, advertisers have followed suit to "reach the users where they can find them, where the users are engaged." Rem. Tr. Sept. 30 AM 114:17-19 (Jayaram (Google)).

Plaintiffs argue that, in addition to changing consumer and media trends, "Google's illegal conduct" has contributed to the slowing growth of the open-web display marketplace through conduct that "discourage[ed] investment and innovation by ad tech providers in open-web display," and supracompetitive take rates that "made open-web display advertising a less attractive option for advertisers." [Dkt. No. 1810] at 6; accord Rem. Tr. Sept. 30 PM 14:9-12 (Goel (PubMatic)) ("[I]t's difficult for me to separate what is the slowness of [open-web display advertising's] growth rate as a result of Google's monopoly and significant market share as compared to market dynamics or market forces."). According to Plaintiffs, greater competition in the open-web display advertising market would "help reverse these trends by increasing incentives to invest and innovate. . . ." [Dkt. No. 1810] at 6 (citations omitted).

C. Technological Disruptions in Open-Web Display Advertising

1. Artificial Intelligence

The integration of AI within the ad tech industry is in its early stages. In United States v. Google LLC, 803 F. Supp. 3d 18 (D.D.C. 2025) [hereinafter Google Search], the district court found that AI technologies, and particularly generative AI, may "prove to be game changers" in the general search engine market and may "wrest[] market share from Google" in the future. Id. at 36. Here, by contrast, AI has not yet had such a disruptive impact on the ad tech industry. See, e.g., Rem. Tr. Sept. 23 PM 81:22-82:2 (Dederick (The Trade Desk)) ("We've all been working on machine learning and algorithms. . . . But we haven't seen major disruption to the business models the same way that you see the disruption to . . . the front door of the internet, which is [S]earch."); Rem. Tr. Sept. 23 AM 31:13-20 (Avery (Kevel)) (stating that advances in GenAI have not impacted competition between publisher ad servers for traditional [open-web] display publishers because there have been "no companies created around generative AI for ad serving"); Rem. Tr. Sept. 23 PM 7:1-21 (Friedman (Goodway)) (stating that AI has not "impacted the publisher ad server market yet," and that it is "hard . . . to forecast exactly how that will impact it").

Currently, AI has been described as an "enabler" for the ad tech industry. Rem. Tr. Sept. 30 PM 134:20-24 (Goel (PubMatic)) ("[I]n contrast to [S]earch, where AI search is the end product that the consumer uses, I see the use of AI in ad tech as an enabler. It's an enabler of automation, streamlining operations, and generating code, software code, at a much faster pace."); accord Rem. Tr. Sept. 22 PM 92:21-93:11 (Casale (Index Exchange)). There has been substantial innovation in the use of AI to manage the day-to-day work of both advertisers and publishers. See Rem. Tr. Sept. 29 AM 110:11-111:17 (Sheffer (Google)) ("If you think about all the work that needs to be done today for a publisher to manage their ad inventory, all of these line items[,] . . . all of these campaigns, all of the data entry on that, all that optimization, increasingly AI will be able to do that for publishers."); Rem. Tr. Sept. 30 PM 72:3-5 (Goel (PubMatic)). Google has been active in this wave of innovation by recently launching Auto Ads for Adsense, which uses AI to "adaptively decide with a publisher's permission where to put ads on their site and how many there should be, and to constantly experiment with that to see what's changing to balance user engagement with monetization." Rem. Tr. Sept. 25 PM 88:8-15 (Craycroft (Google)); accord Rem. Tr. Sept. 29 AM 110:17-23 (Sheffer (Google)).

Other players in the ad tech industry have also invested in AI-powered functionalities to improve efficiencies in ad servers and ad exchanges. For example, PubMatic "is in a multiyear process of integrating AI capabilities into a variety of [their business] solutions," Rem. Tr. Sept. 30 PM 72:19-20 (Goel (PubMatic)), and has developed PubMatic for Buyers, which is described as a "generative AI media buying solution" that "enables advertisers to build optimized campaigns using natural language prompts," id. at 73:4-12. Using PubMatic for Buyers, advertisers can type natural language prompts describing the parameters of their advertising campaign into an AI chat assistant, and PubMatic will set up and manage that campaign on their behalf. See id. at 73:4-74:11. PubMatic also uses AI to identify real-time yield anomalies—such as breaks or ruptures in the processing of data integration—to allow for quick corrections to improve publisher monetization, id. at 74:12-75:3, and has a product in beta mode that uses AI to "adjust price floors" in live auctions based on a variety of different factors—such as data, quality of the impression, and quality of the user—on a more real-time and granular basis, id. at 75:16-76:10.

AI has also been used in the ad tech industry to power functionalities that shift advertiser spend. For example, The Trade Desk uses AI and machine learning "to get better at bidding on ads[;]" to evaluate the "quality of inventory that are available in different ad exchanges," Rem. Tr. Sept. 23 PM 132:16-133:1 (Dederick (The Trade Desk)); and to "predict[] and anticipat[e] how many ads will be available in the future" for purchase, id. at 130:3-10 (Dederick (The Trade Desk)). Omnicom has created an AI-powered built-in feature, Omni Assist, that helps plan how to consolidate data sets and to confirm the appropriate audience channel mix for a given client and budget. Rem. Tr. Sept. 23 AM 128:5-129:10 (Lambert (Omnicom)).

Although AI has yet to disrupt the ad tech industry, it is widely acknowledged that AI has the potential to change the industry dramatically. See, e.g., Rem. Tr. Sept. 25 PM 88:4-8 (Craycroft (Google)) ("[W]ith the last few years of AI innovation, the way people consume information is going to change dramatically, but we also know that we're not in a new steady state, we don't know exactly what that's going to look like and it's going to change rapidly. . . ."); Rem. Tr. Sept. 23 PM 62:17-24 (Lambert (Omnicom)) (comparing AI's impact on the advertising industry "to the Wild West" because "it will be really hard for anybody to be accurate in a prediction of how AI will impact how ads are purchased programmatically in the future"); Rem. Tr. Sept. 30 PM 83:3-9 Goel (PubMatic); Rem. Tr. Oct. 3 PM 32:25-34:6 (Layser (Amazon)).

Early signs indicate that as "user experiences are getting significantly more interactive, more immersive, more personalized, and more and more real time" as a result of AI, the ad tech industry will follow. Rem. Tr. Sept. 29 AM 102:9-104:7 (Sheffer (Google)); accord Rem. Tr. Oct. 1 PM 29:1-31:10 (Douglas (wikiHow)) (testifying that, from her own experience working at wikiHow, AI will change the display advertising space as user experiences interacting with the Internet and webpages change). For example, companies have started to make strides towards embedding ads within AI-powered chat interfaces. Luzia, a business based in Europe that runs a chat-based interactive experience in which users befriend an AI avatar, has started to "experiment[] with their direct sales and [Google's] AdMob ads to find a way to embed those ads within the chat discussion. . . ." Rem. Tr. Sept. 29 AM 107:21-109:3 (Sheffer (Google)). Furthermore, PubMatic is in the "process of engaging" a growing number of "consumer services and application[] [entities] that use AI technology [to] create chat interfaces with consumers" as potential publishers on the PubMatic platform. Rem. Tr. Sept. 30 PM 67:21-68:3 (Goel (PubMatic)). Although these AI-enabled advancements are still in a nascent stage of development, they could threaten the stability and growth of traditional open-web display ads, see id. at 68:24-70:20, and are relevant to the parties' proposed remedies—in particular, the length of time a specific remedy may require.

2. Supply-Path Optimization

Supply-path optimization has also been cited as a potential disruptor in the ad tech industry. Id. at 70:22-71:7 (testifying that the ad tech industry is at an "inflection point" and that one reason for the inflection point is "supply path optimization"). Supply-path optimization aims to "find[] the most efficient path" from the advertiser to the publisher, which sometimes "means skipping a step in the ad tech stack." Rem. Tr. Oct. 1 PM 101:22-25 (Lerner (Def. Expert)); accord Rem. Tr. Sept. 26 143:6-16 (Racic (Prebid)) ("[Supply-path optimization] in general is about . . . clean[ing] up the path between a publisher and the end buyer, . . . eliminating multiple touches in there that aren't necessary," which "reduc[es] latency."); Rem. Tr. Sept. 23 PM 44:22-45:7 (Friedman (Goodway Group)) (stating that supply-path optimization is "good for everybody" because it helps "to minimize the leakage or the take between" advertisers and publishers when middlemen are eliminated). As advertisers' buying tools begin to make their own direct connection to publishers, supply-path optimization may "blur[]" the lines between ad exchanges and publisher ad servers, Rem. Tr. Sept. 30 PM 71:4-7 (Goel (PubMatic)), and may make ad exchanges "obsolete," Rem. Tr. Sept. 23 PM 44:5-21 (Friedman (Goodway Group)) (testifying that "[ad] exchanges as stand-alone entities, and not having buying capabilities . . . are likely not needed for very long").

Although some supply-path optimization partnerships continue to involve ad exchanges, see, e.g., Rem. Tr. Sept. 23 AM 106:14-107:6 (Lambert (Omnicom)), other such partnerships have eliminated the need for ad exchanges, Rem. Tr. Oct. 1 PM 101:22-102:1 (Lerner (Def. Expert)). The Trade Desk offers a product called Open Path, which "allows some percentage of [The] Trade Desk inventory to bid in the ad server outside of the header bidder[,] . . . skipping an ad exchange. . . ." Rem. Tr. Sept. 22 AM 81:16-25 (Whitmore (Advance Local)). Furthermore, PubMatic has created supply-path optimization partnerships with "some of the largest advertisers and agencies," "offer[ing] products, technology, and service[s] to these advertisers and agencies in order to convince them that they should spend more of their ad budget through their [demand-side platform] onto the PubMatic ad exchange." Rem. Tr. Sept. 30 PM 7:7-13 (Goel (PubMatic)). The use of supply-path optimization in the industry is expected to grow in the next several years. See id. at 111:24-112:2 (testifying that "supply path optimization activity could be 75 percent of

PubMatic's total buyer activity in the next several years"); Rem. Tr. Sept. 26 143:17-19 (Racic (Prebid)) (stating that most Prebid members "are using supply path optimization").

III. Conclusions of Law

A. Legal Framework

"It is the duty of the district court, upon finding a violation of the antitrust laws, to redress the violation and restore competition." Google Search, 803 F. Supp. 3d at 67 (citing United States v. U.S. Gypsum Co., 340 U.S. 76, 88 (1950), and then citing Ford Motor Co. v. United States, 405 U.S. 562, 573 (1972)). Effective relief "must seek" to "unfetter a market from anticompetitive conduct," "terminate the illegal monopoly," "deny to the defendant the fruits of its statutory violation," and "ensure that there remain no practices likely to result in monopolization in the future." United States v. Microsoft Corp., 253 F.3d 34, 103 (D.C. Cir. 2001) [hereinafter Microsoft I] (en banc) (first quoting Ford, 405 U.S. at 577; and then quoting United States v. United Shoe Mach. Corp., 391 U.S. 244, 250 (1968)).[7]

An appropriate remedy redresses harm to competition "by restoring conditions in which the competitive process is revived and any number of competitors may flourish (or not) based upon the merits of their offerings." Massachusetts v. Microsoft Corp., 373 F.3d 1199, 1231 (D.C. Cir.

[7] Google argues that "termination of monopolies" as a remedy objective is unsupported by antitrust law, relying on Google Search and Microsoft I. See [Dkt. No. 1811] at 4. Plaintiffs respond that those cases "disclaimed the objective of terminating the monopolies because the courts found that the monopolists only illegally maintained monopolies, not as here, illegally acquired monopolies." [Dkt. No. 1810] at 22 (citations omitted) (emphasis in original). By contrast, here, the Court's liability opinion found that "Google has violated Section 2 of the Sherman Act by willfully acquiring and maintaining monopoly power in the open-web display publisher ad server market and the open-web display ad exchange market . . . ." Google, 778 F. Supp. 3d at 810. Accordingly, the remedy objective to "terminate the illegal monopoly," as identified by the D.C. Circuit in Microsoft I, 253 F.3d 34, is appropriate here. See Rem. Tr. Oct. 2 PM 14:10-18 (Lerner (Def. Expert)) ("[T]here's broad agreement that remedies should terminate monopoly [caused] by anticompetitive conduct . . . ."). Although Plaintiffs contend that divestiture is the only remedy that can accomplish this objective, the Court rejects that position. See infra Section IV(A).

2004) [hereinafter Microsoft III]. A remedy must also be "tailored to fit the wrong creating the occasion of the remedy." Microsoft I, 253 F.3d at 107. "The district court is vested with broad discretion in crafting the remedy decree." Google Search, 803 F. Supp. 3d at 68 (citing Ford, 405 U.S. at 573).

"The ordinary starting point" for an antitrust remedy "is an injunction terminating the anticompetitive conduct." Id. (first citing Ford, 405 U.S. at 575; and then citing Microsoft I, 253 F.3d at 106). But as multiple courts have long recognized, "'relief, to be effective,' must often 'go beyond the narrow limits of the proven violation.'" Id. (quoting Gypsum, 340 U.S. at 90); see also New York v. Microsoft Corp., 224 F. Supp. 2d 76, 148 (D.D.C. 2002) [hereinafter Microsoft II], aff'd, Microsoft III, 373 F.3d 1199 ("[I]n cases like this one, where a monopolist has consummated an exclusionary act . . . equitable relief beyond a mere injunction against repetition of the act is generally appropriate." (internal quotation marks and citation omitted)). Accordingly, "the district court is 'empowered to fashion appropriate restraints on [the defendant's] future activities both to avoid a recurrence of the violation and to eliminate its consequences.'" Microsoft III, 373 F.3d at 1216 (quoting Nat'l Soc'y of Pro. Eng'rs v. United States, 435 U.S. 679, 697-98 (1978) [hereinafter NSPE].

Under this mandate, the district court may "prohibit 'practices connected with acts actually found to be illegal,'" Google Search, 803 F. Supp. 3d at 68 (quoting Gypsum, 340 U.S. at 89), "including practices 'which are of the same type or class as unlawful acts,'" id. (quoting Zenith Radio Corp. v. Hazeltine Rsch., Inc., 395 U.S. 100, 132 (1969)); see also Microsoft III, 373 F.3d at 1233 (finding that the district court "did not abuse its discretion by adopting a remedy that denie[d] Microsoft the ability to take the same or similar actions to limit competition in the future"). The district court may also "impose affirmative obligations on the defendant." Google

Search, 803 F. Supp. 3d at 69 (citing Microsoft III, 373 F.3d at 1215 (approving "forward-looking" provisions requiring Microsoft to disclose certain Application Programming Interfaces and communications protocols, even though "non-disclosure of this proprietary information had played no role in . . . holding [that] Microsoft violated the antitrust laws")).

Accordingly, behavioral remedies need not be "confined to 'end[ing] specific illegal practices.'" Id. at 69 (quoting Int'l Salt, 332 U.S. at 401) (alteration in original); see also Microsoft II, 224 F. Supp. 2d at 107 (acknowledging "unquestionable legal authority" to "address conduct beyond the precise parameters of that found to violate the antitrust laws"). Behavioral remedies may also "do more than return the market to the status quo ante. . . ." Ford, 405 U.S. at 573 n.8. "Rather, they must 'represent[] a reasonable method of eliminating the consequences of the illegal conduct.'" Google Search, 803 F. Supp. 3d at 69 (alteration in original) (quoting NSPE, 435 U.S. at 698 (upholding an injunction "go[ing] beyond a simple proscription against the precise conduct previously pursued")); see also United States v. Bausch & Lomb Optical Co., 321 U.S. 707, 726 (1944) (holding that Supreme Court precedents "uphold equity's authority to use quite drastic measures to achieve freedom from the influence of the unlawful restraint of trade," so long as such measures "reasonably tend[] to dissipate the restraints and prevent evasions").

"Structural relief, such as divestiture or dissolution, is also available to redress [an antitrust] violation." Google Search, 803 F. Supp. 3d at 69. Known as the "most drastic, but most effective, of antitrust remedies," United States v. E.I. du Pont de Nemours & Co., 366 U.S. 316, 326 (1961), structural relief "is designed to eliminate the monopoly altogether," Microsoft III, 373 F.3d at 1230, and "is a remedy that is imposed only with great caution, in part because its long-term efficacy is rarely certain," Microsoft I, 253 F.3d at 80. Accordingly, structural relief "requires a clearer indication of a significant causal connection between the conduct and creation or maintenance of market power." Id. at 106 (emphasis in original) (citation omitted). "Courts have traditionally ordered such remedies where the monopoly arose by merger or acquisition," Google Search, 803 F. Supp. 3d at 69 (citing Microsoft I, 253 F.3d at 105), "and where 'other measures will not be effective to redress a violation,'" id. (quoting E.I. du Pont, 366 U.S. at 327)).

"The harshness of a remedy is not reason alone to reject it." Id. (citing E.I. du Pont, 366 U.S. at 327). "On the contrary, those who violate the antitrust laws cannot 'avoid an undoing of their unlawful project on the plea of hardship or inconvenience.'" Id. (quoting E.I. du Pont, 366 U.S. at 326-27); see also FTC v. Whole Foods Mkt., Inc., 548 F.3d 1028, 1033 (D.C. Cir. 2008) ("Even remedies which 'entail harsh consequences' would be appropriate to ameliorate the harm to competition from an antitrust violation.") (quoting E.I. du Pont, 366 U.S. at 327). An antitrust action would be "a futile exercise if the Government proves a violation but fails to secure a remedy adequate to redress it." E.I. du Pont, 366 U.S. at 323.

Although a district court is afforded broad discretion in crafting antitrust remedies, it must also recognize limits to its equitable powers. "As the Supreme Court has made clear, the ends of equity are ill-served by punishing the monopolist for past transgressions," Google Search, 803 F. Supp. 3d at 70 (citing Int'l Salt, 332 U.S. at 401); "prohibiting 'all future violations of the antitrust laws,'" id. (quoting Zenith Radio, 395 U.S. at 133); "or providing aid to a particular competitor," id. (citing Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209 (1993)). Furthermore, "'[m]ere existence of an exclusionary act does not itself justify full feasible relief against the monopolist to create maximum competition.'" Microsoft I, 253 F.3d at 106 (quoting 3 Phillip E. Areeda & Herbert Hovenkamp, Antitrust Law ¶ 650a, at 67 (1996)). Lastly, "the court must be sensitive to remedies that risk substantially stifling technological innovation or impairing consumer welfare." Google Search, 803 F. Supp. 3d at 70 (citing Microsoft III, 373 F.3d at 1219 (affirming the district court's rejection of a remedy that would work a "substantial" effect upon Microsoft's incentive to innovate and thereby harm consumers)); see United States v. Am. Tobacco Co., 221 U.S. 106, 185 (1911) (counseling that antitrust violations should be remedied with "as little injury as possible to the interest of the general public" and with "proper regard" for relevant private interests).

At bottom, "[w]hen it comes to fashioning an antitrust remedy, . . . caution is key." Nat'l Collegiate Athletic Ass'n v. Alston, 594 U.S. 69, 106 (2021). "Judges must be mindful . . . of their limitations—as generalists, as lawyers, and as outsiders trying to understand intricate business relationships," and "remain aware that markets are often more effective than the heavy hand of judicial power when it comes to enhancing consumer welfare." Id. In other words, "judges must be open to clarifying and reconsidering their decrees in light of changing market realities," and "be wary about invitations to 'set sail on a sea of doubt.'" Id. at 106-07 (quoting United States v. Addyston Pipe & Steel Co., 85 F. 271, 284 (CA6 1898) (Taft, J.)).

B. Fruits of Google's Unlawful Conduct

"Antitrust remedies must 'deny to the defendant the fruits of its statutory violation.'" Google Search, 803 F. Supp. 3d at 81 (quoting Microsoft I, 253 F.3d at 34). But "the fruits of a violation must be identified before they may be denied." Microsoft III, 373 F.3d at 1232. Based on the facts in this record, the Court finds that Google's anticompetitive behavior resulted in it obtaining: (1) "monopoly power" in the ad exchange and publisher ad server markets, Google, 778 F. Supp. 3d at 810; (2) "unparalleled scale," in these markets, id. at 832; and (3) "well over a decade" of profits obtained by charging durable supracompetitive prices for AdX, id. at 852.

1. Monopoly Power

As the Court has found, "Google engaged in 'willful acquisition or maintenance of [its monopoly] power' . . . by tying DFP to AdX and committing a series of exclusionary and anticompetitive acts to entrench its monopoly power in two adjacent product markets" in violation of Sections 1 and 2 of the Sherman Act. Id. at 872 (alteration in original) (quoting Eastman Kodak Co. v. Image Tech. Servs., Inc., 504 U.S. 451, 481 (1992)); see also [Dkt. No. 1663] at 8 ("Because Google illegally acquired its monopolies in the relevant markets, the termination of those monopolies serves to deny Google the fruits of its violations.").

Recognizing the "unique attractiveness of [AdWords'] extensive advertiser demand," Google, "with limited exceptions, . . . made AdX the only ad exchange into which AdWords advertising demand was permitted to bid," and "required publishers to use DFP as their ad server if they wanted to access real-time bids from AdX." Google, 778 F. Supp. 3d at 825-26; see id. at 862-63 (finding that "[a] primary source of Google's monopoly power in the ad exchange market is AdWords' uniquely large and diverse array of advertising demand"[8]); Rem. Tr. Sept. 24 AM 27:12-29:5 (Lee (Pls. Expert)) (stating that in 2022, only 11 percent of AdWords open-web display transactions were through non-Google exchanges, and that this percentage had fallen to 5 percent in 2024); Plaintiffs' Remedies Trial Exhibit ("PRX") 133. Ultimately, "Google combined DFP and AdX under a single publisher-facing market, Google Ad Manager, which further intertwined DFP and AdX." Google, 778 F. Supp. 3d at 855 (citation omitted). Having established monopoly power in the ad exchange and the publisher ad server markets, Google then entrenched that power by implementing a series of anticompetitive policies, including First Look, Last Look, and Unified Pricing Rules. See id. at 864-65. Through these policies, Google used its control of DFP to give AdX unfair advantages at winning transactions and made it difficult for other ad exchanges to

[8] Google was able to amass this advertising demand primarily due to the dominance of Search. Google, 778 F. Supp. 3d at 862-63.

compete on a level playing field, thereby impeding their ability to "enter the market, grow, and compete." Id. at 827.

During the remedies trial, industry participants raised a new concern, described as the "black box" nature of Google's ad tech tools, as another feature that contributed to the unfairness of the advertising auction processes by hiding DFP's final auction logic from its users.[9] See Rem. Tr. Nov. 21 AM 16:19-22 (Pls. Closing Arg.); Rem. Tr. Sept. 26 156:20-23 (Racic (Prebid)) (testifying that market participants are unable to "validate the auction mechanics of DFP's final auction logic" because it is a "black box"). As defined by Plaintiffs, DFP's "final auction logic" includes:

> [A]ny mechanism, functionality, computation, or logical process used by DFP to determine concurrently which advertisement(s) will serve (or "win") an Impression or Impressions and at what price, including functionalities that adjust bids (e.g., Enhanced Dynamic Allocation, Billable Event Rate adjustments), functionalities that decide between Direct Demand and Indirect Demand (e.g., Enhanced Dynamic Allocation), functionalities that calculate or optimize Publisher reserve prices (e.g., Reserve Price Optimization, Optimized Pricing Rules), and functionalities that optimize Multi-Slot Auctions (e.g., filtering candidate ads, performing competitive exclusions, and optimizing bids across ad slots), and related functionalities.[10]

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[9] Plaintiffs make a passing mention of Google's "control of the decision-making process for which ads will win" as a separate fruit of Google's unlawful conduct; however, because this issue is directly related to DFP's monopoly power, the Court will consider these two concerns together. [Dkt. No. 1663] at 8.

