

NOTE

Cleaning Up Digital Pollution: Applying Environmental Law to Jurisdictional Issues in Internet Data Extraction Cases

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ABSTRACT

The current approach used by district and circuit courts to test personal jurisdiction in internet data extraction cases has made it increasingly difficult—and sometimes impossible—for plaintiffs to sue companies that collect and exploit their personal data without their knowledge. Lower courts’ interpretations of the Supreme Court’s precedent on specific personal jurisdiction have resulted in situations where no state is able to assert specific jurisdiction over these claims. In cases involving foreign companies, who are not “at home” anywhere in the United States, as defendants, general jurisdiction is also unavailable, leaving plaintiffs with no avenue for relief when their privacy is violated. This issue has become more prevalent with the rise of cases involving “session replay” code, an internet data-tracking software that frequently violates state privacy and wiretapping statutes.

This Note proposes that courts should evaluate whether specific personal jurisdiction is proper in data extraction cases using environmental pollution cases as a template. By analogizing to a more common, less technologically complicated cause of action, courts will better understand when their exercise of jurisdiction over a defendant is fair and comports with the due process requirements of the Fourteenth Amendment.

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INTRODUCTION

Nine out of ten U.S. adults say they go online every day.¹ Even though much of modern life takes place on the internet, the judiciary has struggled to keep pace with this evolving reality. Courts have had difficulty evaluating personal jurisdiction on the internet for as long

¹ See Risa Gelles-Watnick, *Americans' Use of Mobile Technology and Home Broadband*, PEW RSCH. CTR. (Jan. 31, 2024), <https://www.pewresearch.org/internet/2024/01/31/americans-use-of-mobile-technology-and-home-broadband/> [<https://perma.cc/X4H7-JHBJ>].

as the technology has existed.² For online conduct that resembles traditional causes of action, courts have used pre-internet cases to guide their analysis, albeit imperfectly.³ But cyberspace is rapidly evolving and connecting people around the world in ways unanticipated by caselaw.⁴ New online behavior does not fit neatly into old legal frameworks, leading to confusion and disagreement among courts and legal scholars.⁵ This problem is exacerbated by judges' limited understanding of fact patterns involving technology and the internet, which makes it difficult for them to perform the fact-intensive inquiry that personal jurisdiction requires.⁶ Despite ongoing uncertainty in the area of internet personal jurisdiction, the Supreme Court has yet to provide guidance on the topic, leaving the circuits to rely on the standard personal jurisdiction canon for their analysis.⁷

Courts are especially perplexed by personal jurisdiction in cases arising from online data extraction. Data extraction is the process by which website operators collect, store, and sell personal identifying information from users of their site—frequently without their knowledge.⁸

² See 4A WRIGHT & MILLER'S FEDERAL PRACTICE & PROCEDURE § 1073 (4th ed. 2025).

³ See, e.g., *C.W. Downer & Co. v. Bioriginal Food & Sci. Corp.*, 771 F.3d 59, 66 (1st Cir. 2014) (applying the Supreme Court's analysis of a breach of contract action in *Burger King Corp. v. Rudzewicz*, 471 U.S. 462, 479 (1985), to an internet contract); *Silver v. Brown*, 382 F. App'x 723, 728–29 (10th Cir. 2010) (applying the Supreme Court's analysis of a defamation action via a magazine article in *Calder v. Jones*, 465 U.S. 783 (1984), to defamation on an internet blog).

⁴ See *J. McIntyre Mach., Ltd. v. Nicastro*, 564 U.S. 873, 887 (2011) (Breyer, J., concurring) (“[T]here have been many recent changes in commerce and communication, many of which are not anticipated by our precedents.”).

⁵ See M. Margaret McKeown, *The Internet and the Constitution: A Selective Retrospective*, 9 WASH. J.L. TECH. & ARTS 135, 143–47 (2014) (“Personal jurisdiction once seemed so easy . . . [t]hen came the computer, the web, and the cloud. Courts were flummoxed on how to approach the topic”); Katherine Neikirk, Note, *Squeezing Cyberspace into International Shoe: When Should Courts Exercise Personal Jurisdiction over Noncommercial Online Speech?*, 45 VILL. L. REV. 353, 355 (2000) (“It is unclear . . . whether personal jurisdiction principles derived from notions of state sovereignty and territorial limits can apply neatly to technology with no geographical boundaries or physical presence.”).

⁶ See, e.g., Lawrence Hurley, *In U.S., When High-Tech Meets High Court, High Jinks Ensue*, REUTERS (May 9, 2014, at 12:28 ET), <https://www.reuters.com/article/2014/05/09/us-usa-court-tech-idUSBREA480N420140509/> [<https://perma.cc/A59F-HFTU>]; Vittoria Elliot & Dell Cameron, *The US Supreme Court Doesn't Understand the Internet*, WIRED (Feb. 22, 2023, at 11:30 ET), <https://www.wired.com/story/the-supreme-court-section-230-the-internet/> [<https://perma.cc/M2EJ-7C9W>].

⁷ See *Walden v. Fiore*, 571 U.S. 277, 290 n.9 (2014) (“[T]his case does not present the very different questions whether and how a defendant's virtual ‘presence’ and conduct translate into ‘contacts’ with a particular State.”); see also Paul Schiff Berman, *The Future of Jurisdiction*, 102 WASH. U. L. REV. 1169, 1171 (2025) (“[A]t least three decades into the Internet and information economy, the U.S. Supreme Court has yet to land on a coherent jurisdictional framework for the new century.”).

⁸ A study conducted by the University of Pennsylvania found that only forty-six percent of American adults know websites can track their activity across devices without logging in, and just

One of the most common and invasive types of data extraction is performed using “session replay” code, which is a third-party technology that can record all user movements, including mouse activity, clicks, keystrokes, and input of personal data—even text that a user types then deletes.⁹ Unlike other analytics tools that aggregate data, session replay code allows companies to record and play back an individual visitor’s browsing session, “as if someone is looking over [the user’s] shoulder.”¹⁰

Because session replay code collects nothing short of a “firehose of information”¹¹ and is prone to improper implementation,¹² its use often constitutes a serious invasion of privacy that has given rise to claims under state wiretapping statutes.¹³ Tracking a user’s clicks while online shopping to improve marketing strategy may seem relatively harmless.¹⁴ But session replay code is also used by companies in sensitive industries, such as finance and healthcare.¹⁵ Often, these companies collect far

forty-four percent understand that a privacy policy does not prevent a company from sharing user data with third parties. See JOSEPH TUROW, YPHTACH LELKES, NORA A. DRAPER & ARI EZRA WALDMAN, UNIV. PA. ANNENBERG SCH. FOR COMM’N, AMERICANS CAN’T CONSENT TO COMPANIES’ USE OF THEIR DATA 10 (2023).