[10] Enhanced Dynamic Allocation ("EDA") is defined as "[a] feature of DFP that allows indirect sales to compete with direct sales, including those with guaranteed commitments." Parties' Joint Glossary, at 6. Billable Event Rate adjustments ("BER") has been defined as the process of determining "the statistical probability that a buyer who wins an auction will actually serve the ad creative such that the publisher can get paid, and using that to potentially modify bids so that the publisher ultimately gets the best effective yield." Rem. Tr. Sept. 25 PM 121:6-12 (Craycroft (Google)). Reserved Price Optimization and Optimized Pricing Rules are defined as "a set of features that are designed for the publisher to increase the yield of their indirect demand sources" by making "an educated forecast about what the range" of indirect demand bids might be, and allowing a publisher to "adjust [its] reserve price on the fly in order to maxim[ize] [its] yield." Rem. Tr. Sept. 29 AM 85:9-18 (Sheffer (Google)). Although Plaintiffs include Multi-Slot Auctions in their definition of DFP's final auction logic Google asserted during the remedies trial that Multi-

Plaintiffs' PFJ § IV(33).

DFP's final auction logic has been described as the "last arbiter" of the advertising auction process, determining which advertising bid will be served against a particular publisher impression. Rem. Tr. Sept. 22 AM 65:13-15 (Whitmore (Advance Local)); Rem. Tr. Sept. 22 PM 62:9-15 (Casale (Index Exchange)) ("I understand the final auction logic to be the determiner of the winner. . . . [A]fter all the line items in the ad server have an opportunity to vie for an impression, presumably after every bid comes through, whether that be through AdX or any other exchange[,] [o]ne winner is determined to render for that given impression opportunity, and the final auction logic would pick the winner."). First Look, Last Look, and Unified Pricing Rules are mechanisms within DFP's final auction logic. Rem. Tr. Nov. 21 AM (Pls. Closing Arg.) 18:10-15.

Because DFP's final auction logic cannot be audited, witnesses from across the industry testified to a lack of confidence in the fairness of DFP's decision-making. See, e.g., Rem. Tr. Sept. 22 PM 59:8-16 (Casale (Index Exchange)) ("We don't receive any inspectability [sic] within DFP. . . . [W]e have no way to audit that right now. . . . [I]t certainly doesn't inspire confidence that what DFP is doing is fair."); Rem. Tr. Oct. 6 AM 18:14-17 (Wheatland (Daily Mail)) ("[A]t the moment [DFP is] a black box. We don't really understand how a lot of these features operate, and it's difficult to even sort of measure how these features operate.").

The lack of transparency surrounding DFP's final auction logic provides Google with a "source of control" that publishers have "no influence over and no transparency into," and may "allow[] Google to put its thumb on the scale as it relates to . . . favoring bids that are coming through AdX." Rem. Tr. Sept. 22 AM 66:1-6 (Whitmore (Advance Local)). According to

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Slot Auctions do not apply to open-web display advertising. Rem. Tr. Sept. 25 PM 121:18-19 (Craycroft (Google)).

Plaintiffs, the black box nature of DFP does not provide the industry with the information and data needed to optimize their business operations and maximize yield in terms of bidding performance. See id. at 66:20-67:14 (testifying that the lack of transparency is problematic for publishers because publishers would "like the ability to know the different points of decision that were influencing [their] ability to monetize [their] properties so that [they could] optimize [their] business operations to yield the best possible outcome," but that their lack of understanding of DFP's final auction logic makes it very difficult to optimize, and that the lack of transparency is "problematic for advertisers as well" because they have no insight as to how their bids are accepted when placing bids through "different exchanges at different prices").[11]

Collectively, these actions have enabled Google to establish and protect its monopoly power in these two relevant markets, while depriving rivals of the ability to compete and harming Google's publisher customers. As to the ad exchange market, despite Google's recognition that "allowing AdWords to bid on other [ad] exchanges would be valuable for AdWords' advertiser customers," Google, 778 F.3d at 854, Google chose to "internalize the benefits of exclusively bidding with AdWords into AdX to enhance AdX's market power and harm competition in that market," Rem. Tr. Sept. 24 AM 26:5-7 (Lee (Pls. Expert)). This "ma[de] it more difficult for

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[11] Google contends that Plaintiffs' identification of DFP's "control of the decision-making process for which ads will win" is an improper "fruit" because "[n]othing in the Court's [liability phase] decision describes the 'Final Auction Logic' as the result of anticompetitive conduct that must therefore be denied from Google." [Dkt. No. 1761] at 47. Although the liability trial did not extensively discuss DFP's final auction logic, broad transparency issues were raised by industry witnesses in the liability phase. See, e.g., Liab. Tr. Sept. 13 PM 92:4-17 (Creput (Equativ)) (testifying that Google's ad tech tools are "a little bit like a black box"); id. at 132:8-16 (Boland (Meta)) ("[W]e didn't have a complete understanding of other things that Google might be doing behind the scenes that were not public, not transparent to us or to others."); Liab. Tr. Sept. 10 AM 23:14-25:11 (Layser (NewsCorp)) (describing Google's refusals to provide "[f]ull transparency" to its publisher customers through "log-level data"). Despite its objection, Google nevertheless proposes remedies that will address this concern. See Google's PFJ § III(5); see also infra Section IV(B)(2)(d).

customers on both sides of the ad exchange market to switch to rival exchanges," Google, 778 F. Supp. 3d at 854, because it "ensured that publishers would lose significant revenue if they did not use AdX," id. at 863, and impeded the ability of rival ad exchanges to "enter the market, grow, and compete," id. at 827. As a result, AdX maintains a "relatively high and durable market share" in the open-web display ad exchange market. Id. at 855 (finding that from 2018 to 2022, "AdX was the exchange for 63% to 71% of the worldwide open-web display transactions among the ad exchanges that produced data for this litigation, and . . . AdX handled 54% and 65% of the market's total transactions" (internal citations omitted)). To provide a comparison: "AdX's share of the worldwide ad exchange market was roughly nine times larger than the share held by Google's next-largest competitor, which only had 6% of the market." Id. (citation omitted). AdX's dominant market share allowed Google to keep charging AdX publishers a supracompetitive 20% take rate. Id. at 852-54; see infra Section III(B)(3). In response, other ad exchanges have turned their investments towards alternative digital advertising formats to compete more effectively. See, e.g., Rem. Tr. Sept. 22 PM 101:23-102:12 (Casale (Index Exchange)) (testifying that Index Exchange does not invest in open-web display ads, but invests in advertising formats like streaming, where it is finding growth).

As with AdX, DFP enjoys a "durable and 'predominant share of the market'" because it is "protected by high barriers both to entry and expansion" due to Google's anticompetitive conduct. Google, 778 F. Supp. 3d at 850 (quoting Grinnell, 384 U.S. at 571). The liability trial evidence showed that "in 2022, Google had a 91% market share of the worldwide publisher ad server market for open-web display advertising as measured by the number of impressions served," and that "significant barriers to entry and expansion that exist in the publisher ad server market" helped maintain DFP's high market share. Id. at 850-51 (describing the building of a publisher ad server as a "complex, resource-intensive process, even for a large corporation," and explaining that the publisher ad server market has "high switching costs"). These dynamics have created a market that currently suffers from a lack of meaningful alternatives to DFP. Id. at 851 ("[M]any once-large rival ad servers have either left the ad serving business entirely (e.g., OpenX), or sought to compete in channels other than open-web display advertising (e.g., Kevel)."); Rem. Tr. Sept. 22 AM 95:4-5 (Whitmore (Advance Local)) ("[T]here isn't an alternative publisher ad server right now, and there might not be for a while."). Google has taken advantage of its monopolistic position in the publisher ad server market by degrading DFP features despite negative publisher feedback, knowing that publisher customers had no choice but to continue using DFP. Google, 778 F. Supp. 3d at 851-52. Google's anticompetitive behavior in the publisher ad server market has forced its publisher customers to use a product that they would not necessarily have used, and has made it difficult for rival publisher ad servers to compete on the merits and gain market share.

In sum, "[f]or over a decade, Google has tied its publisher ad server and ad exchange together through contractual policies and technological integration, which enabled the company to establish and protect its monopoly power in these two markets." Id. at 873. Google's enjoyment of this monopoly power justifies the remedies discussed below that seek to break the AdWords-AdX-DFP tie that allowed Google to amass its monopoly power.

Google argues that identifying monopoly power as "a fruit that needs to be addressed" is a "circular point given that the Court is to consider the fruits of monopoly power that Google acquired through anticompetitive conduct." [Dkt. No. 1761] at 47. But monopoly power has been broadly recognized as a plausible fruit for purposes of antitrust remedy analysis. See, e.g., Google Search, 803 F. Supp. 3d at 81-85 (identifying "freedom of threats" as a fruit of Google's anticompetitive behavior); Microsoft III, 373 F.3d at 1233 (affirming the district court's finding that the fruit of Microsoft's anticompetitive conduct, which foreclosed avenues of distribution for nascent middleware products, was its "freedom from the possibility [that] rival middleware vendors would pose a threat to its monopoly of the market for Intel[-]compatible PC operating systems").

Google also contests Plaintiffs' assertion that "Google illegally acquired its monopolies in the relevant market," arguing that "the Court has found that Google made lawful acquisitions in the relevant markets, . . . not that Google established its power in the relevant markets through anticompetitive conduct." [Dkt. No. 1761] at 47. Although in the liability trial the Court found that when Google acquired AdX and DFP, that conduct was not anticompetitive, see Google, 778 F. Supp. 3d at 858-59, the Court also found that "Google has willfully engaged in a series of anticompetitive acts to acquire and maintain monopoly power in the publisher ad server and ad exchange markets for open-web display advertising," id. at 873. See Rem. Tr. Oct. 1 PM 117:3-7 (Lerner (Def. Expert)) (testifying that "while the Court held that the acquisition of DoubleClick was not anticompetitive, the Court did find that Google acquired monopoly power through anticompetitive conduct"). Google's attempt to conflate the two findings is unavailing.

2. Scale

Google's dominant market power in the ad exchange and publisher ad server markets has allowed it to acquire significantly more scale. Google, 778 F. Supp. 3d at 832 ("Google's unparalleled scale in programmatic advertising has given it significant advantages over rival firms."). The record confirms Google's scale advantage. Dr. Glenn Berntson, Engineering Director at Google, stated that Google Ad Manager, at peak, processes "approximately 8.2 million ad requests per second," and processes "approximately 60 million bid requests per second." Rem. Tr. Sept. 29 PM 90:24-91:19 (Berntson (Google)). This translates to "over 600 billion ad requests per day" and "almost . . . [five] trillion [bid] requests per day." Rem. Tr. Oct. 2 PM 85:17-86:6 (Nieh

(Def. Expert)). By contrast, PubMatic, a rival ad exchange, processes nearly 1 trillion ad impressions on a daily basis. Rem. Tr. Sept. 30 PM 12:24-13:1 (Goel (PubMatic)).

Google's scale advantage has a "linear direct" relationship to revenue: the more ad impressions cleared or won, the more revenue generated, Rem. Tr. Sept. 22 PM 53:2-9 (Casale (Index Exchange)); and scale is a "crucial factor for ad tech companies' ability to compete because of the importance of big data analytics for optimizing ad tech services and the significant network effects that exist in programmatic advertising," Google, 778 F. Supp. 3d at 832. Google has consistently used the data and scale obtained through its unlawful monopolies both to improve its products and to gain significant advantages over its rivals. See e.g., id. at 823 ("Google uses [the data it has collected on its users] to improve the matching of advertisements to users, thereby increasing its advertiser customers' return on ad expenditures."); id. at 827 ("First Look also gave Google a data advantage that helped the AdX team train its auction bidding models more effectively."). The benefits derived from scale "generate a flywheel effect, whereby scale begets more scale" as a result of increased data optimization and revenue. [Dkt. No. 1760] at 39.

Google's outsized scale and data advantages are most apparent when evaluating AdX. Ad exchanges specifically benefit from scale due to "network effects." Google, 778 F. Supp. 3d at 856; see also Liab. Tr. Sept. 16 PM 18:11-19:9 (Weintraub (Pls. Expert)) (describing "feedback loop between transaction volume and product quality"). AdX has a distinct scale and data advantage because of its exclusive access to DFP. As the dominant publisher ad server in the market for open-web display advertising, DFP holds publisher data of direct sold campaigns and Google audience data—including first- and third-party data on users of the open web—and shares that information exclusively with AdX, allowing it to operate with "significantly more intelligence than other competing ad exchanges," which do not have the same information. Rem. Tr. Sept. 30

PM 40:3-41:11 (Goel (PubMatic)). Furthermore, AdX also accrues an "efficiency advantage" by having unique access to DFP's pricing data. Id. These advantages, when viewed in aggregate, allow AdX to amass a win rate on impressions higher than other ad exchanges, and to train demand-side platforms to bid more on AdX rather than on other ad exchanges because they find that the "most profitable thing to do is to bid on the Google ad exchange." Id. at 41:4-11. As a result, rivals in the ad exchange market are denied necessary scale, and competition is stifled. See Rem. Tr. Sept. 22 AM 10:7-10 (Pls. Opening Arg.).

3. Profits

Google's scale advantages have had a direct correlation with its revenue stream by enabling Google to "charge[] durable supracompetitive prices for AdX" transactions for over a decade, even as the market matured and other ad exchanges reduced their prices in an effort to compete. Google, 778 F. Supp. 3d at 852. AdX's 20% take rate on each open-web display transaction is higher than that of any rival ad exchange. Id. (explaining that other ad exchanges often charged closer to 10%). Furthermore, Google "has refused to negotiate AdX's take rate with almost all of its customers, only offering minimal discounts to a handful of very large publishers," and has maintained AdX's take rate even after its own employees repeatedly questioned that rate and recognized that the "product was no longer worth 20%." Id. at 853.

"The unique advertising demand from AdWords . . . helped Google maintain the power to keep charging AdX publishers a 20% take rate": by largely limiting AdWords' exchange bidding to AdX, Google ensured that publishers would continue using AdX despite its high prices. Id. at 854; see also Rem. Tr. Sept. 24 AM 33:23-25 (Lee (Pls. Expert)) (testifying that AdWords "was a significant part of the reason AdX was differentiated, and which, in turn, helped support AdX's 20 percent take rate"). Evidence presented during the remedies trial established that this overcharge fell most acutely on Google's publisher customers and advertisers, as industry witnesses explained how AdX's take rate reduced their own margin without noticeable improvements in performance outcome. See, e.g., Rem. Tr. Sept. 22 AM 48:19-50:24 (Whitmore (Advance Local)) (testifying that AdX's take rates decrease a publisher's margin and impacts its ability to "make money to support journalism," and that AdX's take rates "put[] less working media into the market for the advertisers, so their ad dollar doesn't go as far"); Rem. Tr. Sept. 23 PM 79:25-80:9 (Dederick (The Trade Desk)) (testifying that AdX's supracompetitive take rate squeezes advertising margins, without getting performance results or better campaigns). Despite broad recognition of AdX's supracompetitive take rate, and the availability of lower priced exchanges, customers generally have not left AdX because Google's substantial market power leaves them "with very little choice but to keep using it." Google, 778 F. Supp. 3d at 853.

IV. Remedy-Specific Conclusions

After "establish[ing] the appropriate evidentiary and remedial scope" to evaluate the parties' Proposed Final Judgments, the Court must determine what relief is appropriate and explain how its remedies decree will accomplish the objectives of redressing the violation and restoring competition. Google Search, 803 F. Supp. 3d at 93. Specifically, those objectives include: "unfetter[ing] a market from anticompetitive conduct"; "terminat[ing] the illegal monopoly"; "deny[ing] to the defendant the fruits of its statutory violation"; and "ensur[ing] that there remain no practices likely to result in monopolization in the future." Microsoft I, 253 F.3d at 103 (internal quotations and citations omitted); see also Alston, 594 U.S. at 102-03 (cautioning that a court should not "impose a duty that it cannot explain or adequately and reasonably supervise" (internal quotation marks and citation omitted)). The Court begins with the most controversial question: whether the structural remedy of divestiture is necessary. Because divestiture is the "most drastic" antitrust remedy, it should not be imposed unless there is clear evidence that behavioral remedies will not be effective. E.I. du Pont, 366 U.S. at 326. In fact, a comprehensive review of "the major

[S]ection 2 Sherman Act cases won by the government or ending in consent decrees" over the past century concluded that there is "remarkably little evidence" that structural relief "had a positive effect on competition and consumer welfare" because "the government often lags the market in finding ways to increase competition . . . ." Robert W. Crandall, The Failure of Structural Remedies in Sherman Act Monopolization Cases, 80 Or. L. Rev. 109, 197-98 (2001). The study identified one exception, "the 1982 AT&T decree that broke up AT&T," but found that "the vertical divestiture could have been avoided through a simple regulatory policy of requiring equal access." Id. at 197. And as the Court has mentioned, although the breakup of AT&T could be said to have improved competition and innovation, see [Dkt. No. 1810] at 27-28, it caused the loss of Bell Labs, see Rem. Tr. Oct. 1 AM 68:21-69:3 (Goodwin (Def. Expert)).

A. Structural Remedies

Plaintiffs propose two immediate divestitures: the divestiture of AdX, Plaintiffs' PFJ § VI, and the open-sourcing of DFP's final auction logic, id. § VII.[12] Plaintiffs also seek a contingent divestiture of the remainder of DFP in case the imposed remedies do not restore competition in the relevant markets. Id. § VIII.

As to AdX, Plaintiffs' proposal would require Google to sell AdX to a yet unidentified buyer approved by Plaintiffs "in their sole discretion." Plaintiffs' PFJ § VI(A). Under this proposal, once a contract for the sale of AdX to an approved acquirer is executed, Google would have to complete a migration of AdX to the acquirer, id. § VI(J), and—at the option of the acquirer—provide migration, cloud computing, operation, and transition services at a reasonable price to the acquirer, id. §§ VI(L)-(N), (P). Google would have to provide a warranty to the acquirer that AdX

[12] It is undisputed that Plaintiffs' Open-Source Auction is a "de facto divestiture and therefore should be analyzed as a structural remedy." Microsoft III, 373 F.3d at 1230 (holding that the district court "reasonably analogized" plaintiffs' open-source Internet Explorer proposal "to a divestiture of Microsoft's assets").

and any of its included divestiture assets "will be operational and without material defect on the date of their transfer." Id. § VI(S). Although the exact timeframe of divestiture is unclear, it is undisputed that it would take years to complete. Under Plaintiffs' proposal, completion of the AdX migration to the approved acquirer would take up to 540 calendar days from execution of the sale, followed by up to two more years for the migration of AdX customers. Id. §§ VI(J), VI(O). Of course, any divestiture of AdX would be contingent upon the identification and approval of an acquirer, a process that would add additional time to this remedy. See id. Following AdX divestiture, Google would be prohibited from re-entering the open-web display ad exchange market until after the end of the Supervision Period, id. § XI(A), which—under Plaintiffs' PFJ—would last for at least 10 years from the Court's entry of the Final Judgment, id. § V(E).

Plaintiffs argue that the case for AdX divestiture is straightforward because AdX is the "glue" sealing Google's buy-side demand to its sell-side monopoly, and therefore must be divested to break the tie that the Court has found anticompetitive in the liability phase. Google, 778 F. Supp. 3d at 826; see also [Dkt. No. 1810] at 22-25. Plaintiffs contend that ordering Google to divest AdX would remove any incentive to suppress competition at the expense of its own customers, thereby redressing the harms of Google's anticompetitive conduct, and would prevent any recurrence of monopolization. Id. at 20-25; see also Rem. Tr. Sept. 22 AM 7:16-25 (Pls. Opening Arg.). Google contests this assertion, arguing that divestiture of AdX may actually harm competition in the relevant markets because it may incentivize Google to shift investments away from open-web display advertising and towards other ad formats, which would "cause AdWords advertisers to shift their spend away, [and] in turn . . . hurt open-web display publishers who want AdWords demand." Rem. Tr. Nov. 21 AM 78:7-79:7 (Def. Closing Arg.); see also Rem. Tr. Sept. 24 AM 110:21-111:9 (Lee (Pls. Expert)) (testifying that he did not evaluate whether Google would have an incentive to move away from open-web display ads if forced to divest AdX); Def. Closing Arg., slide 68.

Plaintiffs' second structural remedy would require Google to open-source DFP's final auction source code and allow that code to be hosted by a neutral third party, identified as the Open-Source Auction Administrator, to ensure that the final auction logic "work[s] in [an] objective and transparent manner . . . to benefit both publishers and advertisers."[13] Sept. 22 AM Rem. Tr. 15:15-18 (Pls. Opening Arg.); see also Plaintiffs' PFJ § VII. Within two years of the identification of the Open-Source Auction Administrator,[14] Google would have to publish the Open-Source Auction code in a web-based open-source repository, id. § VII(C), and create and implement an Application Programming Interface that facilitates interoperability with the Open-Source Auction, id. § IX(F).[15] The Open-Source Auction would have to include an "overview of logic and requirements guiding implementation," "working code," "documentation regarding testing," and "documentation regarding operationalizing the code," id. § VII(C), and be available through a license "that would allow any user to . . . reproduce, distribute, display, sell and create

[13] "Open-source software is software that's code based, [and] is available to the public by an open-source license, which effectively means that anyone in the public can download the code, can review the code, can inspect the code, [and] can also modify the code. And it promotes a community that is ultimately invested in continuing to improve that software for the better." Rem. Tr. Sept. 22 PM 60:20-25 (Casale (Index Exchange)).

[14] The Open-Source Auction Administrator must: (1) "be independent of and unconnected to Google" and (2) "have the intent and capability—including the necessary managerial, operational, technical, and financial capability—to administer the Open-Source Auction." Plaintiffs' PFJ § VII(B). Plaintiffs have identified Prebid as a possible Open-Source Administrator, asserting that Prebid has experience administering open-source software to the ad tech industry, and that it stands "ready and willing to administer" the Open-Source Auction. [Dkt. No. 1810] at 32-33; see also Rem. Tr. Sept. 26 52:22-25 (Racic (Prebid)).

[15] Google may, for good cause, seek an extension of up to one year to publish the Open-Source Auction code. Plaintiffs' PFJ § VII(E).

derivative works of the Open-Source Auction," id. § VII(F). Google would also have to provide technical assistance and logic-improvement data generated by DFP to the Open-Source Auction Administrator. Id. §§ VII(G), IX(G). Within 30 days of the publication of the Open-Source Auction, Google would have to disable DFP's final auction logic on its servers and thereafter use the Open-Source Auction. Id. § VII(H). Google would have to ensure that DFP Remainder, or the publisher ad server "functionality of DFP remaining after the creation of the Open-Source Auction," id. § IV(21), would send any demand it receives for an open-web display ad impression to the version or implementation of the Open-Source Auction that its publisher-customer selected, id. § VII(I). Following the Open-Source Auction, Google would be prohibited from modifying or influencing the Open-Source Auction, id. § XI(B), and from recreating, reacquiring, or otherwise re-obtaining the ownership or control of DFP's final auction logic until after the end of the Supervision Period, id. § XI(C), which—under Plaintiffs' PFJ—would last for at least 10 years from the Court's entry of the Final Judgment, id. § V(E).