⁹ See J. THOMAS MCCARTHY & ROGER E. SCHECHTER, THE RIGHTS OF PUBLICITY AND PRIVACY § 5:92 (2d ed. 2025). As of 2022, over 12,000 of the 80,000 most visited websites used session-recording technology to capture “all user interactions on a page—including scrolls and mouse movements.” Aaron Sankin & Surya Mattu, *The High Privacy Cost of a “Free” Website*, THE MARKUP (Sep. 22, 2022, at 06:00 ET), <https://themarkup.org/blacklight/2020/09/22/blacklight-tracking-advertisers-digital-privacy-sensitive-websites> [<https://perma.cc/532H-LZUM>].

¹⁰ Steven Englehardt, *No Boundaries: Exfiltration of Personal Data by Session-Replay Scripts*, PRINCETON UNIV. CTR. FOR INFO. TECH. POL’Y: BLOG (Nov. 15, 2017), <https://blog.citp.princeton.edu/2017/11/15/no-boundaries-exfiltration-of-personal-data-by-session-replay-scripts/> [<https://perma.cc/XCN5-98M6>].

¹¹ FullStory, the leading developer of the tool, describes session replay code as a “firehose of information” and promises that “[a]s [companies] get comfortable with navigating the massive amount of information captured by a session replay tool, [they] will discover new ways to mine [their] sessions for insights—things that you never could have learned with a traditional web analytics platform alone.” *The Definitive Guide to Session Replay*, FULLSTORY: BLOG (Oct. 8, 2024), <https://www.fullstory.com/blog/session-replay/> [<https://perma.cc/V8LT-B6BZ>].

¹² See Englehardt, *supra* note 10.

¹³ See, e.g., *Javier v. Assurance IQ, LLC*, No. 21-16351, 2022 WL 1744107, at *2 (9th Cir. May 31, 2022) (holding that allegations concerning a retailer’s use of session replay code were sufficient to state a claim under the California Invasion of Privacy Act, CAL. PENAL CODE § 631 (West 2023)); *Popa v. Harriet Carter Gifts, Inc.*, 52 F.4th 121, 133 (3d Cir. 2022) (reaching the same conclusion under Pennsylvania’s Wiretapping and Electronic Surveillance Control Act, 18 PA. CONS. STAT. § 5725(a)). Courts have also found such allegations sufficient to establish standing. See, e.g., *Schnur v. JetBlue Airways Corp.*, No. 2:22-1621, 2024 WL 2816552, at *7 (W.D. Pa. June 3, 2024) (holding that alleged nonconsensual recording of online activity bears a close relationship to traditional invasion-of-privacy harms and is sufficient for standing).

¹⁴ See *The Definitive Guide to Session Replay*, *supra* note 11.

¹⁵ See Englehardt, *supra* note 10. Princeton University’s Center for Information Technology Policy conducted a study finding that websites like Walgreens.com have, through their use of session replay code, leaked information including medical conditions and prescriptions to the tool’s developers, coupled with names of users. *Id.*

more extensive personal data than they need or intend.¹⁶ That information then can be stored indefinitely or shared with anywhere from forty to 100 third parties, increasing its susceptibility to misuse.¹⁷ Experts on data privacy agree that as long as the tool continues to gather and share such massive amounts of personal information, leaks are inevitable, no matter what precautions companies attempt to take.¹⁸ As users become more aware that websites are covertly recording and sharing their personal information, lawsuits for data extraction have become more frequent.¹⁹

Courts' current approach to determining personal jurisdiction in internet data extraction cases has made it increasingly difficult—and sometimes impossible—for plaintiffs to sue companies engaged in unlawful activity. Courts disagree on the application of conventional personal jurisdiction doctrine to the unique and technical fact patterns of these cases, which has resulted in situations where no state has been able to assert specific jurisdiction over data extraction-related claims that violated a state's law and harmed its residents.²⁰ This issue is exemplified by three recent decisions in the U.S. courts of appeals, where each court declined to exercise specific jurisdiction.²¹ In cases involving foreign companies, who are not “at home” anywhere in the United States, as defendants, general jurisdiction is also unavailable.²² This

¹⁶ See Lily Hay Newman, *Covert 'Replay Sessions' Have Been Harvesting Passwords by Mistake*, WIRED (Feb. 26, 2018, at 12:32 ET), <https://www.wired.com/story/covert-replay-sessions-harvesting-passwords/> [https://perma.cc/Y2SR-68MR].

¹⁷ See Nitasha Tiku, *The Dark Side of 'Replay Sessions' That Record Your Every Move Online*, WIRED (Nov. 16, 2017, at 06:00 ET) (quoting Ashkan Soltani, a security and privacy researcher and former chief technologist for the Federal Trade Commission), <https://www.wired.com/story/the-dark-side-of-replay-sessions-that-record-your-every-move-online/> [https://perma.cc/ZQL7-CS4L].

¹⁸ See Newman, *supra* note 16 (“We’ve had responses from the vendors, they promise to do more on detecting these kinds of leaks,” says Günes Acar, a postdoctoral researcher at Princeton who studies online tracking. “But these leaks will happen no matter what unless they stop collecting all inputs from fields.”).

¹⁹ See Ian M. Ross & Brian M. Trujillo, *Pixels and Privacy: A New Wave of Class Action Litigation*, DAILY BUS. REV. ONLINE (Mar. 15, 2024), <https://www.law.com/dailybusinessreview/2024/03/15/pixels-and-privacy-a-new-wave-of-class-action-litigation/> [https://perma.cc/N4DR-YL3R].

²⁰ See *infra* Part II.

²¹ See *Hasson v. FullStory, Inc.*, 114 F.4th 181, 181–82, 185 (3d Cir. 2024) (affirming the dismissal of one data extraction case and remanding another, both on specific personal jurisdiction grounds); *Rosenthal v. Bloomingdales.com*, 101 F.4th 90, 90, 93 (1st Cir. 2024) (affirming a lower court’s dismissal of the case for want of personal jurisdiction “notwithstanding the defendant’s use of session replay code”); *Briskin v. Shopify, Inc. (Briskin I)*, 87 F.4th 404, 404, 413 (9th Cir. 2023) (affirming the dismissal of the plaintiff’s complaint that claimed the defendants were subject to personal jurisdiction through operation of a nationally available e-commerce company), *rev’d on reh’g*, 135 F.4th 739 (9th Cir. 2025) (en banc).

²² Cf. *Briskin I*, 87 F.4th at 409, 411 (noting that the plaintiff acknowledged the court lacked general jurisdiction over Shopify because the company was incorporated in Canada).

leaves many plaintiffs with no legal recourse, even though their privacy was violated.

As companies continue to use data extraction technologies like session replay code in ways that break state privacy and wiretapping statutes, developing a consistent method to determine personal jurisdiction in these cases that allows plaintiffs to hold companies accountable in the proper forum is essential. But a solution must also fit within the controlling Supreme Court precedent on personal jurisdiction, most of which was decided before the internet—and certainly before session replay code—existed.²³ Any approach must also be accessible enough for all judges to understand, even those without a deep knowledge of the technical minutiae of the internet and data extraction.²⁴

To avoid the gap in accountability created by past attempts at defining personal jurisdiction in the context of data extraction, courts should evaluate whether specific personal jurisdiction is proper for these cases by looking to the factors courts have considered when assessing specific jurisdiction in environmental pollution cases. Environmental pollution claims are like data extraction in that they also involve intangible, frequently cross-border conduct, which makes jurisdictional analysis complicated. Courts have developed a successful approach to determining jurisdiction for pollution claims,²⁵ however, and this can serve as a template to guide courts' analysis for data extraction cases.