According to Plaintiffs, the open-sourcing of DFP's final auction logic is necessary to "shine a light on the pivotal algorithms that dictate which ads are shown on more than 90% of websites worldwide." [Dkt. No. 1810] at 3. In other words, Plaintiffs' Open-Source Auction would restore publisher choice in the publisher ad server market by enabling publishers to understand DFP's final auction logic and modify the final auction logic to their own liking. See Rem. Tr. Oct. 6 AM 11:3-12:19 (Wheatland (Daily Mail)). Plaintiffs also assert that open-sourcing DFP's final auction logic would lower barriers to entry into the publisher ad server market in two ways: (1) it would allow potential entrants to build on DFP's algorithms that have benefited from scale and data advantages in the past and spark increased investment incentives and healthy competition in the market, see Rem. Tr. Sept. 24 AM 45:13-46:15 (Lee (Pls. Expert)), and (2) the transparency provided by the Open-Source Auction would "alleviate informational barriers to publisher switching," allowing open-web publishers to make informed decisions about which publisher ad server best suited their business needs, [Dkt. No. 1810] at 13; see also Rem. Tr. Oct. 3 AM 25:3-13 (Layser (Amazon Web Services)); Rem. Tr. Oct. 6 11:3-19, 18:1-21, 24:1-20 (Wheatland (Daily Mail)). This, in turn, would allow publishers to improve their monetization opportunities. See Rem. Tr. Sept. 26 51:11-21 (Racic (Prebid)).

In addition to the divestiture of AdX and the open-sourcing of DFP's final auction logic, Plaintiffs' PFJ also calls for the contingent divestiture of DFP Remainder, which includes the publisher ad server functionality of DFP that would remain after the creation of the Open-Source Auction, if necessary. Plaintiffs' PFJ § VIII(A). In that case, Google would be required to "promptly and fully divest DFP Remainder to one or more DFP Remainder Acquirer(s) approved in writing by the Plaintiffs in their sole discretion." Id. A decision regarding this contingent divestiture would be decided almost a decade after entry of the Final Judgment. Id. § XIII(A)(7); see also Google's Opening Arg. at 16 (timeline of Plaintiffs' proposal). Following the contingent divestiture of DFP Remainder, Google would be prohibited from re-entering the open-web display publisher ad server market until after the end of the Supervision Period, id. § XI(D), which—under Plaintiffs' PFJ—would last for at least 10 years from the Court's entry of the Final Judgment, id. § V(E).

Plaintiffs assert that the contingent divestiture of DFP Remainder may be necessary to "achieve the purposes of [the] Final Judgment." Id. § XIII(A)(7). According to Plaintiffs, "if Google finds a way around [structural] remedies to continue to use AdWords to disadvantage DFP's rivals," the contingent divestiture of DFP Remainder would serve as a backstop "by eliminating Google's economic incentive to give DFP artificial advantages." [Dkt. No. 1810] at

12; see also Rem. Tr. Sept. 24 AM 50:17-51:4 (Lee (Pls. Expert)). Plaintiffs also argue that the contingent divestiture of DFP Remainder is technically feasible, as it would "utilize the same standard software migration process as the AdX divestiture and require roughly the same . . . work and effort." [Dkt. No. 1810] at 37. Plaintiffs argue that there will be many credible buyers interested in acquiring DFP Remainder. Id.; Rem. Tr. Sept. 24 PM 36:10-14 (Crisci (Pls. Expert)).

Plaintiffs have the "heavy burden to warrant the 'radical structural' remedy of a forced divestiture." Google Search, 803 F. Supp. 3d at 101 (quoting Microsoft I, 253 F.3d at 80). Where, as here, the gravamen of the violation was an unlawful tie among integrated technology assets, divestiture is unprecedented. As Google correctly argues, "courts in tying cases have not ordered divestiture of either the tying or tied product." [Dkt. No. 1811] at 9 (emphasis in original) (first citing Int'l Salt, 332 U.S. at 399 n.7, 401 (requiring defendant to "offer to lease or sell or license the use of" its salt machines "on non-discriminatory terms and conditions"—not divestiture); and then citing Image Tech. Servs. Inc. v. Eastman Kodak Co., 125 F.3d 1195, 1224 (9th Cir. 1997) ("requiring Kodak to sell all parts to all ISOs at reasonable prices" instead of divestiture)).

Against this legal framework, this Court, much like the Google Search court, finds Plaintiffs' divestiture proposal "a poor fit for this case," and declines to impose Plaintiffs' request for structural remedies.[16] Google Search, 803 F. Supp. 3d at 99. As discussed in further detail below, Plaintiffs have not shown that behavioral remedies will be ineffective without the requested divestitures. See infra Section IV(B). The Court bases this finding on substantial evidence produced during the liability trial demonstrating that access to real-time bids from AdX using other publisher ad servers would restore much-needed competition in the relevant markets. See, e.g.,

[16] This decision renders Plaintiffs' requests to prohibit Google from re-entering and competing in the ad exchange and publisher ad server markets for open-web display ad inventory following divestiture moot. See Plaintiffs' PFJ §§ XI(A); XI(C)-(D).

Liab. Tr. Sept. 10 AM 100:12-13 (Layser (News Corp)); Liab. Tr. Sept. 9 AM 75:23-76:8, 77:8-13 (Wolfe (Gannett)); Liab. Tr. Sept. 27 AM 71:9-24 (Wheatland (Daily Mail)); Liab. Tr. Sept. 17 PM 50:4-11 (Cardogan (OpenX)); Liab. Tr. Sept. 13 PM 129:14-21 (Boland (Meta)); Liab. Tr. Sept. 13 PM 65:7-25 (Creput (Equativ)); Liab. Tr. Sept. 9 PM 125:10-18 (Avery (Kevel)); Liab. Tr. Sept. 20 PM 152:23-153:3 (John (Microsoft)). Industry witnesses in the remedies phase also testified that the parties' overlapping behavioral remedies—which include the elimination of any contractual and policy tie between AdX and DFP, the building of new technological integrations between AdX and rival publisher ad servers and between AdX and Prebid auctions, and the sharing of data from AdX and DFP—would lower switching costs, and allow rivals to compete fairly for customers, thereby denying Google any further benefit from its statutory violations. See, e.g., Rem. Tr. Oct. 3. PM 19:9-16, 25:18-26:7 (Layser (Amazon Web Services)); Rem. Tr. Sept. 23 AM 10:21-11:9, 41:4-12 (Avery (Kevel)); Rem. Tr. Sept. 29 AM 29:8-21 (Creput (Equativ)); Rem. Tr. Sept. 22 PM 57:10-20, 59:24-60:4, 69:10-17, 148:4-149:8 (Casale (Index Exchange)); Rem. Tr. Sept. 23 AM 139:4-16, 147:14-148:4 (Lambert (Omnicom)); Rem. Tr. Sept. 22 PM 18:11-18, 20:1-14 (Whitmore (Advance Local)).

Plaintiffs respond that structural remedies are necessary because only structural relief can provide the "assurance" needed to restore competition in the ad exchange and publisher ad server markets. See [Dkt. No. 1810] at 16-17 (citing United States v. Crescent Amusement Co., 323 U.S. 173, 190 (1944) ("The proclivity in the past to use that affiliation for an unlawful end warrants effective assurance that no such opportunity will be available in the future.")). According to Plaintiffs, customers and market participants would remain concerned about re-monopolization without structural changes to Google's ad tech business, and this concern is a "rational, objective perception[] based on experience dealing with Google, using its products, and observing its behavior and the impact of that behavior on other rational actors in the market." Id. at 18. Specifically, industry witnesses expressed concern that "the technology offers a lot of opportunities for . . . Google to continue to put their thumb on the scale," and that without divestiture, "there's . . . always going to be an incentive [by Google] to try to find [its] way around the behavioral remedies" because of Google's "inherent . . . conflict of interest." Rem. Tr. Sept. 22 AM 88:16-89:18 (Whitmore (Advance Local)); see also Rem. Tr. Sept. 22 PM 76:18-77:13 (Casale (Index Exchange)) (behavioral remedies "will help, but they do not provide guaranteed certainty" because "a very creative mind can develop another preferencing feature to implement into DFP tomorrow"). This Court is unaware of any court ever having required a remedy in an antitrust case to provide "guaranteed certainty." Id.

Plaintiffs cite to Google's "track record of pivoting to new forms of anticompetitive conduct when one anticompetitive practice ceases," [Dkt. No. 1810] at 21; see also id. at 23-24 (discussing Google's payments of fines to the Federal Trade Commission and to France's Autorité de la concurrence, or French Competition Authority, for failures to comply with previously made commitments),[17] and argue that this conduct supports their concern that Google's "impulse would always be to adapt to the letter of what might be described in a behavioral remedy, but not the actual spirit of it," Rem. Tr. Sept. 22 AM 111:9-17 (Whitmore (Advance Local)); see also [Dkt. No. 1810] at 20-21 (discussing the "innumerable ways Google could modify its technology to recreate the anticompetitive effects of its illegal campaigns through other means," such as through the modification of bid latency and decision algorithms, the communication of data signals, and

[17] Google argues that Plaintiffs' "accusation" regarding the French Competition Authority case is "factually baseless," asserting that "any sanctions imposed for Google's violation or breach would be publicly reported, and there have been no such public reports." [Dkt. No. 1811] at 18 n. 13.

the creation of an exclusive buying-relationship between AdWords and DFP to recreate the AdX-DFP tie). As a result of these concerns, Plaintiffs contend that behavioral remedies are insufficient because any behavioral decree must be, "at a minimum . . . exceptionally detailed," id. at 23, and imposing only behavioral remedies would require the Court and the ad tech industry "to engage in a never-ending game of Whac-A-Mole with Google," Rem. Tr. Sept. 22 AM 16:1-4 (Pls. Opening Arg.), especially as Google is financially incentivized to "maximize delay in resolving" compliance issues, [Dkt. No. 1810] at 24.[18]

Despite Plaintiffs' assertions to the contrary, the essence of Plaintiffs' rationale for seeking divestiture boils down to a lack of trust that Google will comply with an Order from this Court and an unrealistic desire for certainty. See, e.g., Rem. Tr. Sept. 22 AM 88:16-89:5 (Whitmore (Advance Local)) (testifying that behavioral remedies are insufficient because "there's . . . always going to be an incentive to try to find your way around the behavioral remedies that can only be addressed through divestiture of AdX and DFP"); Rem. Tr. Sept. 23 AM 13:1-12, 43:24-44:1 (Avery (Kevel)) (explaining that his "only concern" regarding Google's proposal to share AdX real-time-bids to Kevel's publisher ad server is Google's "incentive[] to bid unfairly"); Rem. Tr. Sept. 23 PM 108:19-109:10 (Dederick (The Trade Desk)) (stating that behavioral remedies alone are insufficient because "the simple position . . . of one company owning the ad selection on the sell side who [is] also a very large media company with their own ads to sell, and a long history .

[18] Plaintiffs rely on United States v. American Telephone and Telegraph Co., 552 F. Supp. 131 (D.D.C. 1982), for the proposition that where a monopolist has a "pattern . . . [of] shift[ing] from one anticompetitive activity to another, . . . it is unlikely that, realistically, an injunction could be drafted that would be . . . sufficiently detailed . . . ." [Dkt. No. 1810] at 21 (alteration in original) (quoting Am. Tel. & Tel. Co., 552 F. Supp. at 167-68 & n.155). That case involved a negotiated settlement between the parties, requiring a vertical divestiture of AT&T's control over local Bell Operating Companies. Am. Tel. & Tel. Co., 552 F. Supp. at 140-43. Such factors are not present here.

. . [of] demand biasing, discriminatory practices, [and] obfuscation . . . is the problem"); Rem. Tr. Oct. 3 AM 36:19-20, 40:8-18 (Layser (Amazon Web Services)) (agreeing that she did not "have trust or confidence that if the Court ordered" behavioral remedies, Google would "follow that").

Lack of trust alone or desire for "guaranteed certainty" cannot justify divestiture. See Rem. Tr. Sept. 22 PM 77:8-13 (Casale (Index Exchange)). As Plaintiffs' economic expert Professor Robin Lee testified, behavioral remedies would be sufficient if he could be confident that "Google would actually act in complete good faith and follow an injunction." Rem. Tr. Sept. 24 AM 71:4-72:7 (Lee (Pls. Expert)). In Microsoft I, the D.C. Circuit reversed the district court's initial divestiture order that was based, in part, on a finding that "Microsoft has proved untrustworthy in the past." Microsoft I, 253 F.3d at 103 (finding that the order "nowhere" discussed relevant remedies objectives). On remand, the district court rejected the argument that more drastic remedies were necessary based on the belief that Microsoft intended to interfere with competition in the future, stating: "[g]enerally, courts presume that parties will adhere to orders of the Court." Microsoft II, 224 F. Supp. 2d at 181. Furthermore, the justice system itself addresses concerns about trust. As this Court stated during the remedies trial, Google would be kept in check by not one, but two swords of Damocles: (1) an injunction ordered and supervised by the Court, which could hold Google in contempt or impose other penalties for proven violations; and (2) the numerous private lawsuits pending against Google. See Rem. Tr. Sept. 30 PM 130:16-131:4 (Goel (PubMatic)); [Dkt. No. 1811] at 2-3. Many of those lawsuits have been filed by witnesses who testified for the Plaintiffs in both the liability and remedies phase of this trial.[19] See Rem. Tr. Sept.

[19] See, e.g., PubMatic, Inc. v. Google LLC, No. 1:25-cv-10819 (S.D.N.Y.) (seeking an injunction against Google's anticompetitive conduct in the ad tech market, and compensatory, consequential, and punitive damages for all past, current, and future injures caused by Google's anticompetitive conduct); OpenX Techs., Inc. v. Google LLC, No. 1:25-cv-10817 (S.D.N.Y.) (seeking similar relief); Magnite, Inc. v. Google LLC, No. 1:25-cv-10818 (S.D.N.Y.) (same); Equativ SAS v.

30 PM 130:16-131:15 (Goel (PubMatic)) (agreeing that "Google has a number of lawsuits pending against it, and likely will attract more," and that "most corporations, including Google, would be very likely to comply with the court order").

To the extent that Plaintiffs assert that structural relief would be less "cumbersome" than behavioral-only remedies, [Dkt. No. 1810] at 1, 23-24; see also Rem. Tr. Nov. 21 AM 29:9-12 (Pls. Closing Arg.), Plaintiffs fail to appreciate that their divestiture proposals do not identify any prospective acquirers and contain "tremendous ambiguity" that would require the Court to engage in at least as much, if not more, administration of central planning and oversight than behavioral remedies. Rem. Tr. Sept. 25 PM 104:21-105:12 (Craycroft (Google)). Moreover, the time frame to complete divestiture would span multiple years—without accounting for the likelihood of an appeal—whereas every behavioral remedy would be fully in effect within 15 months. See Rem. Tr. Nov. 21 AM 44:16-20 (Def. Closing Arg.).

Acknowledging the likelihood of appeal, Plaintiffs have suggested adopting a two-step divestiture process of "ordering divestiture first, and then (if affirmed on appeal)," identifying a buyer. Steves & Sons, Inc. v. JELD-WEN, Inc., 988 F.3d 690, 722 (4th Cir. 2021); see also Rem. Tr. Nov. 21 AM 37:1-11 (Pls. Closing Arg.). But Steves & Sons does not provide the support that Plaintiffs seek, especially where, as this Court has previously stated, "time is . . . of the essence." Rem. Tr. Nov. 21 AM 21:19-25 (Closing Arg.). Although the Fourth Circuit has affirmed a district court's two-step divestiture process, it made clear in that case that the divestiture process, following its affirmance, was "far from over," stating that if the "special master [could not] locate a satisfactory buyer, the district court may have to revisit its ruling," and that "when a buyer is

Google LLC, No. 1:26-cv-140 (S.D.N.Y.) (same); Index Exchange Inc. v. Google LLC, No. 1:25-cv-10477 (S.D.N.Y.) (same); Gannett Co., Inc. v. Google LLC, No. 1:23-cv-5177 (S.D.N.Y.) (same).

selected, [defendant] may challenge whether a sale to that particular buyer will serve the public interest." Steves & Son, 998 F.3d at 724. The two-step process adopted by Steves & Son would only delay the completion of Plaintiffs' proposed years-long divestiture processes, and runs the risk of being "outstrip[ped]" by "the quickly shifting gears of market innovation," which include imminent industry disruptions caused by AI and supply-path optimization. Novell, Inc. v. Microsoft Corp., 731 F.3d 1064, 1071 (10th Cir. 2013); see supra Section II(C). Accordingly, even under this two-step divestiture process, AdX divestiture would be far from "simple and elegant." Rem. Tr. Nov. 21 AM 12:8-9 (Pls. Closing Arg.).

Plaintiffs also do not satisfy the required standard that there be a significant causal connection between Google's anticompetitive conduct and its creation or maintenance of monopoly power to justify structural remedies. As the Microsoft I court held, "structural relief . . . require[s] . . . a significant causal connection between the conduct and creation or maintenance of the market power." 253 F.3d at 106 (emphasis and alteration in original) (internal quotation marks and citation omitted). Plaintiffs concede this standard is stronger than what is required to find liability, which only requires Plaintiffs to show that "a defendant engaged in anticompetitive conduct that reasonably appears capable of making a significant contribution to maintaining monopoly power." [Dkt. No. 1435] at 9 (quoting Microsoft I, 253 F.3d at 79). In analyzing whether Plaintiffs have met this higher standard, the Court must "discern between conduct that maintains a monopoly through anticompetitive acts as distinct from 'growth or development as a consequence of a superior product, business acumen, or historic accident.'" Google Search, 803 F. Supp. 3d at 100 (quoting Grinnell, 384 U.S. at 570-71).

Plaintiffs attempt to distinguish the facts at hand from those in Microsoft I and in Google Search, asserting that here, the Court found that "Google established monopoly positions for each of AdX and DFP via anticompetitive conduct," unlike what the Microsoft I and Google Search courts found.[20] [Dkt. No. 1810] at 30 (emphasis in original). Although the liability opinion found that Google both "acquire[d] and maintain[ed] monopoly power" in the relevant ad tech markets through illegal conduct involving both AdX and DFP, Google, 778 F. Supp. 3d at 873, the opinion also referenced ample evidence in the record of lawful conduct playing a crucial role in the acquisition and maintenance of Google's ad tech monopoly. This lawful conduct included Google's leveraging its Search product to generate "AdWords' uniquely large and diverse array of advertising demand," made of "mostly small and medium-sized advertisers," id. at 862-63; Google's acquisitions of DoubleClick and Admeld, id. at 858-59; and Google's "multi-billion dollar, lawful investments in 'many, many innovations,'" [Dkt. No. 1811] at 22 (quoting Rem. Tr. Sept. 29 PM 20:23-21:3 (Levitte (Google))). "The contribution of these factors to Google's success is not disputed." Google Search, 803 F. Supp. 3d at 99; see also Rem. Tr. Sept. 22. PM 146:1-147:2 (Casale (Index Exchange)) (testifying that AdX and DFP are "feature-rich" products); Rem. Tr. Sept. 22 AM 129:14:17 (Whitmore (Advance Local)) ("AdX absolutely meets the criteria of an exchange that [Advance Local] want[s] to work with."). Although whether structural remedies are needed in this case is arguably closer than what was presented in Microsoft I and Google Search, the Court does not find sufficient evidence in the record to support structural remedies,

[20] Plaintiffs also attempt to articulate a different standard to justify divestiture, alleging that "[o]ne way to establish a nexus between illegal conduct and divested assets is to show that the monopolist has a track record of using the divested assets to violate the Sherman Act or that the monopolist is likely to do so in the future." [Dkt. No. 1435] at 8 (citing Int'l Boxing Club of N.Y., Inc. v. United States, 358 U.S. 242, 256 (1959); United States v. Paramount Pictures, 334 U.S. 131, 152 (1948); Crescent Amusement, 323 U.S. at 189-90). The cases to which Plaintiffs cite in support of this standard stem from unlawful "intercorporate combination and control," and are therefore inapposite to the facts at hand. E.I. du Pont, 366 U.S. at 329 & n.11 (finding that "[d]ivestiture or dissolution has traditionally been the remedy for Sherman Act violations whose heart is intercorporate combination and control"). Accordingly, the Court declines to adopt this standard.

especially where it is unclear whether they would actually further improve competition. See Rem. Tr. Sept. 23 PM 46:11-13 (Friedman (Goodway Group)) (testifying that "whether divestiture would further improve competition is hard to say"). In sum, when considering what would actually be involved in divestiture and the time required to complete it, "wisdom counsels against adopting radical structural relief." Microsoft I, 253 F.3d at 80.

1. AdX Divestiture

In addition to the general problems discussed above, the specific divestitures sought by Plaintiffs present multiple challenges. Although an AdX divestiture—in theory—seems like a "simple and elegant antitrust remed[y]," Rem. Tr. Nov. 21 AM 12:8-9 (Pls. Closing Arg.), the evidence in the remedies phase shows that it would—in reality—be "incredibly messy and highly risky," Google Search, 803 F. Supp. 3d at 100 (citing Microsoft I, 253 F.3d at 106 ("One apparent reason why courts have not ordered the dissolution of unitary companies is logistical difficulty.")). As Google argues, Plaintiffs' proposed divestiture of AdX would have an effect on other Google products and services beyond the conduct Plaintiffs seek to redress because AdX is a tool that transacts multiple ad forms other than open-web display ads—including app, native, and instream video—and because some AdX customers do not use AdX for open-web display ads at all. See [Dkt. No. 1811] at 29-30. Therefore, ordering Google to sell its ad exchange cannot reasonably be described as "tailored to fit the wrong creating the occasion for the remedy." Microsoft I, 253 F.3d at 107; see also Rem. Tr. Nov. 21 AM 51:5-10 (Def. Closing Arg.); Rem. Tr. Sept. 29 PM 21:6-22:4, 24:19-25:1 (Levitte (Google)) (testifying that Google Ad Manager, which includes AdX and DFP, supports "many many formats" including "banner ads, [or] images on web and on app; out-stream video on web and app[;] . . . native ads on web and app[;] . . . [and] rewarded ads, interstitial ads, in-stream video ads, pre-roll, post-roll, mid-roll," and confirming that AdX is "capable of transacting more than just [open-web] display ad impressions").

An AdX divestiture would also present multiple difficulties regarding its commercial and technical feasibility. Taking commercial feasibility first, Plaintiffs' proposal fails to clarify uncertainties regarding the likelihood of finding an acceptable acquirer, as well as how customers would react to the acquisition. For example, Plaintiffs' PFJ requires that the:

> AdX Acquirer must, in Plaintiffs' sole judgment, (1) be independent of and unconnected to Google, and (2) have the intent and capability (or be likely to have the capability as of the AdX Migration Date)—including the necessary managerial, operational, technical, and financial capability—to compete effectively in the market for Open-Web Display Ad Exchanges. In evaluating the adequacy of the AdX Acquirer, Plaintiffs may also consider whether the sale of AdX to the AdX Acquirer may substantially lessen competition.

Plaintiffs' PFJ § VI(E). Although Paul Crisci, Plaintiffs' investment banking expert, found that AdX "would be attractive to a credible and motivated pool of buyers," Rem. Tr. Sept. 24 PM 36:3-9 (Crisci (Pls. Expert)), his expert opinion was extended only to whether there would be "initial buyer interest," and did not extend to whether divestiture would actually succeed, id. at 68:17-69:10, 71:6-10, 81:19-23.

Tellingly, during the course of the remedies trial, Plaintiffs failed to identify a viable AdX acquirer. Although three industry witnesses testified that they might be interested in buying AdX, none were ready to commit to the purchase. Rem. Tr. Sept. 22 PM 95:7-15, 96:4-16, 131:23-25 (Casale (Index Exchange)) (testifying that Index Exchange, as a rival ad exchange, would be interested in acquiring AdX as "an opportunity to consolidate" the market, but that Index Exchange had not yet analyzed whether acquiring AdX would be feasible); Rem. Tr. Sept. 30 PM 24:14-25:4, 93:5-19 (Goel (PubMatic)) (testifying that PubMatic did not "have enough information about AdX as an entity to know if [it] would be interested in bidding on it or not"); Rem. Tr. Sept. 23 AM 29:24-30:4, 54:3-6, 55:10-25 (Avery (Kevel)) (testifying that Kevel would be interested in acquiring AdX strategically, but that Kevel did not have the funds by itself to acquire AdX, and that Kevel—without doing due diligence—did not know if it could maintain all of the features of AdX). Plaintiffs also gave no indication as to whether any of the three potential buyers would be "approved . . . by the Plaintiffs in their sole discretion." Plaintiffs' PFJ § VI(A). As compared to the evidence in Google Search, in which Plaintiffs "touted many likely buyers," here, there were no "likely" buyers presented during the remedies trial. See Rem. Tr. Nov. 21 AM 75:16-19 (Def. Closing Arg.); see also Google's Rem. Closing Arg., at slide 58.

As for technical feasibility, Plaintiffs argue that Google's extensive experience in migrating software, see Rem. Tr. Sept. 26 243:24-244:2 (Bjedov (Pls. Expert)) ("It is a large migration, but it's also the kind of migrations that Google or Facebook . . . do once or twice a year."), coupled with the "beautiful" and "very well structured, very organized" source code, Rem. Tr. Sept. 24 PM 127:21-128:3 (Weissman (Pls. Expert)), support their position that it is technically feasible to divest AdX. See [Dkt. No. 1810] at 35-36. According to Plaintiffs, AdX's dependencies on Google's core infrastructure are "general purpose distribut[ed] systems services" for which "there is a rich set of candidate options that exist elsewhere," Rem. Tr. Sept. 25 AM 56:6-57:8, 57:9-25 (Weissman (Pls. Expert)); and the work to replace such dependencies—rewriting Application Programming Interfaces—is a "fairly straightforward" task that software engineers "do all the time," id. at 53:24-54:3, 54:8-12, 62:10-15. Plaintiffs assert that it is technically feasible, within 18 months, Rem. Tr. Sept. 26 163:12-20 (Bjedov (Pls. Expert)), to divest AdX by "copy[ing] and migrat[ing] the technical assets of AdX . . . to a new environment" and replacing the dependencies upon which AdX currently relies, Rem. Tr. Sept. 24 PM 112:6-14 (Weissman (Pls. Expert)).

Google responds that Plaintiffs' argument of technical feasibility overlooks the complexity of AdX's integration with Google's proprietary infrastructure. For over 17 years, AdX and DFP have been tightly knitted to Google's core infrastructure, which involves over 100 million lines of code. Rem. Tr. Oct. 2 AM 20:21-21:8 (Adkins (Google)) ("[I]t's a bit like knitting, maybe. If you're . . . writing software, you know, there's the code you have in front of you, but you're pulling in code from other places to provide that functionality and those services. And then when the code is compiled and runs, it's really kind of tightly coupled. And so I guess to say that it's woven together, it's kind of interdependent once it gets compiled and is running in the infrastructure."). In other words, AdX depends on Google's core infrastructure, which includes its software infrastructure and hardware infrastructure such as data centers and undersea cables. Rem. Tr. Sept. 29 PM 25:7-26:20 (Levitte (Google)); see also Rem. Tr. Oct. 2 AM 19:14-22, 20:11-20, 21:9-22, 22:8-24:13, 27:25-28:10, 36:10-15, 57:22-58:7 (Adkins (Google)); Adkins-DX1.

As a result, replacing such dependencies would require "an enormous amount of work," Rem. Tr. Oct. 2 PM 112:7-8 (Nieh (Def. Expert)), especially as these dependencies involve "breakthrough" systems "custom built" to solve Google's unique problems, including those arising from Google's ad tech,[21] id. at 107:3-108:10, 109:16-111:2, 111:10-113:2, 120:14-22; see also Nieh Defendant's Exhibit ("DX") -1. Evidence in the record showed that migration of technology is a complex undertaking. For example, Google's experience with past migrations shows how long such projects can take: the migration of DoubleClick to Google's infrastructure took seven years, Rem. Tr. Oct. 2 PM 77:19-25 (Nieh (Def. Expert)); the replacement of one AdX and DFP dependency took five years, id. at 78:1-5 (Nieh (Def. Expert)); Rem. Tr. Sept. 29 PM 102:23-

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[21] For example, Professor Jason Nieh, Google's technical expert, explained how F1 and Spanner, two of Google's proprietary database systems, were developed to allow for "transactional schema change" needed by the ad tech industry. Specifically, F1, with the use of Spanner, allowed users to make changes to the way data is laid out, without bringing the system down. Rem. Tr. Oct. 2 PM 109:16-111:2 (Nieh (Def. Expert)).

104:10 (Berntson (Google)) (explaining that the five-year replacement involved 40 engineers); and another migration of one Gmail dependency took eight years, Rem. Tr. Oct. 2 PM 78:6-10 (Nieh (Def. Expert)). Other technical giants have experienced similar long-term issues. For example, efforts to migrate LinkedIn to Microsoft's public cloud were abandoned after four years, id. at 78:22-79:16, and the "far simpler" partial migration of Netflix's mail-order DVD business to Amazon Web Services—which Plaintiffs' expert Dr. Goranka Bjedov highlighted as the closest analogue to that of an AdX divestiture—took seven years, Rem. Tr. Oct. 2 PM 66:23-68:24 (Nieh (Def. Expert)); Rem. Tr. Oct. 3 PM 100:2-5 (Nieh (Def. Expert)); Rem. Tr. Sept. 26 286:3-287:15, 288:6-20 (Bjedov (Pls. Expert)). Against these comparators, Plaintiffs' timeline estimates are unrealistic.

In support of their technical feasibility argument, Plaintiffs rely on an engineering analysis conducted by Google in 2023 and 2024 evaluating the feasibility of a business divestiture of AdX. PRX 50 at -298. Google's business divestiture of AdX considered what would be involved in transferring customer contracts, intellectual property licenses, revenue stream, and a reference source code "that would be illustrative but not operational" to allow an acquirer to "replicate" AdX's behavior on their own infrastructure. Rem. Tr. Sept. 25 PM 62:17-22 (Craycroft (Google)). A transitional period would follow the transfer of such assets, in which the acquirer would "rebuil[d] [AdX] on their own stack"—i.e., replace AdX's dependencies—and Google would continue to operate AdX on behalf of the buyer, and offer technical support to the buyer, for a cost-based fee. Rem. Tr. Sept. 29 PM 70:11-25 (Levitte (Google)); Rem. Tr. Sept. 25 PM 67:4-69:13 (Craycroft (Google)). At the end of the transitional period, the acquirer would "operate AdX themselves," independent of Google's infrastructure, and Google's version of AdX would shut down. Rem. Tr. Sept. 25 PM at 70:3-9 (Craycroft (Google)). Google's internal analysis allotted two years as the "outer bound" for the transitional phase; however, its engineering team recognized that this was a rough estimate that could vary depending on the acquirer. Id. at 81:7-14; Rem. Tr. Sept. 29 PM 34:4-35:19, 56:5-16 (Levitte (Google)).

Although Google's internal analysis concluded that a business divestiture of AdX was feasible from a technical standpoint, see Rem. Tr. Sept. 25 PM 61:20-62:6 (Craycroft (Google)), that analysis differs from Plaintiffs' proposed AdX divestiture in several key respects. First, Google's business divestiture considered only open auction and private auction transaction types, a far "narrower scope" than Plaintiffs' proposed AdX divestiture. Rem. Tr. Sept. 29 PM 56:5-12 (Levitte (Google)). Second, Google's analysis "did not assume any infrastructure dependencies" and placed the burden on the potential acquirer to rebuild AdX on their own proprietary infrastructure. Id. at 56:10-16. Lastly, the transfer of assets did not include any "operational technology" but only included customer contracts, patent licenses, revenue, and "reference source code." Rem. Tr. Sept. 25 PM 62:8-22, 64:10-20, 107:6-108:1 (Craycroft (Google)); see also PRX 50 at -298. Importantly, the reference source code was "explicitly defined to be the subset of AdX code that [is not reliant upon] Google infrastructure dependencies" and would instead be an "instruction manual for rebuilding AdX." Rem. Tr. Sept. 25 PM 63:17-25 (Craycroft (Google)). In short, Plaintiffs' reliance on Google's analysis of the feasibility of a business divestiture of AdX does not support Plaintiffs' far more expansive view of divestiture.

Echoing the Google Search court: "[e]ven if, as Plaintiffs suggest, [AdX's] dependencies could somehow be re-created or made available to a new owner, . . .—and that is a big 'if'—the [C]ourt is highly skeptical that an [AdX] divestiture would not come at the expense of substantial product degradation and a loss of consumer welfare." Google Search, 803 F. Supp. 3d at 101. Expert witnesses for both Plaintiffs and Google testified that AdX may not have equivalent functionality following divestiture. See, e.g., Rem. Tr. Oct. 2 PM 76:1-17 (Nieh (Def. Expert)) ("[I]n a best-case scenario, . . . given the complexity and given the dependencies on Google's proprietary infrastructure, and the fact that those are not available outside, the result might be a product that is not comparable in terms of the functionality and scaling capabilities compared to AdX and DFP today."); Rem. Tr. Sept. 25 AM 99:2-9 (Weissman (Pls. Expert)) (testifying that he did not know if "the performance of the divested AdX and DFP will match Google's" because "[t]he buyer gets to make their own decisions"); Rem. Tr. Sept. 26 277:8-13 (Bjedov (Pls. Expert)) (explaining that because she did not know who the buyer of a potential divestiture would be, she could not say "whether or not it's in their interest to have the same product, equivalent product or degraded product"). Google's engineers admitted that their proposed business divestiture of AdX was not immune from such concerns. See, e.g., Rem. Tr. Sept. 25 PM 109:3-13 (Craycroft (Google)); Rem. Tr. Sept. 29 PM 42:4-9 (Levitte (Google)). Even Plaintiffs appear to acknowledge the possibility of "increased latency" as a result of an AdX divestiture; however, Plaintiffs brush off such concerns by arguing that "increased latency can be beneficial for publishers, and publishers already choose to work with non-AdX exchanges and Prebid even if it leads to tolerable increases in latency." [Dkt. No. 1810] at 36 (internal citations omitted).

The uncertainty around post-AdX divestiture functionality is especially concerning because the stakes are high: this is "technology that absolutely has to work for customers." Rem. Tr. Nov. 21 AM 66:5-6 (Def. Closing Arg.); see also Rem. Tr. Oct. 1 PM 35:19-36:8, 79:10-24 (Douglas (wikiHow)) (testifying that, as a small publisher, service disruptions are "really, really stressful"). Although Plaintiffs' argument that any potential short-term harm to publisher-customers justifies the long-term benefits from increased competition may have some merit, see [Dkt. No. 1810] at 36-37, "[a]cting in equity, . . . the [C]ourt cannot be so myopic," and "must consider the harms that might befall other market actors, even if that means . . . forgoing a remedy that could help restore competition." Google Search, 803 F. Supp. 3d at 106. Because antitrust remedies must cause "as little injury as possible to the interest of the general public" and afford "proper regard" to relevant interests, Plaintiffs' proposed AdX divestiture is neither feasible nor an appropriate remedy. United States v. Am. Tobacco Co., 221 U.S. 106, 185 (1911).

2. Open-Sourcing of DFP's Final Auction Logic

Plaintiffs' proposal as to an Open-Source Auction raises the same concerns as to both its legal justification and technical feasibility, as just raised in the AdX divestiture proposal. The Open-Source Auction would extend beyond open-web display ads by applying to a wide range of ad formats. See Rem. Tr. Sept. 24 AM 102:8-14 (Lee (Pls. Expert)); Rem. Tr. Sept. 29 PM 49:7-14 (Levitte (Google)) (testifying that "final auction logic refers to all of Google Ad Manager['s] or ad serving logic"); Rem. Tr. Sept. 29 AM 92:1-17 (Sheffer (Google)) (explaining that the Open-Source Auction would also impact the "8,000 or so publishers that use [Google Ad Manager] only for direct sales").

More importantly, the Open-Source Auction is insufficiently tailored to the Court's liability phase findings. Although the lack of transparency surrounding Google's ad tech tools was discussed during the liability trial, see supra Section III(B)(1), Plaintiffs never argued that DFP's "black box" final auction logic contributed to Google's unlawful ad tech monopolies, and in its liability opinion, the Court did not find that DFP's final auction logic was anticompetitive. As a result, Plaintiffs' assertions, "standing alone and unconnected to specific liability findings, cannot be utilized to justify specific remedial provisions." Microsoft II, 224 F. Supp. 2d 76 at 138; accord Google Search, 803 F. Supp. 3d at 157-58 (rejecting Plaintiffs' self-preferencing prohibitions where Plaintiffs "never alleged that such self-preferencing was illegal" during the liability phase). For this reason alone, the Open-Source Auction will be rejected.

Plaintiffs have also failed to meet their burden to prove the technical feasibility of the Open-Source Auction. To support their argument of technical feasibility, Plaintiffs again rely on Google's internal engineering documents from 2023 and 2024, see PRX 50 at -325; PRX 60 at -488 to -490, in which Google evaluated the technical feasibility of "making DFP's auction logic open-source" and concluded that this project was technically feasible. See Rem. Tr. Sept. 25 PM 70:15-24; 74:3-7 (Craycroft (Google)). Plaintiffs assert that this internal analysis, which sought "[t]o create an [open-source] project with code that models DFP's current final auction that decides between indirect demand and direct demand, [and] to do that in the context of working with the industry to define an [Application Programming Interface] or a protocol for DFP to talk to the [open-source] auction so that someone else could build an alternative implementation," id. at 73:6-14 (Craycroft (Google)), "largely mirrors what Plaintiffs have proposed." [Dkt. No. 1810] at 31. Although Google estimated that this project would take four years to complete, Rem. Tr. Sept. 25 PM 82:14-22 (Craycroft (Google)), Plaintiffs assert that by leveraging Google's extensive experience with open-sourcing software, see PRX 124 at 1 (describing Google's Open Source Programs Office and stating that "[a]t Google, open source is at the core of our infrastructure, processes and culture"), Google's internal timelines could be streamlined to complete the open-sourcing project within two years. See Rem. Tr. Sept. 26 163:12-20, 176:17-22, 177:10-14 (Bjedov (Pls. Expert)); Rem. Tr. Sept. 25 AM 14:4-20, 32:24-33:12 (Weissman (Pls. Expert)).

But as Google's witnesses made clear, Google's internal analyses regarding the open-sourcing of DFP's final auction are very different in scope from Plaintiffs' proposed Open-Source Auction. Specifically, Plaintiffs' Open-Source Auction, which includes bid-adjustment functionalities like Billable Event Rate adjustments, functionalities such as Enhanced Dynamic Allocation that decide between direct demand and indirect demand, and optimization functionalities like Reserve Price Optimization and Optimized Pricing Rules, among others, encompasses functionalities that constitute the "heart and soul of any ad server," and goes well beyond the "final auction" of DFP.[22] Rem. Tr. Sept. 29 AM 78:10-18 (Sheffer (Google)); Rem. Tr. Sept. 29 PM 130:18-20 (Berntson (Google)) (testifying that the scope of Plaintiffs' Open-Source Auction "looks an awful lot more to me like the description of a bunch of the core functionalit[ies] of an ad server, not final auction logic"); id. at 36:2-37:11 (Levitte (Google)); Rem. Tr. Sept. 25 PM 120:20-121:5 (Craycroft (Google)).

By contrast, Google's internal analyses considered open-sourcing only a fraction of DFP's functionalities, namely: the comparison between values associated with indirect deals and direct deals, and the final decision-making process given those inputs. Rem. Tr. Sept. 25 PM 110:22-111:4 (Craycroft (Google)); Rem. Tr. Sept. 29 PM 41:14-22 (Levitte (Google)) (explaining that Google's 2024 analysis regarding DFP's open-source auction only looked at "the final auction where [DFP] compares bids at the end," not "all the logic within DFP ad serving"). Google's analyses did not include open-sourcing Enhanced Dynamic Allocation, Billable Event Rate adjustment, Reverse Price Optimization and Optimized Pricing Rules, Filtering Candidate Ads, and Competitive Exclusions, and for good reason. Rem. Tr. Sept. 29 PM 39:13-41:13 (Levitte (Google)); see also PRX 50 at -325. These functionalities require the "aggregate analysis over many, many thousands or millions of auctions," a significant amount of data, to identify optimization opportunities. Rem. Tr. Sept. 25 PM 109:23-110:7 (Craycroft (Google)). For

[22] Google also argues that Plaintiffs' term "final auction logic" is a "newly devised term never discussed until remedies," and asserts that Google does not use this term when describing DFP's decision-making functionalities. [Dkt. No. 1811] at 35; see also Rem. Tr. Sept. 29 PM 133:20-24 (Berntson (Google)) (explaining that "final logic" rather than "final auction logic" was a better descriptor); Rem. Tr. Oct. 2 PM 80:25-81:4 (Nieh (Def. Expert)) ("[T]here's a lot of ambiguity regarding what . . . final auction logic means. And in fact, from what I've heard, a lot of words are being used to describe something, but everybody seems to have a different idea of what it means.").

example, Enhanced Dynamic Allocation requires a seven-day window of historical bid distribution data. Rem. Tr. Sept. 29 PM 140:8-14 (Berntson (Google)). Currently, Google runs the historical bid distribution calculation once a day, a calculation that takes approximately 10 hours running on 4,000 computers. Id. at 140:17-141:3. For "[o]ne call, [and] for one ad request" for one publisher, Google's Engineering Director, Dr. Berntson, estimated that the historical bid distribution calculations required for Enhanced Dynamic Allocation would take between 15 and 45 minutes. Id. at 141:6-21. Google's witnesses explained that, although Plaintiffs' proposed Open-Source Auction can be built, its functionality in practice is not feasible for ad-serving purposes. Id. at 141:22-24; see also Rem. Tr. Sept. 30 AM 11:4-13:1 (Berntson (Google)) (explaining that where the data is stored locally in the publisher ad server and the logic of the Enhanced Dynamic Allocation calculation is open-sourced, the passing of data would not be viable given the volume of data, the extensiveness of the calculations, and the need for real-time processing); Rem. Tr. Oct. 2 PM 81:8-82:4 (Nieh (Def. Expert)). Plaintiffs' portrayal of the Open-Source Auction as a "plug and play" system is therefore a broad oversimplification. See Rem. Tr. Oct. 6 AM 14:9-14 (Wheatland (Daily Mail)); Wheatland PX-1 at 1; see also Rem. Tr. Oct. 6 AM 79:5-80:11 (Nieh (Def. Expert)) (explaining that after taking DFP's source code and open-sourcing it, one cannot expect to "stick these two things back together" without the same technical feasibility issues).

Even assuming the feasibility of the Open-Source Auction, it is unclear whether Plaintiffs' proposal would provide a net benefit to publisher customers. As discussed above, Plaintiffs assert that the Open-Source Auction would provide greater autonomy for publisher customers to choose how their ads are served. See supra Section IV(A). Publisher customers could run the open-source final auction code within their existing ad server, including DFP; by managed service providers such as those that offer a Prebid server today; or by publishers themselves. [Dkt. No. 1810] at 33.

But all these options would—at a minimum—require publishers to regularly evaluate the open-source final auction code and any code updates, placing a potentially unwanted burden on publishers. Rem. Tr. Sept. 25 PM 110:12-15 (Craycroft (Google)); Rem. Tr. Sept. 29 PM 47:20-48:25 (Levitte (Google)); Rem. Tr. Oct. 1 PM 37:14-38:15 (Douglas (wikiHow)) (explaining that as a small publisher, she does not have the resources or time to think about ad serving). Furthermore, publishers that choose to have a service provider manage the open-source final auction code would have to pay a fee to that service provider, which might be cost-prohibitive for smaller publishers. See Rem. Tr. Sept. 26 20:14-21:3 (Racic (Prebid)); Rem. Tr. Sept. 29 PM 49:22-50:4 (Levitte (Google)); Rem. Tr. Sept. 22 PM 137:14-138:12 (Casale (Index Exchange)). And publishers that choose to run the open-source final auction code themselves would have to test, integrate, and run the software on their own. Rem. Tr. Sept. 29 PM 52:22-53:6 (Levitte (Google)) (explaining that "only a few of the largest publishers" would be able to run the open-source final auction code on their own because it is "extremely complex"). In fact, given these considerations, Google ultimately decided against implementing its own version of the open-source project, concluding that its implementation "carries with it a very long timeline to get it designed right, operationalized[,] and tested," and that it would create "an ongoing cost and friction for publishers in exchange for that choice and the transparency that you would get from the auction." Rem. Tr. Sept. 25 PM 111:9-20 (Craycroft (Google)). Accordingly, Plaintiffs' Open-Source Auction remedy is neither appropriate nor reasonable.

3. Contingent Divestiture of DFP Remainder

Plaintiffs' proposed contingent divestiture of DFP Remainder is a flawed remedy for the same reasons the Court finds the other divestiture proposals flawed. First, contingent divestiture of the entirety of DFP Remainder would exceed the scope of the liability findings because DFP transacts more than open-web display ads. RDTX 899; see also Rem. Tr. Oct. 1 AM 143:8-144:6

(Lerner (Def. Expert)) (testifying that the contingent DFP Remainder divestiture would include "divestitures of types of ads . . . that were not implicated by the Court's findings" and that the divestiture "would have an adverse effect on those segments of the business even though there was no anticompetitive conduct that was found related to [them]"). Second, Plaintiffs have failed to show that the contingent divestiture of DFP Remainder is commercially and technically feasible. As with AdX divestiture, Plaintiffs' proposal regarding DFP Remainder lacks critical commercial details regarding asset scoping that renders the proposal uncertain and therefore infeasible. Rem. Tr. Oct. 1 AM 10:8-25 (Goodwin (Def. Expert)); see also Goodwin DX-2, DX-3. Plaintiffs' proposing the possibility of having multiple buyers for DFP Remainder exacerbates commercial uncertainty. Rem. Tr. Oct. 1 AM 20:1-13 (Goodwin (Def. Expert)) ("[I]t's unclear to me, and it's certainly unclear to . . . buyers, how . . . the allocation of those customers [would] be assigned between the different DFP Remainders, DFP 1 or 2 or 3. Obviously a buyer is going to be more interested in the quality of their customers, and there will be some natural tension between how that allocation would actually work."). Plaintiffs' argument of technical feasibility is also undermined by the complex integration of DFP with Google's proprietary infrastructure. See supra Section IV(A)(1) (discussing similarly for AdX).

Lastly, equivalent functionality following the contingent divestiture of DFP Remainder would not be guaranteed. See, e.g., Rem. Tr. Oct. 2 PM 76:1-17 (Nieh (Def. Expert)); Rem. Tr. Sept. 25 AM 99:2-9 (Weissman (Pls. Expert)). In particular, where DFP currently provides its services for free to over 90 percent of its publisher customers, RDTX 895, the possibility that costs will increase for publishers following divestiture is very real, see Rem. Tr. Sept. 22 PM 138:7-12 (Casale (Index Exchange)); Rem. Tr. Sept. 23 PM 48:4-6 (Friedman (Goodway)); Rem. Tr. Sept. 29 AM 99:5-15 (Sheffer (Google)). Having concluded that none of Plaintiffs' proposed structural remedies will be granted, the parties' proposed behavioral remedies, most of which "substantially overlap," will be addressed. Rem. Tr. Nov. 21 AM 45:22-46:2 (Def. Closing Arg.); Google's Rem. Closing Arg., at slide 80.