Part I of this Note traces the foundational principles of specific personal jurisdiction required by the Due Process Clause of the Fourteenth Amendment. Part I also introduces the two tests that the Supreme Court has created to determine when a defendant's actions meet the due process requirements for specific personal jurisdiction. Part II examines three recent cases in the U.S. courts of appeals arising from data extraction and session replay code and demonstrates that each court's approach to assessing specific personal jurisdiction is unworkable and often leads to absurd results. Part III highlights the commonalities in jurisdictional analysis for environmental pollution cases across federal and state courts. Part IV explains that because of the parallels between the two causes of action, courts' jurisdictional analysis in pollution cases can provide a template for their analysis in data extraction cases and improve their understanding of the complex cause of action. It proposes a three-factor, supplemental test based on environmental pollution

²³ See *infra* Part IV.

²⁴ During oral argument for two consolidated session replay code cases addressing personal jurisdiction before the Court of Appeals for the Third Circuit, one of the three judges on the panel referred to himself as a “dedicated Luddite” who had difficulty understanding the technical details of the software at issue. Jennifer Kay, ‘Luddite’ Federal Judges Will Decide Web-Tracking Software Case, BLOOMBERG L. (Apr. 18, 2024, at 13:07 ET), <https://www.bloomberglaw.com/product/blaw/bloomberglawnews/bloomberg-law-news/XD2L1IJG000000> [<https://perma.cc/2FNS-JNJH>].

²⁵ See *infra* Part III.

cases, requiring courts to examine (1) evidence that “pollution” regularly reaches the forum, (2) the nature of the system connecting the forum and defendant, and (3) the amount of control the defendant has over containing the pollution byproduct of their hazardous activity. Part IV also reevaluates the previously discussed circuit cases under this new framework and explains how the application of these factors would affect the outcome of each case.²⁶

I. FOUNDATIONAL PRINCIPLES OF PERSONAL JURISDICTION

Personal jurisdiction is the authority of a court to issue judgments that bind a defendant.²⁷ The Due Process Clause of the Fourteenth Amendment limits this power to protect individuals and companies from being forced to litigate in a state with which they have no connection and to prevent states from encroaching on each other’s interests.²⁸

There are two types of personal jurisdiction: general and specific. General jurisdiction is broad, allowing a forum state to adjudicate any and all claims brought against a defendant.²⁹ But a state may only assert this all-purpose jurisdiction over a defendant who is “at home” in the forum.³⁰ Because the one or two states with general jurisdiction over a

²⁶ This Note is not intended to define a test or framework for analyzing personal jurisdiction across all internet cases. Although many tests have been suggested by legal scholars and used by lower courts to understand personal jurisdiction in other internet-related contexts, the factors considered in those proposed frameworks provide little guidance in the unique context of data extraction, which is the focus of this Note. *See, e.g.*, 59 AM. JUR. PROOF OF FACTS 3D *Proof of Personal Jurisdiction in the Internet Age* § 8, Westlaw (database updated July 2025) (discussing the sliding scale test from *Zippo Mfg. Co. v. Zippo Dot Com, Inc.*, 952 F. Supp. 1119 (W.D. Pa. 1997), which determines jurisdiction for causes of action arising from information or activity on a website reaching a member of a forum based on the degree of interactivity of that site); Richard E. Kaye, Annotation, *Internet Website Activities of Nonresident Person or Corporation as Conferring Personal Jurisdiction Under Long-Arm Statutes and Due Process Clause*, 81 A.L.R. 5th 41 §§ 9–13 (2000) (discussing specialized tests for trademark, copyright, and patent infringement on the internet).

²⁷ *See Int’l Shoe Co. v. Washington*, 326 U.S. 310, 316 (1945).

²⁸ *See* U.S. CONST. amend. XIV; *World-Wide Volkswagen Corp. v. Woodson*, 444 U.S. 286, 291–93 (1980) (discussing the reasoning behind the limitation of personal jurisdiction over nonresident defendants). Although the Fourteenth Amendment directly controls the exercise of jurisdiction by state courts, the same analysis also applies to federal courts sitting in diversity. *See Wilson v. Belin*, 20 F.3d 644, 646 (5th Cir. 1994) (“In a diversity suit, a federal court has personal jurisdiction over a nonresident defendant to the same extent that a state court in that forum has such jurisdiction.”). *Compare* *Bristol-Myers Squibb Co. v. Superior Ct.*, 582 U.S. 255, 261–62 (2017) (analyzing Fourteenth Amendment requirements for personal jurisdiction in a case brought in a California state court), *with* *Burger King Corp. v. Rudzewicz*, 471 U.S. 462, 485–87 (1985) (analyzing Fourteenth Amendment requirements for personal jurisdiction in a diversity action brought in federal court in the Southern District of Florida).

²⁹ *See* *Goodyear Dunlop Tires Operations, S.A. v. Brown*, 564 U.S. 915, 919 (2011).

³⁰ For the purpose of general jurisdiction, an individual is considered “at home” in the state where they are domiciled, whereas a corporation is at home in its state of incorporation and principal place of business. *See Daimler AG v. Bauman*, 571 U.S. 117, 137–39 (2014) (holding a foreign

defendant are “unique” and “easily ascertainable,” there is little room for corporations to contest their jurisdiction.³¹

In contrast, specific jurisdiction is “case-linked,” in that it gives a forum state power over a wider range of defendants who are not “at home” in the state, but only in relation to “a narrower class of claims.”³² As a result, specific jurisdiction more frequently serves as the basis for jurisdiction in federal courts than general jurisdiction.³³ For specific personal jurisdiction to comport with due process, the defendant’s connection with the forum must be strong enough that the defendant “should reasonably anticipate being haled into court there.”³⁴ Because specific jurisdiction turns on the unique facts of each individual case, it tends to be the focal point of most personal jurisdiction disputes.³⁵

A. *The Origin of Specific Personal Jurisdiction: International Shoe Co. v. Washington*

*International Shoe Co. v. Washington*³⁶ marked the birth of the Supreme Court’s modern personal jurisdiction doctrine, establishing that a defendant’s “minimum contacts” with a state are sufficient to confer specific jurisdiction.³⁷ The landmark case arose when Washington state sued International Shoe Company for unpaid taxes.³⁸ Washington argued that because International Shoe employed Washington-based salespeople who took orders for its products from state residents, the business was obligated to contribute to Washington’s unemployment compensation scheme.³⁹ International Shoe countered that Washington lacked jurisdictional and taxation power over the company because it kept no permanent offices or merchandise in the state.⁴⁰

Under the territorial regime that preceded *International Shoe*, a forum state could exercise adjudicatory authority only over a defendant physically present in the state, through *in personam* jurisdiction, or over property located within the forum, thorough *in rem* or *quasi in rem*

corporation was not at home, and therefore general jurisdiction was unavailable, anywhere in the United States).

³¹ See *id.* at 137.

³² *Ford Motor Co. v. Montana*, 592 U.S. 351, 358–60 (2021).

³³ See Michael E. Solimine, *The Quiet Revolution in Personal Jurisdiction*, 73 TUL. L. REV. 1, 10, 32–41 (1998).

³⁴ *World-Wide Volkswagen Corp. v. Woodson*, 444 U.S. 286, 297 (1980).

³⁵ See *Daimler*, 571 U.S. at 128.

³⁶ 326 U.S. 310 (1945).

³⁷ *Id.* at 312, 316–17.

³⁸ Washington state could not assert general jurisdiction over International Shoe because the company was incorporated in Delaware with its principal place of business in Missouri. See *id.* at 310–13.

³⁹ See *id.* at 313–25.

⁴⁰ See *id.* at 313–16.

jurisdiction.⁴¹ But with the rise of corporations—purely legal entities that could conduct business and cause harm without being physically present or owning property in a state—the Court recognized that the traditional methods of asserting jurisdiction needed to adapt.⁴² Accordingly, *International Shoe* held that a forum state’s exercise of specific personal jurisdiction is consistent with due process as long as the defendant has “certain minimum contacts with [the forum] such that maintenance of the suit does not offend ‘traditional notions of fair play and substantial justice.’”⁴³

Although many modern scholars now criticize *International Shoe*’s “minimum contacts” requirement as being too restrictive on jurisdiction due to its increased focus on the subjective intent of the defendant,⁴⁴ when the case was decided in 1945, it initiated a significant expansion of states’ authority to assert jurisdiction beyond the rigid *in personam* and *in rem* frameworks that had previously governed.⁴⁵ The ruling acknowledged that technology made interstate connections easier and more common.⁴⁶ This change meant due process no longer required a defendant to be served in a certain state or own property there, and necessitated a more flexible approach to jurisdiction.

Today, application of the *International Shoe* framework is imprecise, because it was developed in a time when “contacts” were understood only in physical terms. The Court’s analysis primarily focused on tangible connections, such as salespeople operating within a state or orders being mailed there, to indicate the business’s activities were physically present in the state.⁴⁷ The Justices in 1945 could not have foreseen the technological developments in the latter half of the twentieth century that would allow businesses to interact with residents of a state without any physical conduct there. As a result, *International Shoe* provides no guidance for when a purely virtual interaction between a defendant

⁴¹ See *Shaffer v. Heitner*, 433 U.S. 186, 199–200 (1977) (quoting *Pennoyer v. Neff*, 95 U.S. 714, 720 (1877)), *superseded by statute*, 10 DEL. CODE ANN. tit. 10, § 3114 (1977).

⁴² See *Int’l Shoe*, 326 U.S. at 316–17.

⁴³ *Id.* at 316 (quoting *Milliken v. Meyer*, 311 U.S. 457, 463 (1940)).

⁴⁴ See, e.g., Cody J. Jacobs, *In Defense of Territorial Jurisdiction*, 85 U. CHI. L. REV. 1589, 1589 (2018) (“While [*International Shoe*] is traditionally cast as a step toward expanding personal jurisdiction, the minimum contacts test has now become a greater restraint on state power than the territorial regime that preceded it.”).

⁴⁵ See Charles W. “Rocky” Rhodes, *Nineteenth Century Personal Jurisdiction Doctrine in a Twenty-First Century World*, 64 FLA. L. REV. 387, 400 (2012) (“Over the next dozen years [following *International Shoe*], the Court interpreted constitutional jurisdictional limits as establishing minimal restraints on the reach of state courts.”); see also *McGee v. Int’l Life Ins.*, 355 U.S. 220, 222 (1957) (noting that between *International Shoe* in 1945 and *McGee* in 1957, “a trend [was] clearly discernible toward expanding the permissible scope of state jurisdiction over foreign corporations and other nonresidents”).

⁴⁶ See *Int’l Shoe*, 326 U.S. at 316–17.

⁴⁷ See *id.* at 313–14.

and a state constitutes a “minimum contact.” Despite the case’s inability to anticipate the proliferation of intangible connections across states, the Supreme Court continues to rely on *International Shoe* as the cornerstone of its jurisdictional analysis.⁴⁸ Building on *International Shoe*’s foundation, the Court’s subsequent cases have effectively produced two approaches for assessing minimum contacts: the “traditional” test and the “effects” test.⁴⁹

B. *The Traditional Test*

The traditional test for specific personal jurisdiction requires that (1) “the defendant purposefully avail[ed] itself of” the benefits of the forum state and its residents through its in-state activities, and (2) the plaintiff’s claim “arises out of” or “relates to” those activities.⁵⁰ This approach tends to be best suited for cases where a contract or physical contacts connect the defendant with the forum state, as seen in *International Shoe*.⁵¹

The current formulation of the traditional test is best illustrated by the Supreme Court’s decision in *Burger King Corp. v. Rudzewicz*,⁵² where the Court held that a long-term, deliberately structured relationship connecting the defendant with a state was sufficient to establish “purposeful availment.”⁵³ Burger King, a Florida corporation, sued two Michigan franchisees for breach of contract and trademark

⁴⁸ See *Ford Motor Co. v. Montana*, 592 U.S. 351, 358 (2021) (“The canonical decision in this area [of personal jurisdiction] remains *International Shoe*.”).

⁴⁹ Although the Supreme Court has never explicitly referred to its two lines of precedent on specific personal jurisdiction as “the traditional test” and “the effects test,” many lower courts have adopted these labels. See, e.g., *Eighteen Seventy, LP v. Jayson*, 32 F.4th 956, 967 (10th Cir. 2022) (using “effects test” language); *Axiom Foods, Inc. v. Acerchem Int’l, Inc.*, 874 F.3d 1064, 1069 (9th Cir. 2017) (same); *Marten v. Godwin*, 499 F.3d 290, 297 (3d Cir. 2007) (“The effects test and traditional specific jurisdiction analysis are different, but they are cut from the same cloth.”).

⁵⁰ *Hanson v. Denckla*, 357 U.S. 235, 247 n.11, 251–53 (1958). Sometimes, lower courts include a third “reasonableness” step as part of the traditional test, but the Supreme Court has not articulated reasonableness as a separate consideration in its recent decisions. Charles W. “Rocky” Rhodes, *The Roberts Court’s Jurisdictional Revolution Within Ford’s Frame*, 51 STETSON L. REV. 157, 185 (2022). Because the traditional test is so restrictive, jurisdiction is typically considered reasonable if the purposeful availment and relatedness requirements are met since they indicate a defendant’s strong connection with the forum state. See *id.*

⁵¹ See, e.g., *Glob. Commodities Trading Grp., Inc. v. Beneficio de Arroz Choloma*, 972 F.3d 1101, 1107–09 (9th Cir. 2020).