B. Behavioral Remedies

In general, the parties' proposed behavioral remedies include: (1) an injunction against the specific conduct the Court found anticompetitive in the liability phase; (2) interoperability provisions that would require Google to integrate AdX with both rival publisher ad servers and Prebid, and integrate DFP with Prebid; (3) data-sharing remedies; (4) prohibitions against discriminatory bidding behavior; and (5) buyside remedies regulating AdWords and DV360. Because both parties largely agree that such behavioral remedies are necessary, the Court will adopt them, as modified below, in its Final Judgment.[23]

1. Injunctive Relief

The parties propose an injunction that would enjoin Google from "enforc[ing] any policies or contract terms" that tie DFP to AdX, Google's PFJ § III(2); Plaintiffs' PFJ § X(I), conduct the Court found unlawful under the Sherman Act, Google, 778 F. Supp. 3d at 859-864. Google would also be barred from reimplementing First Look and Last Look functionality, and would be required to deprecate and not reimplement Unified Pricing Rules in DFP for all indirect transaction types.

[23] Although the parties agree broadly on proposed behavioral remedies, they provide slightly differing timeframes regarding when such remedies can be implemented. For example, Plaintiffs' PFJ would require that Google establish interoperability between DFP and Prebid within 18 months; however, Google has committed to providing such interoperability within 12 to 15 months. Compare Plaintiffs' PFJ § IX(C), with Google's PFJ §§ III(3)(b)-(c). Where Google's timeframe is shorter than Plaintiffs' timeframe, the Court will defer to Google, as its engineers are "intimately familiar with the products at issue." [Dkt. No. 1811] at 1. Where Google's timeframe is longer, the Court will task the parties with meeting to try to reach mutually agreeable timeframes. Compare Plaintiffs' PFJ § IX(B) (requiring Google to establish AdX-publisher ad server interoperability within 6 months), with Google's PFJ § III(1)(a) (requiring a similar interoperability function to be completed within 12 months).

Google's PFJ §§ III(3), (4); see also Plaintiffs' PFJ § X(J). Google also proposes provisions that prevent circumvention of this injunctive remedy. Specifically, under Google's PFJ, Google will allow publishers to set different floor prices across multiple buying tools and ad exchanges and will not provide a discount on DFP fees in exchange for a publisher's agreement to set uniform prices across all demand sources. Google's PFJ §§ III(4)(a)-(b).[24] These policies were found to have anticompetitive effects in the ad exchange market because they entrenched AdX's monopoly power and allowed Google to "charge[] durable supracompetitive prices for AdX." Google, 778 F. Supp. 3d at 852. Furthermore, Google would be prohibited from implementing any policies or contract terms that would effectively recreate the AdX-DFP tie. Google's PFJ § III(2); Plaintiffs' PFJ § X(I).

It is undisputed that the proposed injunction is an important first step towards restoring competition in the relevant markets, especially as the "ordinary starting point" for a court's antitrust remedy "is an injunction terminating the anticompetitive conduct." Google Search, 803 F. Supp. 3d at 68 (citing Ford, 405 U.S. at 575). These prohibitions directly address the unlawful AdX-DFP tie, and certain aspects of DFP's auction logic that favored AdX to the detriment of rival ad exchanges. Google, 778 F. Supp. 3d at 859-865. Furthermore, these provisions, taken together, will help to restore competition among ad exchanges and exert a downward pressure on AdX's supracompetitive take rate, a fruit of Google's unlawful conduct. See supra Section III(B)(3); see also Rem. Tr. Oct. 1 AM 133:13-21 (Lerner (Def. Expert)). For example, based on

[24] Plaintiffs' Post-Trial Brief, relying on a prior version of Google's PFJ, argues that Google's proposal would leave its ad exchange monopoly intact because it "would permit Google to continue to engage in First Look, Last Look, and [Unified Pricing Rules] for all transactions not sold by open auction," [Dkt. No. 1810] at 38-39; however, Google has resolved that concern in its post-trial PFJ by expanding this prohibition to include all indirect transaction types. See Google's PFJ §§ III(3), III(4), VI(OO).

the calculations of Plaintiffs' liability expert, Dr. Tim Simcoe, the elimination of Unified Pricing Rules alone would reduce AdX's take rate from 20% to approximately 16.6%, a rate comparable to what is charged by some of AdX's competitors. See Liab. Tr. Sept. 18 PM 16:23-17:11, 32:16-20 (Simcoe (Pls. Expert)); Rem. Tr. Oct. 2 PM 31:22-32:8 (Lerner (Def. Expert)); Lerner DX-12 (showing that AdX's 16.6% take rate with the elimination of Unified Pricing Rules is comparable to those of other ad exchanges). Plaintiffs have acknowledged that these provisions "would absolutely address our concern about the prior illegal conduct." Hr'g Tr. May 2 AM at 35:14-16; see also [Dkt. No. 1435] at 13. Accordingly, the parties will be ordered to meet and confer to work out the specific language of the injunction consistent with this Memorandum Opinion and present one agreed upon version for the Final Judgment.

2. Interoperability and Data-Sharing Remedies

The parties' proposed behavioral remedies go beyond the enjoining of anticompetitive conduct and prescribe affirmative, forward-looking remedies that seek to "eliminat[e] the consequences of [Google's] illegal conduct." NSPE, 435 U.S. at 698. Plaintiffs and Google propose substantially similar interoperability and data-sharing remedies, which seek to ensure the severance of the AdX-DFP tie. These include: (1) interoperability of AdX and DFP with Prebid; (2) interoperability of AdX and rival publisher ad servers; and (3) data-sharing of a publisher's DFP and AdX bid data. Additionally, in response to concerns raised by Plaintiffs regarding the lack of transparency surrounding DFP's decision-making algorithms, Google proposes to provide technical documentation of DFP's final auction logic to all publishers. Google's PFJ § III(5). Each remedy will be discussed in more detail below.

a. AdX and DFP Interoperability with Prebid

Both Plaintiffs and Google would require Google to build technological integrations of AdX and DFP with header bidding software published and promoted by Prebid. See Plaintiffs'

PFJ §§ IX(A), (C); Google's PFJ §§ III(1)(b), III(3)(b)-(c). Prebid is a consortium of "non-Google industry members and open-source advocates" that developed header bidding, a technical solution that allows "publishers using DFP to solicit real-time bids from multiple ad exchanges." Google, 778 F. Supp. 3d at 828. Currently, publishers using Prebid's header bidding software insert a "string of code into the header of its webpage to solicit bids from multiple ad exchanges and hold fair auctions for the publisher's inventory outside of Google's technical architecture." Id. "The winning bid in a header bidding auction [is] placed into DFP as a floor price against which AdX [will] compete." Id. Prebid's header bidding solution, which is open-sourced, has had great appeal among publishers because it encourages publisher transparency and control by enabling publishers to examine the Prebid auction to "see transparently what's happening and understand fundamentally why [they are] winning . . . [or] losing." Rem. Tr. Sept. 26 10:5-8 (Racic (Prebid)). Publishers can then use that information to optimize their business operations. See id. at 10:5-14, 29:9-16; see also PRX 103 at 3 (Prebid's Code of Conduct, which emphasizes transparency as one of Prebid's core values). Since 2015, Prebid has "dramatically increase[d] publisher revenue" and has "achieved widespread adoption by large publishers"; however, Google declined to have AdX participate with Prebid, viewing it as a threat to its revenue model. Google, 778 F. Supp. 3d at 828 (alteration in original) (internal quotation marks and citations omitted).

Both parties have submitted proposals requiring that Google give publisher-customers the choice to use Prebid, which would separate DFP from AdX. Specifically, Google will be required to create and implement an Application Programming Interface between AdX and Prebid that will enable Prebid to solicit real-time bids from AdX for all indirect open-web display ad inventory. Plaintiffs' PFJ § IX(A); Google's PFJ § III(1)(b)(1). Google must also create and implement an Application Programming Interface and a server-to-server connection between DFP and Prebid, enabling DFP publisher-customers to route all indirect demand, as well as all programmatic direct demand (which includes programmatic guaranteed transactions and preferred deals) through Prebid.[25] Plaintiffs' PFJ § IX(C); Google's PFJ §§ III(3)(a)-(c); see also Rem. Tr. Sept. 25 PM 91:20-92:14, 101:24-102:12 (Craycroft (Google)); Rem. Tr. Sept 29 AM 94:10-20, 94:21-95:21 (Sheffer (Google)). The Prebid integrations must operate in a "functionally equivalent manner and on materially identical terms as DFP currently interoperates with and solicits bids from AdX." Plaintiffs' PFJ § IX(C); see also Google's PFJ §§ III(3)(b), III(9) (requiring that Google not introduce additional latency and pass the same information to Prebid that AdX passes to buying tools). Google goes further by agreeing to provide reasonable technical support to Prebid to ensure that publishers are able to utilize the Prebid integrations, Google's PFJ §§ III(3)(b)-(c), and to build tools that will enable publishers to make a mutually exclusive choice to call AdX either from Prebid or directly from DFP. Id. § III(1)(b)(2); see also Rem. Tr. Sept. 25 PM 98:9-100:1, 141:9-18 (Craycroft (Google)) (explaining that this commitment would prevent publishers from making simultaneous or sequential calls to AdX from DFP, a concern voiced by Plaintiffs during the remedies trial).

The AdX and DFP integrations with Prebid would provide publisher customers with much-

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[25] In response to Plaintiffs' concerns, Google has updated its PFJ to include all indirect demand—which encompasses both private auction and open auction deals—as well as all programmatic direct demand, within the scope of its Prebid interoperability remedies. Google's PFJ §§ III(3)(a)-(c), VI(OO). This would effectively enable the final auction to occur in Prebid, apart from the final comparison between indirect and direct deals that are inputted by the publisher into the publisher ad server. See Rem. Tr. Nov. 21 AM 56:10-23 (Def. Closing Arg.); see also Google's Rem. Closing Arg., at slide 24. To the extent that Plaintiffs would require non-programmatic direct deals to be included in the Prebid interoperability remedies, this argument misunderstands Prebid's mechanics. As Michael Racic, the President of Prebid, explained during his remedies phase testimony, direct deals "shouldn't be part of the final auction logic. . . . [They should not] enter into any auction at all because there's no reason for [them] to be in an auction because it's already an agreed-upon price." Rem. Tr. Sept. 26 122:17-123:23 (Racic (Prebid)); see also id. at 124:20-25.

needed transparency and control. First, integrating AdX and DFP with Prebid would "put control in publishers' hands and outside Google," [Dkt. No. 1811] at 14, by allowing publishers the choice to have Prebid—not DFP—run the "single head-to-head clearing auction" that selects a winner among all indirect and programmatic direct demand. Rem. Tr. Sept. 25 PM 91:21-92:10 (Craycroft (Google)); see also Rem. Tr. Oct. 3 PM 20:12-22 (Layser (Amazon Web Services)) (testifying that "Prebid enables the publisher to take back control of its ad tech stack"); [Dkt. No. 1435] at 13-14 (Plaintiffs asserting that interoperability with Prebid "is needed to begin restoring competition and shifting control away from Google and toward publishers"). Unlike the "black box nature" of DFP's final auction logic, the Prebid auction "gives publishers full transparency into the logs of everything that happened inside header bidding," Rem. Tr. Oct. 3 PM 36:5-36:8 (Layser (Amazon Web Services)), and allows publishers to "see how pricing works" and "how the auction works," Rem. Tr. Sept. 25 PM 92:7-10 (Craycroft (Google)).

That transparency would also provide publishers with control over the auction analysis and implementation of auction optimizations. See id. at 92:11-14 (explaining that the AdX and DFP integrations with Prebid would allow publishers to "do various optimizations in terms of price discovery and yield optimization, like setting reserve prices differently across different demand types or demand sources in one place, in Prebid"). Furthermore, at least one publisher-witness testified at trial that in addition to increased control and transparency for publisher-customers, the parties' proposed Prebid integration would also help to "give publishers the option to switch [publisher] ad servers" and lower switching costs. Rem. Tr. Oct. 3 PM 25:18-26:7 (Layser (Amazon Web Services)).

The AdX and DFP Prebid integrations would also enforce DFP's neutrality between AdX and other ad exchanges, and would restore competition in the ad exchange market. See Rem. Tr.

Sept. 22 PM 20:1-14 (Whitmore (Advance Local)) ("Google [cannot] put their thumb on something in the Prebid software in order to affect the outcome of that auction of auctions in Prebid, . . . [and cannot] use Prebid software to favor AdX."). During the remedies trial, Plaintiffs' ad exchange witnesses explained that the AdX-Prebid integration, in which AdX would compete against other ad exchanges, would "relinquish any advantage that AdX might benefit from today by being a part of DFP" because Prebid is a "fair" auction "whereby . . . everything is effectively in the open and inspectable." Rem. Tr. Sept. 22 PM 57:10-20 (Casale (Index Exchange)). This result would be reinforced by the DFP-Prebid integration, which would eliminate AdX's information asymmetry. Specifically, under the parties' proposed DFP-Prebid integration, DFP would be required to share all of the pricing information, including the pricing of direct-sold campaigns, and Google audience data that it currently only shares with AdX, to all participants in the Prebid auction, allowing rival ad exchanges to compete at parity with AdX. Plaintiffs' PFJ § IX(C); Google's PFJ §§ III(3)(a)-(c), III(9); see Rem. Tr. Sept. 30 PM 44:9-46:21 (Goel (PubMatic)). The elimination of AdX's information asymmetry, in turn, would neutralize AdX's win-rate advantage. See Rem. Tr. Sept. 30 PM 46:16-21 (Goel (PubMatic)); see also Rem. Tr. Sept. 22 PM 69:10-17 (Casale (Index Exchange)) ("[T]his would simply put us at parity, which would effectively mean any ad slot that AdX had available to it, we would have available to Index. Any data that AdX had available to it, we would have available on Index."). The parties' Prebid interoperability proposals would also accelerate ongoing market trends around the growing popularity of header bidding, leading to restored competition in the ad exchange market. See Rem. Tr. Sept. 22 PM 148:4-149:9 (Casale (Index Exchange)) (explaining that under the AdX-Prebid integration, AdX will be competing in a "hyper-competitive" Prebid auction where publishers "can quickly shift from one ad exchange to another based on performance," leading to lower exchange take rates and higher publisher revenues); Rem. Tr. Sept. 24 AM 98:10-99:17 (Lee (Pls. Expert)) (testifying that "[t]he multi-homing that header bidding makes easier can intensify competition and reduce market power").

The integrations with Prebid will help to restore competition in the publisher ad server market as well. Because there is a "self-reinforcing effect" between the ad exchange markets and the publisher ad server markets, "re-establishing competition in the [ad] exchange market, which would allow rival [ad] exchanges to grow, . . . would have the impact of helping to re-establish competition in the publisher ad server market and enable rival publisher ad servers to gain share." Rem. Tr. Oct. 1 AM 138:20-139:14 (Lerner (Def. Expert)).

Finally, the Prebid integrations would also restore competition in the publisher ad server market in a more direct manner. As Plaintiffs' economic expert Professor Lee explained, AdX and DFP interoperability with Prebid would provide non-DFP publisher ad servers greater access to real-time bids from AdX and AdWords demand. Rem. Tr. Sept. 24 AM at 96:7-97:4 (Lee (Pls. Expert)). In light of these findings, the Court agrees with both parties that the AdX-Prebid and DFP-Prebid interoperability remedies "represent[] a reasonable method of eliminating the consequences of the illegal conduct." NSPE, 435 U.S. at 698; accord Bausch & Lomb, 321 U.S. at 726 ("The test is whether or not the required action reasonably tends to dissipate the restraints and prevent evasions.").

b. AdX Interoperability with Rival Publisher Ad Servers

In addition to requiring the implementation of AdX and DFP interoperability with Prebid, both parties propose that Google build a technological integration between AdX and rival publisher ad servers, enabling AdX to submit real-time bids to rival publisher ad servers "in the same manner it currently submits real-time bids to DFP" for all indirect demand.[26] Plaintiffs' PFJ § IX(B); see also Google's PFJ § III(1)(a). Google further commits to providing "reasonable technical support" to rival publisher ad servers to enable them to integrate with AdX. Id.

The parties' proposals directly respond to the central competitive injury identified during the liability trial: that publishers' inability to access AdX's real-time bids through other publisher ad servers stifled fair competition in the relevant ad tech markets. See Google, 778 F. Supp. 3d at 861. For example, Plaintiffs' liability-phase publisher-witnesses largely testified to being tied to using DFP as their publisher ad server despite receiving offers from other publisher ad servers to cut ad serving fees in half, Liab. Tr. Sept. 9 AM 75:23-76:8 (Wolfe (Gannet)), or being dissatisfied with Google's decisions to implement anticompetitive policies within DFP, such as Unified Pricing Rules, Liab. Tr. Sept. 27 AM 71:9-24 (Wheatland (Daily Mail)), because they needed "access to AdX demand," id.; see also Liab. Tr. Sept. 9 AM 77:8-13 (Wolfe (Gannett)) (testifying that there were no "alternative ways for using programmatic display advertising for Gannett to get access to that demand from [AdWords] other than using Google's ad exchange").

Furthermore, Plaintiffs' liability-phase publisher ad server witnesses testified that their inability to access real-time bids from AdX made it difficult to compete with DFP. See, e.g., Liab. Tr. Sept. 13 PM 65:7-25 (Creput (Equativ)) (testifying that the "main reason Equativ lost large media publisher ad server clients to Google's DFP" was because they "didn't have access to Google AdX"). As the Court's liability opinion explained, some publisher ad servers ultimately

[26] As discussed above, Google has expanded the scope of its interoperability remedies to include all indirect demand, which includes both open auction and private auction transaction types. See Google's PFJ § VI(OO). This expansion of scope directly addresses concerns voiced by Plaintiffs and their witnesses during the remedies trial. See [Dkt. No. 1810] at 40 (arguing that "Google's proposals do not address the incentives of publishers to switch and rivals to enter or expand" because Google had excluded categories of impressions, such as private auctions, from its remedies proposals).

decided to leave the business entirely because of their inability to access Google demand. Google, 778 F. Supp. 3d at 851; see Liab. Tr. Sept. 13 PM 129:14-21 (Boland (Facebook)); Liab. Tr. Sept. 17 PM 50:4-52:12 (Cardogan (OpenX)).

During the remedies trial, publisher witnesses confirmed that providing access to AdX real-time bids outside of DFP would address their concerns by facilitating their ability to switch publisher ad servers. Rem. Tr. Sept. 22 PM 22:17-21 (Whitmore (Advance Local)) (testifying that if publisher ad servers could access "unique Google demand in the same way that DFP accesses AdX," then "that would be something that publishers would investigate as an alternative"); Rem. Tr. Oct. 3 PM 25:18-20 (Layser (Amazon Web Services)) (explaining that "if AdX provided [real-time bids] to other ad servers," the AdX-DFP "tie could be broken"). Plaintiffs' publisher ad server witnesses further affirmed that equal access to AdX demand would allow them to fairly compete with DFP. See, e.g., Rem. Tr. Sept. 23 AM 10:21-11:9 (Avery (Kevel)) ("[T]he key thing that I think enables us to compete in the publisher ad server market is if we can get demand directly from AdX in a fair way.").

Giving rival publisher ad servers access to AdX real-time bids is therefore "directly tied to the theory of liability in this case." Google Search, 803 F. Supp. 3d at 110. Indeed, the parties' proposals would incentivize rival publisher ad servers to compete for publisher business and allow publishers to use the ad server of their choice to access AdWords demand through AdX, thereby eroding DFP's market share. See Rem. Tr. Oct. 1 AM 139:15-140:4 (Lerner (Def. Expert)). And, as discussed above, the "self-reinforcing" nature of the ad tech markets means that increased competition in the publisher ad server market will also drive competition in the ad exchange market. See id. at 139:4-14; Rem. Tr. Sept. 24 AM 47:24-48:25 (Lee (Pls. Expert)) ("[I]f the publisher ad server market is more competitive and customers are more able to choose more attractive DFP alternatives, then DFP would be constrained in its ability to degrade certain quality features that make it harder for customers to choose other ad exchanges in a manner similar to [Unified Pricing Rules.]"). This access, in conjunction with the parties' other interoperability remedies, will allow rivals to gain customers, scale, and data, and further optimize and improve their own products.

c. Data-Sharing Remedies

To complement the interoperability remedies discussed above, both parties also propose data-sharing provisions, which would require Google to provide publishers with historical and configuration data from DFP, as well as ongoing AdX bid data. Google's PFJ §§ III(1)(g)-(h); Plaintiffs' PFJ §§ IX(D)-(E). Google would also have to enable publishers to export that data to rival publisher ad servers, through the creation of an Application Programming Interface. Google's PFJ §§ III(1)(g)-(h); Plaintiffs' PFJ § IX(D)-(E). Google has also committed to publish sufficient documentation enabling publisher ad servers to understand and import the aforementioned data into their systems, and to provide reasonable technical support to publisher ad servers as needed. Google's PFJ §§ III(1)(g)(2), (h). The rationale for these remedies is directly tied to the key liability finding that Google's unlawful AdX-DFP tie and subsequent leveraging of its tied ad tech tools to engage in a series of anticompetitive acts allowed Google to secure a sizeable scale advantage over its rivals.

Because Google's data and scale advantages are among the "fruits of its statutory violation," United Shoe, 391 U.S. at 250, the Court finds that data-sharing "represents a reasonable method of eliminating the consequences of the illegal conduct," NSPE, 435 U.S. at 698. Furthermore, as Judge Mehta found in Google Search, data sharing "is 'well within the range of ordinary Sherman Act remedies.'" 803 F. Supp. 3d at 108 (quoting Herbert Hovenkamp, Antitrust and Platform Monopoly, 130 Yale L.J. 1952, 2011 (2021) ("[I]nformation pooling . . . could permit the emergence of more evenly competitive firms undermining scale economics, and could actually increase the range of positive network effects.")).

Although data-sharing would not provide rivals with immediate comparable scale, see Rem. Tr. Sept. 22 AM 101:3-102:11 (Whitmore (Advance Local)); Rem. Tr. Sept. 23 PM 92:20–93:16, 93:22–94:22 (Dederick (The Trade Desk)), both Plaintiffs and Google have acknowledged that data-sharing will help to foster competition in the publisher ad server market by "alleviat[ing] informational barriers to publisher switching," see [Dkt. No. 1810] at 13-14; [Dkt. No. 1811] at 11-12. As the liability opinion found, publisher ad servers are "sticky products that take a lot of work to change." Google, 778 F. Supp. 3d at 851 (internal quotation marks and citation omitted); see Rem. Tr. Sept. 29 AM 15:22-24 (Creput (Equativ)) (explaining that a "challenge for Equativ to compete . . . on the DFP server market . . . is the complexity of an ad server migration from our publisher"). The parties' proposed remedies requiring Google to share publisher data would therefore improve rival publisher ad servers' ability to compete because "[t]he ability to . . . easily move [publisher] data to another ad server . . . removes some of the friction in [a publisher's decision] to move from . . . DFP to [a non-DFP publisher ad server.]" Rem. Tr. Sept. 23 AM 21:21-22:1 (Avery (Kevel)).

Furthermore, under the parties' proposed remedies, Google would also be required to make AdX bid data, including all winning and losing bid data for each auction in AdX, available to publishers. Google's PFJ § III(1)(h); Plaintiffs' PFJ § IX(E). This would arm rival publisher ad servers with crucial information needed to "provide publishers with analytics . . . as to the value of their inventory, and offer optimization opportunities that the publisher might act on." Rem. Tr. Sept. 25 PM 95:23-96:23 (Craycroft (Google)). Accordingly, data-sharing remedies can help close the sizeable data and scale gap that Google currently enjoys and allow "rival publisher ad servers a fair chance to compete on the merits in the future to win additional scale advantages of their own." [Dkt. No. 1810] at 14.