⁵² 471 U.S. 462 (1985).

⁵³ *Id.* at 474–75. Although the Supreme Court refined and expanded upon the wording of the traditional test in several cases between *International Shoe* and *Burger King*, it is unnecessary to discuss those cases here, as *Burger King* represents the present state of the framework. See, e.g., *McGee v. Int’l Life Ins.*, 355 U.S. 220, 223–24 (1957); *Hanson*, 357 U.S. at 253–54; *World-Wide Volkswagen Corp. v. Woodson*, 444 U.S. 286, 292 (1980).

infringement.⁵⁴ The defendants moved to dismiss for lack of jurisdiction, arguing the claim did not arise in Florida where the lawsuit was initiated.⁵⁵

The Court rejected the defendants' argument, holding that by initiating a long-term franchise agreement that created continuing, mutual obligations—including frequent communication and payment to the Florida corporation—the defendants purposefully availed themselves “of the privilege of conducting activities within the forum State.”⁵⁶ The Court explained that when a defendant intentionally reaches out to a party in a forum state and establishes a long-term relationship via contract, which involves repeated contacts with the state, it is generally reasonable to require the defendant to answer for any harm resulting from those contacts.⁵⁷

This concept of “purposeful availment” has grown more complicated as companies increasingly globalize and automate.⁵⁸ With today's technology and interstate market, corporations can contract more frequently and with less effort than ever before. A company can enter into a contract in a state, even a contract with a “substantial connection” to that state, without necessarily “purposefully availing” itself of the privileges of the forum, at least not to the same extent as companies did at the time of *International Shoe* or *Burger King*.

And when a company does make a physical connection with a forum, like through its product ending up there, modern supply chains and distribution networks often render that contact too attenuated from the company's intentional conduct for purposeful availment. The Supreme Court's fractured “stream-of-commerce” line of cases demonstrates this, as the Justices disagree about whether placing a product into the stream of commerce with the expectation that it might reach the forum suffices to establish purposeful availment.⁵⁹ If the Court has hesitated to find purposeful availment for manufacturers of tangible products physically entering a forum, it seems even less likely they would do so for the producer of a digital “product.”⁶⁰

⁵⁴ See *Burger King*, 471 U.S. at 462, 464–69.

⁵⁵ See *id.* at 469.

⁵⁶ See *id.* at 475–76, 478–82 (quoting *Hanson*, 357 U.S. at 253).

⁵⁷ See *id.* at 469–82.

⁵⁸ See Henry S. Noyes, *The Persistent Problem of Purposeful Availment*, 45 CONN. L. REV. 41, 93–95 (2012) (discussing the unique ways online retailers can structure transactions with out-of-state customers to avoid legal entanglement with disfavored states).

⁵⁹ See, e.g., *Asahi Metal Indus. Co. v. Superior Ct.*, 480 U.S. 102, 105 (1987) (plurality opinion); *J. McIntyre Mach., Ltd. v. Nicastro*, 564 U.S. 873, 873 (2011) (plurality opinion). See generally Shane Yeargan, Note, *Purpose and Intent: Seeking a More Consistent Approach to Stream of Commerce Personal Jurisdiction*, 90 WASH. U. L. REV. 543, 569 (2012) (discussing the inconsistency in the Court's stream-of-commerce jurisprudence).

⁶⁰ See Yeargan, *supra* note 59, at 569.

In the event that a plaintiff successfully convinces a court that the defendant purposefully availed itself of the forum state, his next hurdle is to demonstrate how the claim at issue “arise[s] out of” or is “connected with” that conduct.⁶¹ The Supreme Court attempted to clarify this relatedness requirement in *Ford Motor Co. v. Montana*,⁶² holding that a close relationship between the defendant’s purposeful availment and the plaintiff’s claim is sufficient and a strict causal link is not required.⁶³ The case involved two plaintiffs—one in Montana and one in Minnesota—who were injured in crashes involving defective Ford vehicles.⁶⁴ Ford Motor Company argued that neither Montana nor Minnesota had specific jurisdiction over the corporation, as neither of the defective cars involved in the crashes were manufactured or sold in the states.⁶⁵ Alternatively, Ford asserted that even if the sale of the cars was on some level connected with the plaintiffs’ injuries, the link had to be causal in nature.⁶⁶ The company maintained that “jurisdiction attaches ‘only if the defendant’s forum conduct gave rise to the plaintiff’s claims.’”⁶⁷

The Court disagreed and found the company’s conduct met the requirements for jurisdiction under the traditional test.⁶⁸ First, Ford conceded that it purposefully availed itself of the benefits of doing business in Montana and Minnesota by advertising, selling, and servicing the Crown Victoria and Explorer models in those states.⁶⁹ Second, the Court noted that for specific jurisdiction, a plaintiff’s claim may *either* “arise out of” *or* “relate to” the defendant’s in-state conduct. In the majority’s view, “arise out of” and “relate to” are two distinct ways for conduct and claim to be connected.⁷⁰ A causal link is sufficient but not necessary, as long as the plaintiff demonstrates “there is a strong ‘relationship among the defendant, the forum, and the litigation.’”⁷¹ Accordingly, the sales, marketing, and servicing of the car models in the states were related enough to the injuries caused by cars of those same models sold out of state for jurisdiction to be proper.⁷²

Although *Ford* resulted in the Court conferring jurisdiction, its holding highlights how the traditional test becomes even more confusing

61 *Int’l Shoe Co. v. Washington*, 326 U.S. 310, 319 (1945).

62 592 U.S. 351 (2021).

63 *See id.* at 358–68.

64 *See id.* at 365.

65 *See id.* at 361–62.

66 *See id.*

67 *See id.* (emphasis in original).

68 *See id.* at 358, 364–68.

69 *See id.* at 361, 367–68.

70 *See id.* at 362.

71 *See id.* at 353 (quoting *Helicopteros Nacionales de Colombia, S.A. v. Hall*, 466 U.S. 408, 414 (1984)).

72 *See id.* at 370.

and potentially inconsistent when applied to claims that look more like torts than contracts. In contract cases, it is often easier to establish that a defendant has intended to connect itself with a state because the contract at the center of the claim provides a paper trail—it documents the office or home location of each party and where the contract was executed. Relatedness in these cases is not an issue, as the claim arises out of the contract, and that contract contains explicit references to the forum. In contrast, torts often arise from unexpected or unintentional contacts between parties who may not have a well-documented connection, if they have a relationship outside the allegedly tortious conduct at all. As a result, demonstrating minimum contacts under the traditional test in these cases requires showing another distinct, intentional contact with the state, which must then be linked to the claim at issue with some degree of relatedness. The Supreme Court has used the traditional approach on tort claims; however, in each of those cases the defendant's conduct was either intentional or the defendant had a strong physical presence in the state.⁷³

The challenge for a tort claimant then lies in showing how the supposedly *unintentional* conduct underlying the suit “arises out of” or “relates to” some other, *intentional*, in-forum conduct of the defendant. Concurring opinions in *Ford* illustrate how the majority's conception of relatedness under the traditional test is problematic—particularly because it makes it difficult for lower courts to define the doctrine's outer limits consistently. Justice Alito lamented that by treating “arise out of” and “relate to” as distinct and eliminating the causation requirement, the majority failed to provide lower courts with a clear metric, leaving them to guess at when conduct was related enough.⁷⁴ Justice Gorsuch echoed these concerns, observing that “[i]n some cases, the new test may prove more forgiving than the old causation rule. But it's hard not to wonder whether it may also sometimes turn out to be more demanding.”⁷⁵ The Justices were right to raise concern over *Ford's* implications—after the

⁷³ See, e.g., *Keeton v. Hustler Mag., Inc.*, 465 U.S. 770, 772–75 (1984) (holding the defendant's intentional libelous conduct and regular circulation of magazines in New Hampshire justified personal jurisdiction over the Ohio corporation); *Ford*, 592 U.S. at 370 (holding that defendant's in-state marketing, sales, and dealers in the state were sufficient to justify jurisdiction in defective product claims). In both instances the Court also noted that the defendant made significant sales through its business in the state, which may have made the Court more comfortable finding that jurisdiction was proper. See *Keeton*, 465 U.S. at 772 (“Respondent's contacts with New Hampshire consist of the sale of some 10,000 to 15,000 copies of Hustler Magazine in that State each month.”); *Ford*, 592 U.S. at 365 (“Ford had advertised, sold, and serviced those two car models [involved in the accidents] in both States for many years.”).

⁷⁴ See *Ford*, 592 U.S. at 374–75 (Alito, J., concurring) (“To rein in th[e] phrase [‘relate to,'] limits must be found, and the Court assures us that ‘relate to,’ as it now uses the concept, ‘incorporates real limits.’ But without any indication what those limits might be, I doubt that the lower courts will find that observation terribly helpful.” (citations omitted)).

⁷⁵ See *id.* at 376 (Gorsuch, J., concurring).

decision, courts and legal commentators expressed serious uncertainty over the role of relatedness in the traditional test.⁷⁶

Determining relatedness between two physical contacts is challenging enough. But the *Ford* Court did not consider how relatedness would be further complicated when trying to connect a physical contact with a virtual one.⁷⁷ Additionally, many tort claims—such as defamation and fraud—can arise from harm occurring in a forum state, even when the defendant has neither physical presence nor business operations there.⁷⁸ The limitations of the traditional test when applied to claims involving virtual contacts suggest it may be an inadequate approach as applied to modern commerce and certain interstate torts.

C. *Calder & The Effects Test*

The shortcomings of the traditional, “purposeful availment” test resulted in the Supreme Court adapting the *International Shoe* framework to the torts context.⁷⁹ Colloquially known as “the effects test,”⁸⁰ this test instead looks to whether the defendant committed an intentional act by “expressly aiming” his conduct in a way that causes harm that the defendant knew was likely to be suffered in the forum state.⁸¹ The Supreme Court first articulated this reasoning in the 1984 case of *Calder v. Jones*,⁸² where it concluded that Florida magazine editors engaged in libel expressly aimed their conduct at California.⁸³ In *Calder*, entertainer Shirley Jones sued the editors of the *National Enquirer* in her home state of California.⁸⁴ Because the *National Enquirer* was a Florida corporation and its editors lived and worked there, they moved to dismiss the California case for lack of jurisdiction.⁸⁵ The editors argued that they were not responsible for the circulation of the article in California

⁷⁶ See, e.g., Linda Sandstrom Simard, Charles W. “Rocky” Rhodes & Cassandra Burke Robertson, *Ford Motor Co.: The Murky Doctrine of Personal Jurisdiction*, 2020–2021 AM. CONST. SOC’Y SUP. CT. REV. 119, 120; see also Anthony Petrosino, *Rationalizing Relatedness: Understanding Personal Jurisdiction’s Relatedness Prong in the Wake of Bristol-Myers Squibb and Ford Motor Co.*, 91 *FORDHAM L. REV.* 1563, 1573–88 (2023) (exploring the varying applications in state and federal courts of the *Ford* relatedness inquiry).

⁷⁷ The Court suggested that its traditional test doctrine may not translate to such contexts. See *Ford*, 592 U.S. at 366 n.4 (“We have long treated isolated or sporadic transactions differently from continuous ones. And we do not here consider internet transactions, which may raise doctrinal questions of their own.” (citations omitted)).

⁷⁸ See, e.g., *Calder v. Jones*, 465 U.S. 783, 789–90 (1984).

⁷⁹ See, e.g., *id.*

⁸⁰ See *infra* Section II.B.

⁸¹ See *infra* Section II.B.

⁸² 465 U.S. 783 (1984).

⁸³ *Id.* at 784–86, 791.

⁸⁴ *Id.* at 784–86.

⁸⁵ *Id.*

because they had no economic stake in the National Enquirer's sales in that state, nor any control over their employer's marketing activity there.⁸⁶

The Court observed that the editors' libelous story concerned "an entertainer whose television career was centered in California," that the story drew "from California sources," and that "the brunt of the harm . . . was suffered in California."⁸⁷ Accordingly, the Supreme Court found California's exercise of personal jurisdiction over the editors was proper because of their actions' effects in that state, even if the conduct itself took place in Florida.⁸⁸ *Calder* represented the Court's acknowledgment that the "purposeful availment" requirement of the traditional test was ill-suited for analyzing whether personal jurisdiction was proper in a tort claim.

The Supreme Court left this offshoot of its personal jurisdiction doctrine untouched for thirty years, until *Walden v. Fiore*,⁸⁹ where the Court clarified that although under the test courts may consider where the plaintiff's harm was felt, the defendant must have specifically aimed its conduct at the forum state, rather than just coincidentally affecting the plaintiff there.⁹⁰ The case arose when two professional gamblers were detained by Drug Enforcement Administration agent Anthony Walden at the Atlanta airport, where he seized from them a large amount of cash.⁹¹ The gamblers brought a Fourth Amendment claim against Walden for an unreasonable search and seizure in Nevada.⁹² The gamblers had significant connections to Nevada but did not live there at the time of confiscation.⁹³ Agent Walden argued that Nevada lacked specific personal jurisdiction because he had "never traveled to, conducted activities within, contacted anyone in, or sent anything or anyone to" the state.⁹⁴

The Court emphasized that even an analysis under *Calder* requires that courts "look[] to the defendant's contacts with the forum State itself, not [solely] the defendant's contacts with persons who reside there."⁹⁵ The only link connecting the defendant to the forum cannot be the individual plaintiff.⁹⁶ The Court noted that in *Calder*, the strength of the connection with the forum was a "function of the nature" of the tort

⁸⁶ *See id.* at 788–89.

⁸⁷ *Id.*

⁸⁸ *Id.* at 789–91.