The parties disagree about the precise scope of the data-sharing remedy. Google's data portability provisions apply only to open-web display ads, Google's PFJ §§ III(1)(g)-(h), VI(D), VI(W), VI(EE)-(GG); however, Plaintiffs would require Google to share all available publisher data and configurations, Rem. Tr. Nov. 21 AM 17:13-18 (Pls. Closing Arg.); see [Dkt. No. 1810] at 40. According to Plaintiffs, "publishers need adequate information to meaningfully evaluate a potential switch from DFP to another ad server," and "Google's proposal . . . would not provide that necessary information—including data about video or in-app ads—which would hamper publishers' ability to switch publisher ad servers." [Dkt. No. 1810] at 40 (citing Rem. Tr. Oct. 3 AM 26:21-27:10, 29:1-22 (Layser (Amazon Web Services))).

Plaintiffs' data-sharing remedy is rejected because it is overly broad and is not "tailored to fit the wrong creating the occasion for the remedy." Microsoft I, 253 F.3d at 107. The "wrong" committed by Google was rooted in a "series of anticompetitive acts to acquire and maintain monopoly power in the publisher ad server and ad exchange markets for open-web display advertising." Google, 778 F. Supp. 3d at 873. Although the liability opinion acknowledged that "digital advertising is not limited to open-web display advertising," it defined the relevant monopolized markets as "limited to tools that facilitate open-web display transactions" and rejected ad formats such as instream video, mobile app, and social media ads as out-of-scope. See id. at 835, 839, 842. Furthermore, Plaintiffs never alleged any unlawful conduct relating to non-open-web display ad formats. Indeed, Plaintiffs' liability-phase arguments were built on the premise "that open-web display advertising is a distinct form of digital advertising that is not reasonably interchangeable with other forms of advertising." [Dkt. No. 1380] at ii; see Google at

778 F. Supp. 3d at 835, 839. Plaintiffs cannot now abandon that distinction to argue for behavioral remedies that apply across all ad formats and channels, as this would go beyond "the same type or class" of conduct that has been found unlawful. See Zenith Radio Corp. v. Hazeltine Rsch., Inc., 395 U.S. 100, 132 (1969).

d. DFP Technical Documentation

Google has agreed to provide "DFP technical documentation" to all publishers. Google's PFJ § III(5). Specifically, Google would provide:

> DFP technical documentation explaining and a data file showing, for each ad served, the ad candidate prices and any price adjustments used in executing the DFP "final logic" to select the ad that is served, for example, the price(s) of any direct deals considered, any programmatic bids considered, and any bid adjustments applied and the category of adjustment made.

Id.

In other words, Google proposes to provide "technical documentation with examples of source code that then explain how everything works," along with a comprehensive "file" explaining all of the data analyzed by DFP in serving an ad to a publisher, and how a winner was selected for a given ad request. Rem. Tr. Sept. 29 PM 143:12-144:23 (Berntson (Google)); Rem. Tr. Sept. 30 AM 10:9-11 (Berntson (Google)). As Dr. Berntson, Google's Engineering Director, explained, the data that Google would provide to publishers includes:

> [A]ll of the reservation campaigns, [including] all of the bids from all of the different bidders submitting bids into our systems [when Google receives an ad request]. All of the information at that point in terms of when we're actually choosing which ads to serve, which is the [Enhanced Dynamic Allocation] price that represents the top pick in terms of the reservation ad, every bid submitted by every bidder. If the bid is associated with a deal, what the priority of that deal is and therefore the implied boost that's used to choose that ad. If [Billable Event Rate] is being applied, what the [Billable Event Rate] value is. And all of that data associated with that one instance of serving an ad back to the publisher, along with an explanation as to which is the winner and why was it selected.

Rem. Tr. Sept. 29 PM 151:7-152:10 (Berntson (Google)).

According to Google, this remedy would directly address Plaintiffs' concerns regarding the lack of transparency surrounding the "black box" nature of DFP's final auction logic. [Dkt. No. 1811] at 34-35; see Rem. Tr. Sept. 22 AM 65:13-67:4, 70:5-13 (Whitmore (Advance Local)); Rem. Tr. Sept. 22 PM 59:6-16 (Casale (Index Exchange)); Rem. Tr. Sept 23 AM 116:23-117:11 (Lambert (Omnicom)); see supra Section III(B)(1). Google further asserts that providing DFP technical documentation, as an alternative to Plaintiffs' proposal to open-source DFP's final auction logic, would be a more accessible remedy. Rem. Tr. Sept. 30 AM 9:14-10:15, 29:5-30:1 (Berntson (Google)) ("[T]here's a subset of publishers, probably most of our publishers, who wouldn't really be able to leverage that [open-sourced] source code to get an understanding of how our systems work. . . . I would argue that [Google] providing detailed technical documents that then describe in plain English how [its] systems work, including reference[s] to . . . key algorithms, is probably going to be more accessible to more people, whether you're talking about publishers or partners or third-party ad servers.").

Google's proposal is reasonable. During the remedies trial, Plaintiffs' witnesses largely testified to the benefits of much-needed transparency into DFP's decision-making algorithms, which would "restore trust via accountability in the ad exchange market," Rem. Tr. Sept. 30 PM 42:14-43:11 (Goel (PubMatic)), and provide ad exchanges with the confidence that they are competing in a "completely fair" final auction, Rem. Tr. Sept. 22 PM 62:24-63:19 (Casale (Index Exchange)). That transparency would allow "downstream companies" to "understand exactly how [DFP] functions." Rem. Tr. Oct. 3 AM 43:11-23 (Layser (Amazon Web Services)). This transparency will "restore innovation to the [ad tech] space." Id. Google's commitment to provide DFP technical documentation would allow publishers to "validate whether or not DFP is doing the right thing in this process of selecting an ad to serve for the publisher" without introducing the feasibility challenges of an Open-Source Auction. Rem. Tr. Sept. 29 PM 144:24-145:10 (Berntson (Google)). Plaintiffs do not dispute that DFP technical documentation would restore transparency to the ad tech industry; however, they raise two objections to Google's remedy.

First, Plaintiffs argue that Google's remedy is an insufficient alternative to the open-sourcing of DFP's final auction logic because it "doesn't let a rival publisher ad server kickstart a new business." Rem. Tr. Nov. 21 AM 99:21-100:4 (Pls. Closing Arg.); accord Rem. Tr. Sept. 24 AM 45:22-46:5 (Lee (Pls. Expert)); Rem. Tr. Oct. 6 AM 19:10-17 (Wheatland (Daily Mail)). The liability opinion did not discuss DFP's final auction logic as a form of anticompetitive conduct contributing to Google's unlawful publisher ad server monopoly; therefore, it "cannot be utilized to justify specific remedial provisions." Microsoft II, 224 F. Supp. 2d 76 at 138; see supra Section IV(A)(2). Accordingly, Plaintiffs' argument is rejected.

Second, Plaintiffs argue that Google's remedy lacks sufficient specificity to test its efficacy. See Rem. Tr. Nov. 21 AM 99:25-100:3 (Pls. Closing Arg.) ("We don't know what those technical documents are, we don't know how often they're provided, we don't know the format they're provided, and we don't know what publishers can do with them."). Although a court's remedies decree must "be as specific as possible," Int'l Salt, 332 U.S. at 400, the lack of particulars is not fatal because a court may "rely on the Technical Committee to 'facilitate the resolution of potentially complex and technologically nuanced disputes between [the parties] over the practical workings of' the [F]inal [J]udgment." Google Search, 803 F. Supp. 3d at 127-28 (quoting Microsoft III, 373 F.3d at 1244). For this reason, Plaintiffs' contention that the DFP technical documentation remedy is "too vague to adopt and implement" is rejected. Id. at 128. The parties will be ordered to meet and confer to come up with more specific parameters for this remedy, with the understanding that the appointment of a Monitor and Technical Committee as part of the Final

Judgment will provide a mechanism to assist the parties in devising an agreed-upon approach that defines the format of the DFP technical documentation and frequency of disclosure. That will be the best vehicle for addressing the ad tech industry's call for transparency.

3. Non-Discriminatory Bidding Behavior

The parties propose anti-discrimination provisions designed to prevent Google from circumventing the proposed relief, and to foreclose other forms of monopolistic conduct that would recreate the unlawful AdX-DFP tie. Specifically, Google must ensure that it uses or passes data signals on a non-discriminatory basis—i.e., regardless of whether Google's ad tech tools are involved in a given transaction. Plaintiffs' PFJ § X(E); Google's PFJ §§ III(1)(f), III(3)(b), III(9)-(10). Furthermore, AdX and DFP must operate on a non-discriminatory basis. AdX must pass bids to publisher ad servers and header bidding auctions, including Prebid, without regard to whether such ad tech tools are owned by, or affiliated with, Google. See Plaintiffs' PFJ § X(G); Google's PFJ §§ III(1)(c)-(f), III(10) (requiring Google to not vary the AdX revenue share, introduce additional latency, reduce the frequency with which it responds to bid requests, or reduce the information transmitted by AdX based on whether a publisher is using DFP, a non-Google ad server, or Prebid); Rem. Tr. Sept. 25 PM 92:19-93:9 (Craycroft (Google)). And DFP must "serve ads according to Publishers' preferences and directions and without regard to whether the winning bid is from a Google product." Plaintiffs' PFJ § X(F); accord Google's PFJ §§ (III)(3), III(5), III(9) (requiring Google to provide technical documentation and data files explaining DFP's decision-making process, refrain from introducing additional latency, and pass the same information to non-Google ad exchanges or Prebid that AdX passes to buying tools).[27] Plaintiffs would also require

[27] In their Post-Trial Brief, Plaintiffs argue that Google's proposed remedies are insufficient because they "leave[] myriad paths to Google providing preferential access to AdX . . . demand through DFP," and that "Google's incentive to exploit those avenues would remain." [Dkt. No. 1810] at 39. Google has since updated its PFJ to address these concerns. Compare [Dkt. No. 1664-

that Google "not seek, offer, or accept any compensation or other remuneration for preferentially routing any indirect demand for open-web display ad inventory to any open-web display ad exchange or any open-web display publisher ad server." Plaintiffs' PFJ § X(D) (citation modified).

As both parties recognize, the anti-discrimination policies are complementary behavioral remedies "designed to prevent Google from distorting the competitive process in new ways," and "to close off the 'untraveled roads'" that might allow Google to recreate its unlawful ad tech monopolies. [Dkt. No. 1435] at 15 (quoting Int'l Salt, 332 U.S. at 400); accord Rem. Tr. Nov. 21 AM 50:9-13 (Def. Closing Arg.) ("[N]o similar practices likely to result in monopolization in the future will remain because of the proposed . . . anti-discrimination provisions, strict anti-circumvention measures which speak specifically to every concern that Plaintiffs have raised."); Google's Rem. Closing Arg., at slides 33-34 (demonstrating how Google's proposed anti-discrimination remedies would address Plaintiffs' concerns regarding future Google behavior that may circumvent relief). Accordingly, the anti-discrimination policies, including Plaintiffs' proposed prohibition against preferential routing, would help to "ensure that there remain no practices likely to result in monopolization in the future," United Shoe, 391 U.S. at 250, by prohibiting conduct "of the same type or class as [the] unlawful acts which the Court has found to have been committed or whose commission in the future unless enjoined, may fairly be anticipated from the defendant's conduct in the past," NLRB v. Express Publ'g Co., 312 U.S. 426, 435 (1941).

Despite the overall agreement regarding the need for anti-discrimination provisions, each party has pointed out ambiguities in the other's proposal. For example, Google has argued that Plaintiffs' "Non-Discriminatory Use of Data Signals" provision, Plaintiffs' PFJ § X(E), is

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1], with [Dkt. No. 1811-2]; see Rem. Tr. Nov. 21 AM 49:9-13 (Def. Closing Arg.); Google's Rem. Closing Arg., at slides 33-34.

impermissibly vague because "it doesn't enumerate a very specific list of things" and does not allow for exceptions related to "spam or fraud," Rem. Tr. Sept. 25 PM 128:15-129:10 (Craycroft (Google)). To rectify this defect, Google has proposed "clarified versions" of these anti-discrimination provisions. Id. at 130:23-131:4. For example, Google's PFJ includes provisions that specify the types of data signals Google would be required to use in a non-discriminatory fashion, see, e.g., Google's PFJ §§ III(1)(f), III(3)(b), III(8)-(10); and provides explicit exceptions for privacy purposes, see, e.g., id. §§ III(9)-(10) (creating an exception for "any information outside of Google that it is prohibited from passing to a third party under Google's internal privacy policies and/or governing laws"). Plaintiffs have similarly identified ambiguities in the language of Google's parallel proposals. See Rem. Tr. Nov. 21 AM 30:1-31:10 (Pls. Closing Arg.) (arguing that Google's commitment "not to introduce additional latency" in transmitting real-time AdX bids to non-Google publisher ad servers could create opportunities for Google to assert pretextual justifications in circumventing behavioral remedies); Pls. Closing Arg., at slide 21; Google's PFJ §§ III(1)(e), III(3)(b).

It is "in the interests of the court and of both litigants, that the [remedies] decree be as specific as possible . . . so that parties may know[] their duties and unintended contempts may not occur." Int'l Salt, 332 U.S. at 400. Accordingly, the Court finds that Plaintiffs' anti-discrimination provisions, as proposed, are too indefinite. See Google Search, 803 F. Supp. 3d at 115 ("[T]he [C]ourt cannot accept the remedy's indefinite aspects. . . . These indefinite terms will be excised."). Plaintiffs' anti-discrimination provisions broadly require that Google's ad tech tools operate and use data in a non-discriminatory fashion without specifically explaining compliance mechanisms. They omit important carve-out provisions that account for Google's internal privacy policies and governing laws. Furthermore, Plaintiffs define "Data Signals" as "any information that an Ad

Buying Tool uses to evaluate the value of an Impression," Plaintiffs' PFJ § IV(19), without offering specifics as to what that information might be. Google is entitled to know precisely what information it must share. See Google Search, 803 F. Supp. 3d at 115. For these reasons, the parties will be required to work together to craft mutually agreeable specific behavioral remedies that will more clearly describe what Google must do to avoid discriminatory bidding behavior.

4. Buy-side Remedies (AdWords and DV360)

The parties propose behavioral remedies regulating Google's buy-side ad tech tools, AdWords and DV360,[28] Plaintiffs' PFJ §§ X(A)-(C); Google's PFJ §§ III(6)-(8); however, Google denies that remedies concerning AdWords and DV360 are appropriate because these ad tech tools were not one of the markets for which liability was found, [Dkt. No. 1811] at 39. As such, the law does not permit Plaintiffs to demand relief for conduct they tried and failed to prove was anticompetitive. See Microsoft II, 224 F. Supp. 2d 76 at 138. In the liability trial, the Court found that both large and small advertisers had significant choice among other tools beyond AdWords for purchasing advertising. Google, 778 F. Supp. 3d at 841-43. Given the "ease and benefits" for advertisers of "allocating advertising spending across channels," the Court rejected Plaintiffs' claim that the advertiser ad networks for open-web display ads constituted a relevant ad tech market. Id. at 842. Moreover, Plaintiffs also did not allege a market in which DV360 competes. Id. at 865 n.29 ("[DV360 is] a Google ad buying tool which is not within any of the relevant antitrust markets."). Because "[t]he Court did not find that Google has monopoly power—much less acquired or maintained monopoly power via anticompetitive acts—in any market for

[28] AdWords is a "self-service advertising platform for buying search ads" offering "ads across both Google's owned-and-operated websites and third-party websites." Google, 778 F. Supp. 3d at 823-24 (citations omitted). DV360, also known as Display & Video 360, is Google's demand-side platform, which "provide[s] large advertisers with significant control over the sources of inventory from which they purchase impressions and how they bid on those impressions." Id. at 817-18.

advertising buying tools," [Dkt. No. 1431] at 16, Google argues that Plaintiffs' buy-side behavioral remedies "are legally unavailable because they do not flow from the Court's findings," [Dkt. No. 1434] at 20-21, and would "disrupt competitive conditions among buying tools," [Dkt. No. 1811] at 40.

Google's argument as to AdWords is unpersuasive. As Plaintiffs correctly argue, "any effective remedy . . . must include AdWords" because "Google has repeatedly wielded the buy-side power of AdWords . . . as an instrument for shutting down competition in the two sell-side markets at issue." Rem. Tr. Sept. 22 AM 19:5-11 (Pls. Opening Arg.); see Rem. Tr. Sept. 24 AM 54:11-55:13 (Lee (Pls. Expert)) (testifying that remedies restricting AdWords are "consistent with and responsive to the Court's findings, including that Google leveraged its connections between AdWords and AdX and AdX and DFP in its conduct to harm competition" because "AdWords is a meaningful source of advertiser demand that can . . . affect competition in the relevant markets"). Google reads the Court's liability opinion too narrowly. AdWords was an important part of Google's conduct that harmed competition in both the ad exchange and publisher ad server markets. Specifically, the liability opinion found that Google "effectively restrict[ed] the unique advertising demand offered by AdWords advertisers to AdX," and tied DFP to AdX by "compel[ling] publishers to use AdX and DFP" if they wanted access to AdWords. Google, 778 F. Supp. 3d at 826, 863 (internal quotation marks and citation omitted). The unique access to AdWords' advertising demand thus became a "primary source of Google's monopoly power in the ad exchange market," and "expanded Google's dominance in the publisher ad server market." Id. at 862-63; see Hr'g Tr. May 2 AM at 9:9-18 (the Court stating that the "whole reason" that Google's anticompetitive campaign "works so well" is the "golden goose" of AdWords and "the way in which [publishers] could get [AdWords business]").

Because the Court has found that AdWords demand played a pivotal role in Google's unlawful ad tech campaign, its exclusion from behavioral remedies could allow Google to continue to leverage its buy-side bidding tools to maintain its monopolies in the ad exchange and publisher ad server markets. See, e.g., Rem. Tr. Sept. 22 PM at 85:3-22 (Casale (Index Exchange)) (testifying that excluding AdWords from behavioral remedies "would not restore a fair level of liquidity to the market at all" because "[i]t would still favor AdX with a disproportionate amount of additional demand from Google's search business," and "AdX would win a significant amount of impressions because of the search demand, which Index would not be able to compete for or win").

Even with the implementation of behavioral remedies discussed above, Google could circumvent such remedies by having AdWords bid directly into DFP. Rem. Tr. Sept. 24 AM at 67:1-6 (Lee (Pls. Expert)). In fact, the evidence presented at the remedies trial indicated that this possibility was on the horizon. Through a product known as Google Partner Bidding, or gBid Direct, Google's buy-side tools can directly submit bids into auctions run by the publishers without an ad exchange for mobile app inventory. Rem. Tr. Sept. 29 PM 77:19-78:2, 82:22-83:9 (Levitte (Google)); Rem. Tr. Sept. 30 AM 143:12-144:6 (Jayaram (Google)). Although gBid Direct does not currently "enable advertisers to send [AdWords] . . . bids directly into DFP," Rem. Tr. Sept. 29 PM at 82:15-17 (Levitte (Google)), it could in the future, see [Dkt. No. 1760] at 36-37. Alternatively, "Google could adjust AdWords' take rate or fees based on whether an impression is coming from DFP or another publisher ad server." Rem. Tr. Sept. 24 AM 67:6-8 (Lee (Pls. Expert)). As Plaintiffs' expert, Professor Lee, explained, AdWords already does "something similar . . . when it bids through different ad exchanges where it charges more than double the take rate on a rival ad exchange than it does in AdX."[29] Id. at 67:8-11, 123:25-124:2; accord PRX 140. Such conduct could constructively recreate the AdWords-AdX-DFP tie that the Court has found unlawful. See [Dkt. No. 1760] at 37.

Against this evidence, behavioral remedies regulating AdWords are appropriate, as the Court may "prohibit 'practices connected with acts actually found to be illegal,' including practices 'which are of the same type or class as unlawful acts.'" Google Search, 803 F. Supp. 3d at 68 (first quoting Gypsum, 340 U.S. at 89; and then quoting Zenith Radio, 395 U.S. at 132); cf. Rem. Tr. Sept. 22 AM at 81:6-15 (Whitmore (Advance Local)) (testifying that a behavioral remedy "prohibit[ing] any form of [d]irect [b]idding between Google's ad tech products on the buy-side, like AdWords, and Google's ad tech products on the sale-side for open-web display" would "remove[] the conflict of interest that Google may have to steer the supply exclusively through their own channels"); Rem. Tr. Sept. 22 PM at 73:4-74:1 (Casale (Index Exchange)); Rem. Tr. Sept. 23 PM 107:17-108:1 (Dederick (The Trade Desk)).

Although Plaintiffs correctly argue that an effective remedy must include AdWords, DV360 "did not play a role during the liability phase of this case, . . . and [has] not been shown to be relevant to the Court's task of terminating the illegal conduct, . . . and restoring competition to the relevant market . . . ." Microsoft II, 224 F. Supp. 2d at 133 (first citing United Shoe, 391 U.S. at 250; and then citing Ford, 405 U.S. at 573); see Google, 778 F. Supp. 3d at 865 n.29; Rem. Tr. Sept. 24 AM 115:4-5 (Lee (Pls. Expert)) ("In the liability phase, DV360 was not part of the markets

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[29] Although AdWords bids almost exclusively through AdX, in 2015, Google launched a feature called AdWords Bid, or AWBid, which allows AdWords to "bid[] through third-party exchanges to a limited extent." Rem. Tr. Sept. 30 AM 127:1-25 (Jayaram (Google)); see Google, 778 F. Supp. 3d at 825 n.15. As of the remedies trial, AdWords is integrated with around 50 third-party ad exchanges. Rem. Tr. Sept. 30 AM 127:5-6 (Jayaram (Google)). "[F]rom 2015, approximately only on average 3 percent of impressions transacted from [AdWords] were placed outside of AdX." Liab. Tr. Sept. 16 PM 133:9-16 (Abrantes-Metz (Pls. Expert)).

I evaluated."). Because Plaintiffs failed to offer any evidence, let alone economic analysis, that identified a relationship between DV360 and Google's anticompetitive conduct vis-à-vis the AdX-DFP tie, buy-side behavioral remedies are appropriate only as to AdWords, and not as to DV360.

As to AdWords, Plaintiffs' PFJ would prohibit Google from creating a direct bidding integration between AdWords and DFP. Plaintiffs' PFJ § X(A). Specifically, Plaintiffs' PFJ would require DFP "to receive bids from or provide Bid Requests to AdWords . . . only through an Ad Exchange," id., and Google would have to ensure that AdWords bids in a non-discriminatory fashion, "[s]ubject to the express instructions of advertisers," id. § X(B). In other words, AdWords must "determine when and how to submit bids, how much to bid, and what information to transmit with bids without regard to whether a Publisher is using any of Google's products, including DFP . . . ." Id. Google would also have to use its first-party data in a non-discriminatory fashion when buying or evaluating open-web display ad inventory, i.e., without regard to whether Google-owned or affiliated tools were being used. Id. § X(H). Lastly, AdWords would be prohibited from engaging in preferential routing by a requirement that it would have to route any indirect demand for open-web display ad inventory to any open-web display ad exchange or any open-web display publisher ad server without regard to whether the ad exchange or publisher ad server is owned by, or affiliated with, Google. Id. § X(C).