⁸⁹ 571 U.S. 277 (2014).

⁹⁰ *Id.* at 287–88.

⁹¹ *Id.* at 279–81.

⁹² *Id.* at 281.

⁹³ *See id.* at 279–82.

⁹⁴ *Id.* at 282, 288–89.

⁹⁵ *Id.* at 285.

⁹⁶ *Id.*

at issue.⁹⁷ In contrast, Agent Walden acted in Georgia, where the money was seized, and had no way of knowing the plaintiffs were connected to Nevada or would be harmed there.⁹⁸ *Walden* requires plaintiffs assert something more than the mere fact that they were harmed in a state for that state to be able to properly assert specific jurisdiction over an out-of-state defendant.

The Court's opinion in *Walden*, in downplaying the significance of the plaintiff's location in the personal jurisdiction inquiry, raised the question of whether the decision significantly impacted the effects test. But the *Walden* Court took care to emphasize that its holding clarified, rather than overruled, *Calder*.⁹⁹ The main consequence of *Walden* has been that lower courts generally will not find mere knowledge that a defendant's conduct will have an effect in a forum in itself sufficient to establish jurisdiction.¹⁰⁰ But nothing in *Walden* required courts to completely disregard the defendant's knowledge that they would be harming the plaintiff and that the plaintiff was located in the forum state. Of course, few would argue that jurisdiction should follow a plaintiff at their whim, subjecting defendants to suit wherever that plaintiff happens to go. *Walden*'s holding does not mean courts cannot consider a defendant's awareness of the plaintiff's location, especially when that location is "the focal point both of the [conduct] and of the harm suffered" or serves as evidence of the defendant's pattern of repeated contacts with the state.¹⁰¹

After *Walden*, lower courts still generally prefer the effects test over the traditional test for determining jurisdiction in online causes of action.¹⁰² This is in part because the Court indicated in *Walden* that the defendant's contacts with the forum in dispute in that case were distinguishable from internet contacts.¹⁰³ In a footnote, the Court said, "[T]his case does not present the very different questions whether and how a defendant's virtual 'presence' and conduct translate into 'contacts' with a particular State. . . . We leave questions about virtual contacts for another day."¹⁰⁴ This suggests the Court understood that internet and

⁹⁷ *Id.* at 287–88.

⁹⁸ *Id.* at 288–89.

⁹⁹ *See id.* at 287–88.

¹⁰⁰ *See, e.g.*, *Blessing v. Chandrasekhar*, 988 F.3d 889, 905–07 (6th Cir. 2021); *Fed. Mut. Ins. v. FedNat Holding Co.*, 928 F.3d 718, 721 (8th Cir. 2019); *Brook v. McCormley*, 873 F.3d 549, 553 (7th Cir. 2017).

¹⁰¹ *Walden*, 571 U.S. at 287 (citing *Calder v. Jones*, 465 U.S. 783, 789 (1984)).

¹⁰² *See, e.g.*, *XMission, L.C. v. PureHealth Rsch.*, 105 F.4th 1300, 1309–10 (10th Cir. 2024) (applying the effects test to claims arising from unsolicited marketing emails); *Del Valle v. Trivago GMBH*, 56 F.4th 1265, 1276 (11th Cir. 2022) (applying the effects test to claims arising from an interactive travel-booking website); *Lang Van, Inc. v. VNG Corp.*, 40 F.4th 1034, 1040–43 (9th Cir. 2022) (applying the effects test to online intellectual property infringement).

¹⁰³ *Walden*, 571 U.S. at 290 n.9.

¹⁰⁴ *Id.*

virtual contacts are probably properly analyzed under the effects test—rather than the traditional test that relies on physical contacts—and left open for lower courts to decide exactly in what way they differ from the contacts in *Walden*.

II. COURTS' CHALLENGES APPLYING PERSONAL JURISDICTION DOCTRINE TO DATA EXTRACTION CASES

The application of existing personal jurisdiction doctrine to data extraction cases has proven difficult as courts struggle to fit modern technological harms into frameworks designed around physical-world interactions. Plaintiffs in data extraction cases have attempted to rely on the traditional test, the effects test, or a combination of the two.¹⁰⁵ But no matter which framework they have invoked, plaintiffs' success in proving that jurisdiction is proper has been limited. The main problems with applying the traditional test to data extraction cases are that tying a purely online activity to some physical presence in the state is difficult and data extraction lacks the mutuality inherently required for purposeful availment.¹⁰⁶ The effects test has been marginally more successful as a method to prove jurisdiction, but courts have been inconsistent in determining what virtual conduct constitutes express aiming.¹⁰⁷

A. *Data Extraction Under the Traditional Test*

Courts applying the traditional test in data extraction cases often find that plaintiffs have failed to establish purposeful availment. In *Rosenthal v. Bloomingdales.com, LLC*,¹⁰⁸ for example, the First Circuit found it lacked jurisdiction under the traditional test.¹⁰⁹ The court concluded that the plaintiff failed to demonstrate how the defendant company purposefully availed itself through data extraction alone and also failed to show that the data extraction was related to the defendant's other qualifying in-state conduct.¹¹⁰

The suit began when Massachusetts resident Scott Rosenthal sued Bloomingdales, claiming it violated the state's wiretapping and privacy statutes.¹¹¹ Rosenthal alleged that the retailer deployed session replay code on its website to “intercept, record, and map his electronic communications.”¹¹² Rosenthal argued that Bloomingdales purposefully

¹⁰⁵ See discussion *infra* Sections II.A, II.B.

¹⁰⁶ See *infra* Sections II.A–B.

¹⁰⁷ See *infra* Sections II.A–B.

¹⁰⁸ 101 F.4th 90 (1st Cir. 2024).

¹⁰⁹ *Id.* at 95–98.

¹¹⁰ *Id.* at 98–99.

¹¹¹ *Id.* at 93–94.

¹¹² *Id.*

availed itself of Massachusetts in two ways.¹¹³ First, the extraction of his personal data was part of the retailer's broader strategy to develop a market in Massachusetts, which it aimed to expand through its use of session replay code.¹¹⁴ Second, Bloomingdales's brick-and-mortar retail locations and sale of products within the state constituted purposeful availment of the state's residents.¹¹⁵

Bloomingdales challenged Massachusetts's assertion of jurisdiction.¹¹⁶ The retailer asserted that Bloomingdales's data extraction activity did not target the state and thus could not in itself constitute purposeful availment.¹¹⁷ Bloomingdales also rebutted Rosenthal's argument by contending that even if Bloomingdales purposefully availed itself of Massachusetts through its retail stores, those activities did not meet the relatedness requirement of the traditional test.¹¹⁸ It emphasized that the company's in-state stores or product sales had nothing to do with Rosenthal's purely online, privacy-related claims.¹¹⁹

The First Circuit combined its discussion of purposeful availment and relatedness, agreeing with Bloomingdales that its in-state stores and sales were insufficient to establish Massachusetts's jurisdiction.¹²⁰ The *Rosenthal* court reasoned that the presence of physical stores did not indicate that the company intentionally targeted Massachusetts in its online activity, nor make a lawsuit from data extraction unrelated to its retail locations foreseeable.¹²¹ The court noted that it was not clear whether Bloomingdales was aware that it was deploying its session replay code on Massachusetts residents, although it knew Massachusetts residents used the site.¹²² And the First Circuit reasoned that regardless of whether Bloomingdales generally knew the session replay code was collecting the data of users in Massachusetts, this would not impact the jurisdictional analysis; under the traditional test, it only matters whether Bloomingdales purposefully availed itself of the forum. The court concluded that this required targeting Massachusetts in particular, separate from other states.¹²³

¹¹³ *Id.* at 95–98.