Despite its objections to the inclusion of buy-side behavioral remedies, Google has proposed remedies that would prohibit it from "build[ing] any direct bidding integrations between [AdWords] and DFP" through which AdWords could provide real time bids directly to DFP for indirect open-web display inventory; however, Google would not be prohibited from directly integrating AdWords with Prebid. Google's PFJ § III(6). Furthermore, AdWords would be prohibited from prioritizing bidding on AdX over other ad exchanges for indirect open-web display ad inventory solely based on the ownership of the ad exchange; however, AdWords would be permitted to prioritize bidding on AdX to achieve "[a]dvertisers' objectives, including, for example, on the basis that AdX provides more . . . effective information, access to higher quality [i]mpressions, better fraud protection, or better privacy protection than a rival" ad exchange. Id. § III(7). Lastly, AdWords would be prohibited from "us[ing] Google First-Party Data to personalize" an open-web display impression "for a specific user, unless it does so without regard to whether the [real-time bid request] is submitted by AdX"; however, Google would be "permitted to use Google First-Party Data for other purposes, including, but not limited to, respecting user opt-outs from personalized ads or preventing personalized ads from being shown to children." Id. § III(8).

The parties' proposed behavioral remedy prohibiting direct bidding between AdWords and DFP for indirect open-web display ads is appropriate. Although AdWords does not currently bid directly through DFP, see Rem. Tr. Sept. 25 PM 126:2-4 (Craycroft (Google)), a direct bidding prohibition would prevent Google from leveraging AdWords to recreate a similarly unlawful tie. Accordingly, this remedy "represents a reasonable method of eliminating the consequences of the illegal conduct." NSPE, 435 U.S. at 698.

Google objects to Plaintiffs' direct bidding prohibition, arguing that it would unfairly hamstring AdWords' ability to compete in a market where other buying tools have already started to compete via direct bidding integrations. [Dkt. No. 1811] at 40; see Rem. Tr. Oct. 1 PM 101:20-102:7 (Lerner (Def. Expert)). Specifically, Google points to the growing industry trend of supply-path optimization, in which buying tools bypass ad exchanges to make their own direct connection to publisher inventory. See supra Section II(C)(2); Rem. Tr. Sept. 22 AM 81:16-82:2 (Whitmore (Advance Local)) (discussing The Trade Desk's OpenPath product, in which The Trade Desk can "bid . . . directly into DFP skipping an ad exchange"); Rem. Tr. Sept. 23 PM 44:22-45:18 (Friedman (Goodway Group)); id. at 127:19-128:1 (Dederick (The Trade Desk)) ("[T]he number of OpenPath implementations . . . has grown.").

Google's objection has some merit. Plaintiffs' proposal would not only prohibit Google from creating a direct bidding integration between AdWords and DFP, but it would also require DFP to transact with AdWords "only through an [a]d [e]xchange." Plaintiffs' PFJ § X(A). This overly expansive provision would effectively limit AdWords, for example, from integrating directly with Prebid, creating an "anomalous competitive disadvantage" for Google. Rem. Tr. Sept. 25 PM 125:20-126:25 (Craycroft (Google)). When approving forward-looking remedies, a court should avoid a remedy "so expansive as to be unduly regulatory or provide a blanket prohibition on all future anticompetitive conduct." Microsoft II, 224 F. Supp. 2d at 171 (citing Zenith Radio, 395 U.S. at 103). Plaintiffs have failed to explain why Google's proposed remedy, which provides a narrow exception allowing AdWords to integrate with a non-Google entity like Prebid, is insufficient to "cure the ill effects of the illegal conduct." Gypsum, 340 U.S. at 88. Accordingly, the Court will adopt Google's more narrowly-tailored provision, which would prohibit any direct bidding integrations between AdWords and DFP, but would allow Google to directly integrate AdWords with Prebid. See Google's PFJ § III(6).

AdWords will be prohibited from favoring Google-owned or Google-affiliated ad tech tools when bidding for indirect open-web display ad inventory. See Plaintiffs' PFJ §§ X(B)-(C); Google's PFJ § III(7). Specifically, AdWords must not determine when and how to submit bids, how much to bid, and what information to transmit with bids based on whether a publisher is using any of Google's ad tech products, and AdWords must not prioritize bidding on indirect open-web display ad inventory based on whether Google's ad tech products are being used. Google has confirmed that AdWords does not currently bid in a discriminatory fashion based on the ownership of ad tech tools. See Rem. Tr. Sept. 30 AM 135:10-136:9, 139:8-18 (Jayaram (Google)) (testifying that AdWords does not "currently determine how much to bid through an ad tech tool" or "what information to transmit with a bid based on who owns the tool," nor does it "route any of [its] demand to ad exchanges or publisher ad servers based on whether Google owns those tools"). This forward-looking provision therefore memorializes Google's current practices and is not "unduly regulatory." Microsoft II, 224 F. Supp. 2d at 171. It would also reinforce the efficacy of the direct bidding prohibition by prohibiting conduct "of the same type or class as unlawful acts which the [C]ourt has found to have been committed or whose commission in the future unless enjoined, may fairly be anticipated from the defendant's conduct in the past." Express Publ'g, 312 U.S. at 435.

Both parties have proposed that the non-discriminatory bidding behavior provision contain a narrow exception for advertiser values. See Plaintiffs' PFJ §§ X(B)-(C); Google's PFJ § III(7). The core objective of buy-side tools, such as AdWords, is to "deliver advertiser [return on investment] at scale." Rem. Tr. Sept. 25 PM 127:7-11 (Craycroft (Google)). Given this objective, and recognizing that different ad exchanges have "very different levels of quality in how they make that supply available in terms of latency, robot traffic, fraudulent traffic management, viewability, et cetera," Google's buy-side tools can bid differently on various ad exchanges to optimize advertiser value. Id. 127:14-128:3.

Project Poirot, an initiative launched by Google in 2017 in which Google "shaded, or lowered, bids from its demand-side platform DV360 on impressions offered for sale on non-AdX exchanges," is a prime example of such behavior. Google, 778 F. Supp. 3d at 830 (internal quotation marks omitted). The liability opinion found that Project Poirot "enhanced AdX's market power by adjusting some of DV360's bids in a way that preferenced AdX over third-party ad exchanges"; however, Project Poirot was not considered an element of Google's anticompetitive conduct, at least in part, because evidence in the liability phase suggested that "Project Poirot was a reasonable method for protecting Google's advertiser customers from third-party ad exchanges that were running unfair auctions." Id. at 865 n.29 (first citing Liab. Tr. Sept. 11 PM 52:20-54:4 (Ravi (Pls. Expert)) (explaining that Project Poirot was formally launched to "reduce" bids for "second-price auction[s]" or "dirty auctions"); then citing Liab. Tr. Sept. 19 AM 137:14-138:5 (Bellack (Google)) (testifying that some ad exchanges "in the industry were playing games with their auction logic[,] . . . misrepresenting their fee structure[,] . . . [and] modifying their auctions in ways that were not fair and intended to advantage their own business"); and then citing Liab. Tr. Sept. 24 AM 115:16-25 (Milgrom (Def. Expert))).

Buy-side ad tech tools can, and should, bid differently across ad exchanges to some extent because the quality of ad exchanges varies. For example, The Trade Desk, a competing demand-side platform, "does not treat all ad exchanges the same" and does not "integrate with some ad exchanges" to "avoid low value, worthless, or harmful ads" that may harm advertiser interests. Rem. Tr. Sept. 23 PM 117:22-119:8 (Dederick (The Trade Desk)). Furthermore, advertisers, such as Omnicom, "expect [their demand-side platforms] to curate or prioritize one ad exchange over another," Rem. Tr. Sept. 23 AM 108:16-109:3 (Lambert (Omnicom)), because of differences in quality, security, privacy, and fraud risk. Rem. Tr. Sept. 23 PM 61:24-62:9, 66:8-20, 67:1-5, 71:21-72:9 (Lambert (Omnicom)).

Consistent with the liability opinion and the parties' remedies proposals, the exception for achieving advertiser return on investment is appropriate, and AdWords will be allowed to prioritize bidding on AdX only for the purpose of achieving advertiser return on investment, as long as

Google's ownership of AdX is not a factor in AdWords' bidding behavior. See Rem. Tr. Sept. 30 AM 135:21-136:13 (Jayaram (Google)). The parties will have to identify the specific factors that fall within this exception. This may include, for example, differences in information, impression quality, fraud protection, or privacy protection. See Rem. Tr. Sept. 25 PM 127:14-128:3 (Craycroft (Google)); Rem. Tr. Sept. 23 PM 61:24-62:9, 66:8-20, 67:1-5, 71:21-72:9 (Lambert (Omnicom)).

The Final Judgment will also include a provision regulating the use of Google first-party data when bidding for indirect open-web display ad inventory. First-party data refers to data generated from a specific individual user's activity on Google's owned-and-operated products, including YouTube, Gmail, and Google Search. Plaintiffs' PFJ § IV(36), Google's PFJ § VI(P). With these products, "Google has access to one of the largest pools of first-party data that is available." Rem. Tr. Sept. 22 AM 79:11-13 (Whitmore (Advance Local)). This access creates an outsized information asymmetry that Google could use to its advantage when bidding for indirect open-web display ad inventory, especially as first-party data has been shown to increase the value of a given ad impression by double-digit percentages. See id. at 78:23-79:25, 82:20-84:18 ("[Google's] ability to collect first-party data . . . within their own products, which are significant, and appending that data to bids that are coming through its own exchange . . . makes it uncompetitive for other exchanges that do not have access to that data . . . ."). Although Google does not currently "use first-party data for any kind of targeting or ad optimization on open-web display," Rem. Tr. Sept. 25 PM 129:13-17 (Craycroft (Google)), it very well could in the future, Rem. Tr. Sept. 30 AM 141:10-15 (Jayaram (Google)) (testifying that it is "technologically possible for Google's buy-side tools to access Google first-party data"). Accordingly, requiring the non-discriminatory use of Google first-party data is necessary to curtail alternative methods of recreating the AdX-DFP tie for which Google has been held liable, and ensure that the "untraveled roads" toward illegal maintenance of a monopoly are not "left open." Int'l Salt, 332 U.S. at 400.

Both parties have agreed that Google may use its first-party data without sharing it with third parties to comply with publisher preferences, its internal privacy policy, and the privacy laws and regulations of the jurisdictions in which Google operates. See Plaintiffs' PFJ § X(H); Google's PFJ § III(8). This agreement extends to using first-party data to "respect[] user opt-outs from personalized ads or preventing personalized ads from being shown to children." Google's PFJ § III(8); see Rem. Tr. Sept. 25 PM 129:13-20 (Craycroft (Google)); Rem. Tr. Sept. 30 AM 141:2-22 (Jayaram (Google)); Rem. Tr. Oct. 1 PM 102:11-103:4 (Lerner (Def. Expert)). These narrow exceptions should balance the importance of consumer privacy and the significant resources that Google has invested in upholding and maintaining privacy protections, and the need to ensure AdWords' non-discriminatory bidding behavior. See Rem. Tr. Sept. 29 PM 7:5-8:1 (Sheffer (Google)).

Google raises concerns that requiring the non-discriminatory use of first-party data would unduly regulate AdWords' ability to compete, given that ad-buying tools from competitors, including Meta, Amazon, Yahoo, and TikTok, are already using first-party data. [Dkt. No. 1811] at 40; see Rem. Tr. Sept. 25 PM 129:21-130:2 (Craycroft (Google)); Rem. Tr. Sept. 23 PM 61:13-23 (Lambert (Omnicom)) (testifying that other competitors include Pinterest, Snapchat, Disney, and Roku). According to Google, requiring AdWords to share Google's first-party data with third parties "has very serious complications and roadblocks when it comes to [its] privacy policy as well as privacy law and regulation." Rem. Tr. Sept. 25 PM at 130:3-14 (Craycroft (Google)). This would effectively prohibit Google from using its first-party data when evaluating indirect open-web display ad inventory, see Rem. Tr. Oct. 1 PM 102:11-103:4 (Lerner (Def. Expert)), and would place Google at a competitive disadvantage because its "large competitors, . . . who use their [first-party] data on open-web display, in no way have ever or will ever push that data into third-party-owned buying platforms," Rem. Tr. Sept. 25 PM 130:11-14 (Craycroft (Google)). Given that AdWords does not currently use first-party data to bid on open-web display ads, this concern is premature. For now, this non-discrimination remedy merely puts in writing the status quo, and because "[j]udges must be open to reconsideration and modification of decrees in light of changing market realities," this remedy can be modified if circumstances change. Alston, 594 U.S. at 102.

C. Technical Monitoring

Both parties propose that a Monitor and a Technical Committee be established to facilitate enforcement of, and compliance with, the Final Judgment. See Plaintiffs' PFJ § XIII; Google's PFJ § IV. This proposal "comports with federal courts' long history of utilizing appointed experts and provides a process to review and resolve inevitable disputes between the parties—ideally without further need for judicial intervention." In re Google Play Store Antitrust Litig., 147 F.4th 917, 954 (9th Cir. 2025); see Google Search, 803 F. Supp. 3d at 154-55 (approving the formation of a Technical Committee as part of the court's final judgment); Microsoft III, 373 F.3d at 1243-45 (affirming the district court's approval of a Technical Committee to help enforce the Microsoft-U.S. consent decree).

The parties have agreed to select a Monitor from a slate of three candidates, with one party proposing the slate of candidates, and the other party choosing the Monitor.[30] Plaintiffs' PFJ § XIII(A)(1). The Monitor will serve from appointment until the Final Judgment expires. Id. The Parties agree that the Monitor, who will oversee and ensure Google's compliance with its obligations under the Final Judgment, Plaintiffs' PFJ § XIII(A)(4)(a), will have the authority to:[31]

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[30] According to Plaintiffs, the primary disagreement focuses on which party will propose the slate of Monitor candidates, and which party will select the Monitor. Rem. Tr. Nov. 21 AM 120:23-25 (Closing Arg.).

- interview, either informally or on the record, any current Google employee, who may have counsel present, provided that any such interview be subject to the reasonable convenience of such personnel and without restraint or interference by Google, Plaintiffs' PFJ § XIII(A)(4)(i); Google's PFJ § IV(B)(5)(a);

- obtain and inspect any document, data, and other information in the possession, custody, or control of Google, Plaintiffs' PFJ § XIII(A)(4)(j); Google's PFJ § IV(B)(5)(b);

- obtain and inspect Google's source code or algorithms, Plaintiffs' PFJ § XIII(A)(4)(k); Google's PFJ § IV(B)(5)(c);

- obtain reasonable access to any system or equipment to which Google personnel have access, Plaintiffs' PFJ § XIII(A)(4)(m); Google's PFJ § IV(B)(5)(d);

- obtain reasonable access to, and inspect, any physical facility, building, or other premises to which Google personnel have access, Plaintiffs' PFJ § XIII(A)(4)(n); Google's PFJ § IV(B)(5)(e);

- require Google to provide documents, data, and other information, and to submit reports to the Monitor, Plaintiffs' PFJ § XIII(A)(4)(l); Google's PFJ § IV(B)(5)(f);

- communicate with and interview third parties, as long as a confidentiality agreement is maintained, Plaintiffs' PFJ § XIII(A)(4)(h); Google's PFJ § IV(B)(9);

- hire reasonably necessary staff at the cost and expense of Google, with prior notice to Google and subject to approval by Plaintiffs, Plaintiffs' PFJ §§ XIII(A)(4)(o), XIII(A)(8); Google's PFJ § IV(C)(2).[32]

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[31] Because the Court will not impose structural remedies, several of Plaintiffs' proposed Monitor duties are no longer applicable. For example, because there is no need for a "Transition Period" as described in Plaintiffs' PFJ § V(B), the Monitor will not be required to certify the end of a "Transition Period." See Plaintiffs' PFJ § XIII(A)(4)(b). Similarly, because the Court will not require the Open-Source Auction or the contingent divestiture of DFP Remainder, the Monitor will not be required to assess competition in the publisher ad server market following the Open-Source Auction and make a recommendation regarding the need for a divestiture of DFP Remainder. See Plaintiffs' PFJ §§ XIII(A)(4)(c), XIII(A)(7).

[32] Google must also pay the Monitor, the Technical Committee, and any of their staff, a reasonable fee for their services. Plaintiffs' PFJ § XIII(A)(12); Google's PFJ § IV(C)(1).

The parties also substantially agree that after being appointed by the Court, the Monitor must provide the parties with a proposed work plan, Plaintiffs' PFJ § XIII(A)(3); Google's PFJ § IV(B)(3); however, they disagree as to the timing of the proposed work plan. Plaintiffs propose that the Monitor submit a proposed work plan within 30 days after being appointed, while Google proposes that the work plan be submitted within 45 days. Compare Plaintiffs' PFJ § XIII(A)(3), with Google's PFJ § IV(B)(3). Given the complexity of this undertaking, the 45-day period is more appropriate and will be in the Final Judgment.

The parties also agree that the Monitor must investigate Google's compliance with the Final Judgment, Plaintiffs' PFJ § XIII(A)(4)(d); Google's PFJ § IV(B)(6); and provide periodic reports to Plaintiffs regarding Google's efforts to comply with the Final Judgment and the Monitor's recommendations. Plaintiffs' PFJ § XIII(A)(4)(d); Google's PFJ § IV(B)(6).[33] The Monitor must also notify Plaintiffs immediately if he or she has reason to believe that Google has failed to comply with any provision of the Final Judgment, Plaintiffs' PFJ § XIII(A)(4)(e); Google's PFJ § IV(B)(7), and must investigate any complaints regarding Google's compliance with the Final Judgment, Plaintiffs' PFJ § XIII(A)(4)(f); Google's PFJ § IV(C)(8). All of the Monitor's work will be subject to confidentiality protections. Plaintiffs' PFJ §§ XIII(A)(17), XVII; Google's PFJ § IV(D). The parties have also agreed to create a three-member Technical Committee "to provide technical advice and support to the Monitor." Plaintiffs' PFJ § XIII(A)(2). Plaintiffs

[33] The parties disagree as to the frequency of the Monitor's reports to Plaintiffs: Google proposes that the Monitor report to both Plaintiffs and Google in writing on a quarterly basis from the entry of the Final Judgment until the Final Judgment expires, Google's PFJ § IV(B)(6); while Plaintiffs propose that the Monitor provide reports to Plaintiffs "at intervals and in a form specified by Plaintiffs," Plaintiffs' PFJ § XIII(A)(4)(d). Google's position is more reasonable and will be in the Final Judgment.

and Google will each select one member of the Technical Committee, and those two members will jointly select the third member. Id.

Although the parties largely agree on the creation of the Monitor and the Technical Committee, they differ as to Google's right to object to the Monitor's actions. Plaintiffs propose that Google may object to any of the Monitor's actions only for a claim of "[m]alfeasance by the Monitor," Plaintiffs' PFJ § XIII(A)(9), or if a given action was not "in fulfillment of the Monitor's duties," id. § XIII(A)(10). "Malfeasance," as defined by Plaintiffs, "means conduct wholly outside the bounds of the law or reasonable disagreement," id. § IV(39), and would not include "[d]isagreements between the Monitor and Google related to the nature or scope of the Monitor's duties, powers, or authorities." Id. § XIII(A)(9). Any objection would have to be made within 10 calendar days of the action at-issue, would have to be supported by "clear and convincing evidence," and would be resolved in the first instance by the United States, after consultation with Plaintiff States, before relief could be sought from the Court.[34] Id. §§ XIII(A)(9)-(10).

Under Google's PFJ, following a finding by the Monitor of a potential violation of the Final Judgment, Google would be allowed a reasonable period—not less than 30 days—"to respond to the [Monitor's] concerns before any party discloses the matter to the Court or takes other enforcement action." Google's PFJ § IV(B)(7). Similarly, following any complaint regarding a potential violation of the Final Judgment, Google would "be allowed a reasonable period (which shall ordinarily be not less than 30 days) to respond to any complaint before the [Monitor] discloses the matter to the Court or Plaintiffs or takes any enforcement action." Id. § IV(B)(8). Plaintiffs

[34] Plaintiffs would also require Google to "deposit any disputed costs and expenses into an escrow account . . . until the dispute is resolved." Plaintiffs' PFJ § XIII(A)(9).

protest that these proposed provisions would grant Google "an unusual degree of involvement in its own monitoring." [Dkt. No. 1760] at 42 n.10.

Plaintiffs' position is unreasonable. Providing Google with a broad right to object to a claim that it had violated the Final Judgment would not be unprecedented, see, e.g., United States v. Microsoft, 231 F. Supp. 2d 144, 198 (D.D.C. 2002), aff'd sub nom. Massachusetts v. Microsoft Corp., 373 F.3d 1199 (D.C. Cir. 2004) (allowing Microsoft thirty days to "attempt to resolve . . . or reject" the substance of a complaint regarding a potential violation of the remedies decree); Final Judgment at 22, Google Search, 803 F. Supp. 3d 18 (No. 20-cv-3010) (Dec. 5, 2025) [hereinafter Google Search Final Judgment] ("Google may object to and be heard by the Court on any recommendation from the [Technical Committee] or Plaintiffs as to the interpretations or substantive requirements of this Final Judgment."). But "[t]he [C]ourt is wary of being called in as a referee to the minutiae of the Final Judgment's execution and enforcement." Memorandum Opinion at 49, Google Search, 803 F. Supp. 3d 18 (No. 20-cv-3010) (Dec. 5, 2025) [hereinafter Google Search Mem. Op.]. Following Judge Mehta's approach in the Google Search litigation, this Court will provide Google with a "broad right to object" with the strong caution that abuse of this right could result in it being restricted. Id.

Plaintiffs have also proposed the appointment of a Google employee as an Internal Compliance Officer who would be "responsible for . . . ensuring Google's compliance with [the] Final Judgment."[35] Plaintiffs' PFJ § XIII(C). The Internal Compliance Officer must distribute a copy of the Final Judgment to all "officers and employees of Google"; obtain an annual written

[35] Plaintiffs' proposal for the appointment of a Divestiture Trustee "to oversee and facilitate the expeditious divestiture of AdX . . . and, if necessary, the expeditious divestiture of DFP Remainder," is moot because the Final Judgment will not impose structural remedies. Plaintiffs' PFJ § XIII(B).

certification of their understanding of the Final Judgment; and maintain a record of all persons who have received a copy of the Final Judgment and who have submitted a written certification of its receipt. Id. §§ XIII(C)(2)(a)-(b), XIII(C)(2)(f)-(g). The Internal Compliance Officer must also advise all "officers and employees of Google" that Google's legal advisors are available to confer with them regarding any question concerning compliance with the Final Judgment or U.S. antitrust laws, and must ensure that Google retains all relevant documents and electronically stored information related to the Final Judgment. Id. §§ XIII(C)(2)(e), XIII(C)(2)(i). Lastly, the Internal Compliance Officer must create a confidential means for any Google employee to report potential violations of the Final Judgment or U.S. antitrust laws by Google, and advise Google employees that they may disclose any information concerning any such potential violations without reprisal.[36] Id. § XIII(C)(2)(h).

Given the gravity of Google's antitrust violations, the Court finds appointment of an Internal Compliance Officer, who will be responsible for administering Google's antitrust compliance program and ensuring compliance with the Final Judgment to be appropriate, see Google Search Final Judgment, at 23-26 (including a similar appointment of an Internal Compliance Officer); however, the duties of the Internal Compliance Officer will not be as broad as Plaintiffs propose. First, because the Court will reject Plaintiffs' proposal to establish a legal and ethical compliance program, see infra Section IV(D)(3), the Internal Compliance Officer will not be responsible for overseeing that program, see Plaintiffs' PFJ § XIII(C)(2)(c). Also rejected is Plaintiffs' proposal that the Internal Compliance Officer be tasked with making "periodic reports

[36] Google has taken no position on Plaintiffs' proposal for an Internal Compliance Officer. Accordingly, the parties will be required to work together to craft the specific responsibilities of the Internal Compliance Officer, as modified by the Court in this Memorandum Opinion, for inclusion in the Final Judgment.

to the Monitor, Plaintiffs, and an independent committee of Alphabet Inc.'s Board of Directors" regarding Google's practices concerning its obligations to preserve and produce materials for use in investigations, litigations, or regulatory filings, and its use of the attorney-client privilege and attorney work product doctrine. Id. § XIII(C)(2)(d). Although the liability opinion recognized that "Google's systemic disregard of the evidentiary rules regarding spoliation of evidence and its misuse of the attorney-client privilege may well be sanctionable," the Court ultimately held that "it need not adopt an adverse inference or otherwise sanction Google for [spoliation] at this juncture" because it found Google liable under the Sherman Act based on trial testimony and admitted evidence, including "Google documents that were preserved." Google, 778 F. Supp. 3d at 873. Requiring the Internal Compliance Officer to provide periodic reports on Google's practices regarding evidentiary rules and the attorney-client privilege would therefore not be "tailored to fit the wrong creating the occasion for the remedy." Microsoft I, 253 F.3d at 107.

The Court will change the parties' technical monitoring proposals in two additional respects. First, Plaintiffs' proposal would leave many decisions to the "sole discretion" of the United States, "after consultation with Plaintiff States." See, e.g., Plaintiffs' PFJ §§ XIII(A)(3), XIII(A)(8), XIII(A)(9). Plaintiffs provide no support for the phrase "sole discretion," and the Court does not find this language appropriate. Second, as in Google Search, "to keep the [C]ourt updated on the progress of executing the Final Judgment," the parties, with input from the Monitor and Technical Committee, will be required to file "a status report within 90 days of the effective date of the Final Judgment and then on future dates as set by the Court." Google Search Mem. Op. at 50.

D. Anti-Circumvention, Anti-Retaliation, and Other Administrative Remedies

Plaintiffs have proposed several additional remedial measures to reinforce Google's compliance with the Final Judgment. They include: (1) anti-retaliation, non-interference, and non-circumvention provisions, Plaintiffs' PFJ § XIII(D); (2) disgorgement of profits into a monitored escrow account, id. § XII; (3) establishment of a legal and ethical compliance program, id. § XIII(E); (4) a requirement that Google provide Plaintiffs with compliance affidavits until a Monitor has been appointed, id. § XIV; and (5) a requirement that Google permit Plaintiffs to conduct compliance inspections, id. § XV.

1. Anti-Retaliation, Non-Interference, and Non-Circumvention Remedies

Plaintiffs' PFJ § XIII(D)(1) proposes that "Google must not retaliate in any form against any person, including any employee or third party, because the person has taken any action to bring to light Google's conduct determined in this action to be unlawful" or because the "person is or is contemplating" various acts, including: (1) "filing a complaint related to Google's compliance with [the] Final Judgment"; (2) "disclosing information" to Plaintiffs, the Monitor, or the Internal Compliance Officer; or (3) "testifying, assisting, cooperating with, or participating in any manner in an investigation, proceeding, hearing, or litigation related to Google's compliance with [the] Final Judgment." Google would also have to "establish a policy, annually communicated to all of its employees," that Google employees may disclose any information to Plaintiffs, the Internal Compliance Officer, or the Monitor, without reprisal for such disclosure. Id. § XIII(D)(2).

Plaintiffs' PFJ § XIII(D)(3) includes a general prohibition against conduct that seeks to interfere with the implementation of the Final Judgment. "Google must not take any action to interfere with or impede implementation of th[e] Final Judgment, including the accomplishment of the Monitor's . . . responsibilities." Id. § XIII(D)(3). Any such action, "including any action that interferes with or impedes meeting any deadline imposed by th[e] Final Judgment," constitutes a violation of the Final Judgment and may result in the Court imposing sanctions. Id. Plaintiffs' PFJ also provides that nothing in this provision "limits Plaintiffs' ability to request . . . or the Court's authority to order, other, additional or alternative relief or penalties or to modify th[e] Final

Judgment . . . ." Id. § XIII(D)(4). Section XIII(D)(5) proposes a general prohibition against conduct that seeks to circumvent the terms of the Final Judgment. Specifically, Google must not: (1) "engage in any conduct designed to replicate the effect of any behavior found by the Court to violate the Sherman Act"; (2) "engage in any conduct substantially similar to conduct prohibited by another Section of th[e] Final Judgment or designed to evade any obligation imposed by th[e] Final Judgment"; and (3) "engage in any conduct with the purpose or effect of evading or frustrating the purposes of th[e] Final Judgment." Id. § XIII(D)(5).

These proposed remedies will be rejected for the same reasons articulated in Google Search. There, plaintiffs proposed parallel provisions prohibiting retaliation and circumvention, arguing that such provisions were necessary to "prevent Google from repeating its monopolist playbook." Google Search, 803 F. Supp. 3d at 152 (internal quotation marks and citation omitted). Judge Mehta dismissed those arguments, finding that the anti-retaliation and anti-circumvention provisions failed to satisfy Federal Rule of Civil Procedure 65(d), "which requires that every order granting an injunction must 'describe in reasonable detail . . . the act or acts restrained or required.'" Id. (quoting Fed. R. Civ. P. 65(d)(1)(C)) (explaining that the Supreme Court has interpreted Rule 65(d) "to require 'explicit notice of precisely what conduct is outlawed'" (quoting Schmidt v. Lessard, 414 U.S. 473, 476 (1974))). Against this legal backdrop, Judge Mehta found that the proposed provisions were "too vague" because they failed to "provid[e] any specifics about what type of conduct might constitute a retaliatory act" and offered "scant notice of what conduct would violate the judgment." Id. at 152-53.

The same defect applies to this case. The anti-retaliation provision proposed by Plaintiffs "broadly proscribes retaliation 'in any form,' without providing any specifics about what type of conduct might constitute a retaliatory act." Id. at 153; see Plaintiffs' PFJ § XIII(D)(1). As in Judge

Mehta stated in Google Search, "[d]istinguishing retaliation from sharp-elbowed business conduct cannot be easily determined without some metes and bounds." 803 F. Supp. 3d at 153. Plaintiffs' non-interference provision, which contains the similarly vague phrase "any action," without providing specifics explaining the type of conduct that might constitute interference, will be rejected for the same reason. Plaintiffs' PFJ § XIII(D)(3).

Plaintiffs' anti-circumvention provision, which would prohibit Google from "conduct designed to replicate the effect of any behavior found by the Court to violate the Sherman Act," id. § XIII(D)(5), is likewise "too vague," Google Search, 803 F. Supp. 3d at 153. As explained in Google Search, "Plaintiffs' focus on 'effects' sweeps in a host of possible anticompetitive conduct that bears no resemblance to" the anticompetitive conduct the Court found unlawful. Id. Plaintiffs' prohibition on "substantially similar" conduct, without further specification, is similarly flawed because this "type of comparator language . . . lack[s] the necessary detail when unaccompanied by exemplars." Id. (citing United States v. Philip Morris USA Inc., 566 F.3d 1095, 1137 (D.C. Cir. 2009)). And as in Google Search, Plaintiffs' proposed bar on "any conduct with the purpose or effect of evading or frustrating the purposes of [the] Final Judgment," Plaintiffs' PFJ § XIII(D)(5), "is so ambiguous as to offer scant notice of what conduct would violate the judgment," Google Search, 803 F. Supp. 3d at 153. In addition to being vague and ambiguous, these provisions are unnecessary given the injunction that will be issued. In short, most of these provisions will not be included in the Final Judgment.[37]

[37]Although the Court rejects Plaintiffs' PFJ § XIII(D)(1), it will adopt Plaintiffs' proposed provision requiring Google to establish an anti-reprisal policy, Plaintiffs' PFJ § XIII(D)(2), because it is not broadly worded, and it reinforces the duties of the Internal Compliance Monitor. See supra Section IV(C).

2. Escrow Fund and Disgorgement

Plaintiffs propose that Google create a "Monitored Escrow Account," which "it must hold jointly with and subject to supervision by the Monitor," and into which Google must regularly deposit 50 percent of the net revenues that it obtains from its ownership or operation of AdX from April 17, 2025, until the date on which the closing of the AdX divestiture transaction occurs,[38] Plaintiffs' PFJ §§ XII(A)-(B), and must also regularly deposit 50 percent of the net revenues that it obtains from its ownership or operation of DFP from April 17, 2025, until the later of: the date of a final determination regarding the need for a DFP Remainder divestiture, or the date on which the closing of the DFP Remainder divestiture transaction occurs, id. § XII(C). Funds in the Monitored Escrow Account "may only be used with express authorization of the Monitor, and at the discretion of the Monitor" for three express purposes: (1) "to defray the costs incurred . . . in administering the Open-Source Auction"; (2) "to defray the costs incurred by Publishers in switching from DFP . . . to another Open-Web Display Publisher Ad Server"; and (3) "for any other remedial purpose ordered by the Court." Id. § XII(D). Any remaining funds following the expiration of the Final Judgment would be deposited into the U.S. Treasury. Id. § XII(E).

According to Plaintiffs, the escrow fund and disgorgement provision "would directly mitigate financial barriers to publisher switching," thereby fostering competition in the publisher ad server market.[39] [Dkt. No. 1810] at 13; accord Rem. Tr. Sept. 26 85:25-87:3 (Racic (Prebid))

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[38] As defined by Plaintiffs, "net revenues" means the "amount of revenue remaining after deducting variable costs associated with the operation of AdX or DFP, as applicable." Plaintiffs' PFJ § IV(45). Furthermore, Plaintiffs would require that Google begin its disgorgement deposits "within 30 calendar days of entry of th[e] Final Judgment and every 90 calendar days thereafter." Id. §§ XII(B)-(C).

[39] Because the Court will not require the Open-Source Auction, Plaintiffs' proposal that the escrow fund would "defray the costs" of "administering the Open-Source Auction" is moot. See Plaintiffs' PFJ § XII(D).

(testifying that Plaintiffs' proposed escrow fund is "necessary" for publishers because switching publisher ad servers is "a heavy lift for publishers, big or small"); Rem. Tr. Sept. 24 AM 62:13-63:1 (Lee (Pls. Expert)) (explaining that Plaintiffs' proposal "would help with . . . enhancing competition in the publisher ad server market" because "the provision that reduces customer switching costs more directly helps with competition, as competition tends to be enhanced if consumers can more easily choose among alternatives without incurring significant costs").

The Court will not include Plaintiffs' escrow fund and disgorgement provisions in the Final Judgment because their "lack of specifics is fatal."[40] Google Search, 803 F. Supp. 3d at 149. Although there was evidence presented during the remedies trial that publishers would benefit from the escrow fund, see Rem. Tr. Sept. 26 85:25-87:3 (Racic (Prebid)); Rem. Tr. Sept. 29 AM 22:22-23:1 (Creput (Equativ)); Rem. Tr. Sept. 24 AM 62:13-63:1 (Lee (Pls. Expert)), Plaintiffs fail to explain the linkage between the disgorgement amounts sought—50 percent of the net revenues from AdX and DFP—and the Court's findings concerning AdX's supracompetitive fees, see [Dkt. No. 1761] at 17. And Plaintiffs' requirement that Google disgorge DFP net revenues is wholly untethered to the Court's liability findings, as the Court did not make any finding regarding DFP's fees. See Google, 778 F. Supp. 3d at 852 (finding that "Google has not exercised its monopoly power to raise DFP's prices"). Plaintiffs also fail to specify how the disgorgement amounts would be distributed across publishers looking to switch publisher ad servers. For these

[40] Google makes a legal argument in response to Plaintiffs' disgorgement remedy, asserting that "the Sherman Act does not contain explicit authority for seeking disgorgement in a civil suit." [Dkt. No. 1811] at 40 (citing 15 U.S.C. §§ 4, 15a). Contrary to Google's assertions, federal district courts have affirmatively held that "federal courts may award disgorgement of profits as a remedy for Sherman Act violations." In re TFT-LCD (Flat Panel) Antitrust Litig., No. C 10-4346 SI, 2011 WL 2790179, at *3 (N.D. Cal. July 12, 2011) (citing United States v. Keyspan Corp., 763 F. Supp. 2d 633, 638-41 (S.D.N.Y. 2011)).

reasons, the Court cannot find that these remedies are "tailored to fit the wrong creating the occasion for the remedy." Microsoft I, 253 F.3d at 107.

3. Legal and Ethical Compliance Program

Plaintiffs propose that Google establish a legal and ethical compliance program for its employees, in which "Google must train its officers and employees" regarding: (1) "the meaning and requirements of [the] Final Judgment"; (2) "U.S. antitrust laws"; (3) "obligations to preserve and produce materials for use in investigations, litigations, or regulatory filings"; and (4) "the appropriate use of the attorney-client privilege and the attorney work product doctrine." Plaintiffs' PFJ § XIII(E)(1). Google would have to report to the Monitor and Plaintiffs "any judgment, determination, or finding, whether interim or final, by a court or agency that Google failed to comply with the Sherman Act or Clayton Act, or its obligations to preserve or produce materials for use in investigations, litigations, or regulatory filings." Id. § XIII(E)(2).

Plaintiffs argue that the legal and ethical compliance program is necessary because Google has "demonstrated a wide-spread culture of failing to comply with its legal and ethical obligations" relating to its document retention policies and practices, including in this proceeding.[41] [Dkt. No. 1430] at 15-16 & n.2 (first citing Google, 778 F. Supp. 3d at 872-73; then citing In re Google Play Store Antitrust Litig., 664 F. Supp. 3d 981, 993-94 (N.D. Cal. 2023) (finding that "Google did not take reasonable steps to preserve electronically stored information that should have been preserved in the anticipation or conduct of litigation" regarding Google Chat); and then citing United States v. Google LLC, 747 F. Supp. 3d 1, 187 (D.D.C. 2024) (finding that Google failed to preserve chat evidence)). But as discussed above in Section IV(C), the Court declined to adopt an

[41] Plaintiffs raise no arguments or evidence to support the need for a legal and ethical compliance program requiring Google to train its officers and employees regarding the Final Judgment and U.S. antitrust laws; however, the Court finds that these provisions substantially overlap with the duties of the Internal Compliance Officer, which the Court will approve. See supra Section IV(C).

adverse inference regarding Google's mishandling of electronically stored information and rejected Plaintiffs' request for sanctions. Google, 778 F. Supp. 3d at 872-73. Plaintiffs' rationale for the legal and ethical compliance program is therefore insufficiently tailored to the Court's liability findings and will be rejected. Moreover, the Monitor, Technical Committee, and Internal Compliance Officer provisions should serve to prevent such conduct.

4. Affidavits and Compliance Inspection

Google does not object to Plaintiffs' proposal that it: "deliver to Plaintiffs an affidavit, signed by Google's Chief Financial Officer and General Counsel, describing in reasonable detail the fact and manner of Google's efforts to comply with [the] Final Judgment" every 30 days after entry of the Final Judgment, until a Monitor has been appointed, Plaintiffs' PFJ § XIV(A); and "permit authorized representatives" of Plaintiffs to: (1) "have access during Google's business hours to inspect and copy, or . . . require Google to provide electronic copies of all books, ledgers, accounts, records, data, and documents . . . in Google's possession, custody, or control" regarding the Final Judgment; (2) interview "any Google officers, employees, or agents . . . relating to any matters contained in [the] Final Judgment"; and (3) "require Google to provide written reports to Plaintiffs or to respond to written interrogatories from Plaintiffs" regarding the Final Judgment, id. § XV.[42] Because Google does not object to these proposed remedies, the Court will adopt them as part of the Final Judgment. See also Google Search Final Judgment, at 27-28 (adopting similar compliance inspection provisions).

[42] Plaintiffs would also require Google to retain all records of any efforts made to divest AdX and DFP Remainder, Plaintiffs' PFJ § XIV(B); however, because the Court will not require structural remedies, this provision is moot.

E. Effective Date and Term of Final Judgment

The parties disagree about the term of the Final Judgment, as well as its effective date. Plaintiffs propose that the Final Judgment become effective "on the date the Court enters" it and remain in effect for 15 years, with the possibility of an extension upon Court order pursuant to a request from Plaintiffs or the Monitor. Plaintiffs' PFJ §§ V(A), V(E)-(F). Google asks for an effective date 120 days after entry of the Final Judgment, and a 6-year term. Google's PFJ §§ V(1)-(2).

Google's proposal for a 6-year term is appropriate.[43] "That term accounts for the [C]ourt's expectation that it will take one year to establish the [Monitor and the] Technical Committee and the processes necessary for execution" of the Final Judgment. Google Search, 803 F. Supp. 3d at 159. The major administrative challenges the Court envisions include: (1) Google's creation of Application Programming Interfaces to facilitate interoperability between AdX and DFP and Prebid, and interoperability between AdX and rival publisher ad servers; (2) Google's development of any technical infrastructure to carry out its data-sharing obligations; and (3) establishing the proper format and reporting frequency of DFP technical documentation. The 6-year term will provide competitors in the ad exchange and publisher ad server markets with ramp-up time to build the capacity to compete with Google. It will also provide a sufficient "timeline for the [C]ourt to 'clarify[] and reconsider[]' the [F]inal [J]udgment 'in light of changing market realities'—or the lack of such change." Id. (quoting Alston, 594 U.S. at 106-07 (alterations in original)); see United Shoe, 391 U.S. at 251 (describing the Court's "duty . . . to modify the decree so as to assure the complete extirpation of the illegal monopoly"). This term is consistent

[43] If the Final Judgment has not been fully satisfied within 6 years, the Court has the authority to extend its term.

with the 6-year term adopted in Google Search, 803 F. Supp. 3d at 159, and the 5-year term adopted in Microsoft II, 224 F. Supp. 2d at 183-84.

Plaintiffs' proposed 15-year term—a significant upward departure from the 10-year term requested by the Google Search plaintiffs and the 10-year term requested by the Microsoft II plaintiffs—runs the risk of "impairing rather than enhancing competition," especially given the Supreme Court's warning "that markets are often more effective than the heavy hand of judicial power when it comes to enhancing consumer welfare." Alston, 594 U.S. at 102, 106. Moreover, for technological industries like the one at issue, which are "remarkable for [their] constant and rapid change," imposing a remedy "is not unlike trying to shoe a galloping horse." Microsoft II, 224 F. Supp. 2d at 184; accord Google Search, 803 F. Supp. 3d at 160 ("Plaintiffs' proposed 10-year term runs the risk of growing stale in these fast-moving times . . . ."). As industry witnesses testified, the rapid emergence of AI and supply-path optimization are likely to dramatically change the industry. See supra Section II(C). Plaintiffs' proposed 15-year term may have been informed by the recognition that structural remedies would require multi-year horizons; however, the Court's rejection of such remedies mitigates the need for the Final Judgment lasting 15 years. By imposing only behavioral remedies, the Final Judgment should be implemented within 15 months. See Rem. Tr. Nov. 21 AM 44:16-20 (Def. Closing Arg.).

As to the Final Judgment's effective date, the Court will again follow what was done in Google Search and order that the Final Judgment "take effect 60 days after it is entered," except for the requirement that the parties begin working to appoint the Monitor and form the Technical Committee, an obligation that "will be effectively immediately." 803 F. Supp. 3d at 160.

F. Remaining Provisions

1. Geographic Scope of Injunction

The parties disagree as to the geographic scope of the Final Judgment. The Court found in the liability phase that based on the "globally networked nature of the Internet[, which] has resulted in worldwide competition among ad tech providers," "the worldwide market . . . is the relevant geographic market for both the open-web display publisher ad server market and open-web display ad exchange market." Google, 778 F. Supp. 3d at 848. Despite this finding, Google argues that "[a] United States court should not impose an injunction that would operate outside the nation's borders" because of international comity principles. [Dkt. No. 1811] at 10 (citing In re Google Play Store Antitrust Litig., No. 20-CV-05671-JD, 2024 WL 4438249, *4 (N.D. Cal. Oct. 7, 2024) (limiting permanent injunction to the United States despite a liability finding that the relevant geographic market was worldwide) aff'd, 147 F.4th 917 (9th Cir. 2025)). Although Plaintiffs do not raise explicit arguments on this issue, to the extent they sought divestiture of AdX and DFP Remainder, and the open-sourcing of DFP's final auction logic, the result would have had worldwide impact. See, e.g., Plaintiffs' PFJ §§ VI-VIII.

Although the Sherman Act "does not authorize federal courts to 'regulate the competitive conditions of other nations' economies,'" Google, 778 F. Supp. 3d at 847 (quoting Matsushita Elec. Indus. Co. v. Zenith Radio Corp., 475 U.S. 574, 582 (1986)), federal courts have consistently applied the Sherman Act extraterritorially "where the failure to extend the scope of the statute to a foreign setting will result in adverse effects within the United States," Env't Def. Fund, Inc. v. Massey, 986 F.2d 528, 531 (D.C. Cir. 1993) (collecting cases). Substantial evidence presented in both the liability and remedies trials demonstrates that "[a]d tech providers . . . have built global infrastructure" and "view themselves as competing globally." Google, 778 F. Supp. 3d at 848-49.

Therefore, any injunction that aims to remedy competition must reach worldwide, or else risk "adverse effects within the United States." Env't Def. Fund, 986 F.2d at 531.

The Court also finds, as a practical matter, that applying the Final Judgment on a global basis should be easier to administer and monitor. Evidence presented during the liability trial showed that Google operates its ad tech products on a global basis, for example, by charging "consistent ad exchange fees" and by "often test[ing] and implement[ing] product and policy changes, including much of the conduct at issue in this litigation," worldwide. Google, 778 F. Supp. 3d at 848 (citations omitted). For Google, a worldwide application of the Final Judgment would entail product changes that are consistent across all regions, in line with its current operations. The global application of the Final Judgment is also optimal for assessing whether imposed remedies are effective in restoring competition in the relevant ad tech markets, which are worldwide. For these reasons, the Final Judgment will apply beyond the United States and reach globally.

2. Fees and Costs

The Court will not include in the Final Judgment Plaintiffs' PFJ § XVI, which awards fees and costs to Plaintiffs. A request for such an award must be made in a separate motion.

V. Conclusion

For the reasons explained in this Memorandum Opinion, the Court rejects Plaintiffs' proposals for structural remedies in the form of the divestiture of AdX, the open-sourcing of DFP's final auction logic, and the contingent divestiture of DFP Remainder. Most of the parties' proposed behavioral remedies, as modified by this Court, have been accepted.

To ensure that the Final Judgment has the necessary clarity, by the Order accompanying this Memorandum Opinion, the parties will be required to meet and confer and within 30 days file one jointly proposed Final Judgment, reflecting the decisions and modifications imposed in this

Memorandum Opinion and resolving any still-disputed issues. If any provision remains unresolved, the parties must include their respective versions of that provision in the proposed Final Judgment, labeled as to the proponent. No argument or explanation supporting the provision is to be included. The parties will be notified if further briefing or oral argument is needed.

Because a significant amount of sealed material was referenced during the trial, this Memorandum Opinion will be filed under seal for 14 days to enable the parties to review it for any needed redaction. Requests for redactions must be kept to a minimum and must be supported by sound reasons. If no redactions are requested, this Memorandum Opinion will be unsealed. If any redactions are requested and the Court finds them meritorious, this Memorandum Opinion will remain under seal and a redacted version will be filed publicly.

Entered this 2ND day of September, 2026.

Alexandria, Virginia

/s/ LMB
Leonie M. Brinkema
United States District Judge