¹¹⁴ *Id.* at 95–96.

¹¹⁵ *Id.* at 97–98.

¹¹⁶ *See id.* at 90, 93–94.

¹¹⁷ *See* Brief of Defendant-Appellee Bloomingdales.com, LLC at 8–10, 29–30, *Rosenthal v. Bloomingdales.com, LLC*, 101 F.4th 90 (1st Cir. 2024) (No. 23-1683).

¹¹⁸ *See id.* at 13–26.

¹¹⁹ *See id.*

¹²⁰ *See Rosenthal*, 101 F.4th at 96–98.

¹²¹ *Id.* at 97–98.

¹²² *See id.* (“Although the allegations and evidence that the plaintiff does provide do show that Bloomingdales intentionally targeted the plaintiff when he happened to be in Massachusetts, they do not affirmatively prove that Bloomingdales knew that it was targeting him in Massachusetts.”).

¹²³ *See id.*

Shortly after *Rosenthal*, the Third Circuit found Pennsylvania lacked jurisdiction over a similar claim in *Hasson v. FullStory, Inc.*¹²⁴ The case before the Third Circuit consolidated two class actions in which plaintiffs from Pennsylvania both alleged violations of the state's wiretapping statute: Hasson sued FullStory, Inc. ("FullStory"), a Georgia-based developer of session replay code, and Schnur sued a website operator, Papa Johns International, Inc. ("Papa Johns"), a Delaware corporation that used FullStory's session replay code.¹²⁵

In evaluating Schnur's claims against Papa Johns as the website operator, the Third Circuit determined he properly alleged purposeful availment by Papa Johns in the forum state, satisfying the first prong of the traditional test.¹²⁶ Rather than assess whether the company purposefully availed itself of Pennsylvania through its online activity, the court focused only on Papa Johns's physical presence in the state and related promotional activity.¹²⁷ It acknowledged that Papa Johns "purposefully availed itself of the Pennsylvania market" by "maintain[ing] approximately 85 brick-and-mortar locations in Pennsylvania and regularly market[ing] and advertis[ing] its goods and services within Pennsylvania"¹²⁸—the same type of activity that the *Rosenthal* court found was not in itself purposeful availment.¹²⁹

Even though the Third Circuit found Papa Johns purposefully availed itself of the Pennsylvania market, it still found the relationship between Papa Johns's contacts in Pennsylvania and Schnur's wiretapping claims too weak to assert jurisdiction.¹³⁰ It compared the case to *Ford*, observing that "Papa Johns' website is analogous to the defective vehicles in *Ford Motor*, and Session Replay Code is like the defective parts contained within those vehicles."¹³¹ But the court asserted that unlike *Ford*, where the plaintiffs presented evidence of in-forum promotion of the specific devices that harmed them, Schnur never alleged facts suggesting that Papa Johns's advertisements in the state were specifically for the website which contained the session replay code, but only promotion for its business and products more generally.¹³²

¹²⁴ 114 F.4th 181 (3d Cir. 2024).

¹²⁵ *See id.* at 185. The Third Circuit discussed the sufficiency of the contacts alleged by Hasson against FullStory under the effects test. *Id.* at 195–97. It chose to vacate and remand the case so the district court could determine whether FullStory's contacts were sufficient under the traditional test. *See id.* at 197.

¹²⁶ *Id.* at 193 ("There is no doubt that Papa Johns purposefully availed itself of the Pennsylvania market.").

¹²⁷ *See id.*

¹²⁸ *Id.*

¹²⁹ 101 F.4th 90, 96–98 (1st Cir. 2024).

¹³⁰ *Hasson*, 114 F.4th at 193–95. The court acknowledged that whether the claims "ar[ose] out of or relate[d] to" Papa Johns's activity in the forum was a "close call." *Id.* at 193.

¹³¹ *Id.* at 193–94.

¹³² *Id.* at 194.

When the Third Circuit turned to analyze Hasson's claims against FullStory, it observed that the district court had not evaluated jurisdiction over the code developer under the traditional test and remanded Hasson's claim for that purpose instead of dismissing it like Schnur's.¹³³ But under the Supreme Court's stream-of-commerce line of cases, FullStory would almost certainly fail to meet the requirements of purposeful availment as well.¹³⁴ Like the manufacturers in those cases, FullStory essentially released its code into broad, nationwide streams of commerce, and it was the website operators who exercised ultimate control over where the product was deployed.¹³⁵

Rosenthal and *Hasson* demonstrate how meeting the requirements of purposeful availment in data extraction cases is an uphill battle. The traditional test is better suited for cases sounding in contract rather than tort. Contract cases require a meeting of the minds and an understanding that there will be established continuing obligations—more easily demonstrating purposeful availment.¹³⁶ This mutuality is not present in data extraction fact patterns, where a customer unilaterally interacts with a website and another party unilaterally monitors and stores data on that interaction.

Contractual claims are the least tangible connection accepted by the Supreme Court as evidence of purposeful availment under the traditional test. Other Supreme Court precedents addressing purposeful availment without a contract claim heavily consider physical contacts.¹³⁷ Physical connection is more clearly defined by past cases as a basis for personal jurisdiction.¹³⁸ Thus, it appears that when faced with the choice of whether to focus on physical or virtual contacts, courts prefer physical contacts because there are more examples for the reviewing court to draw parallels.

Even where courts find the purposeful availment requirement has been satisfied by a defendant's physical presence or other activities within the state, plaintiffs' arguments still often fail the relatedness requirement, as they did in *Rosenthal* and *Hasson*. Attempting to tie

¹³³ See *id.* at 197.

¹³⁴ See *supra* Section I.A.

¹³⁵ *Hasson*, 114 F.4th at 187, 195–96.

¹³⁶ See, e.g., *Burger King Corp. v. Rudzewicz*, 471 U.S. 462, 479–80 (1985).

¹³⁷ See, e.g., *World-Wide Volkswagen Corp. v. Woodson*, 444 U.S. 286, 295 (1980) (finding no purposeful availment where the defendant “carr[ie]d on no activity whatsoever” in the state); *Ford Motor Co. v. Montana*, 592 U.S. 351, 364 (2021) (finding purposeful availment where the defendant had “billboards, TV and radio spots, print ads, and direct mail” in the state); *Bristol-Myers Squibb Co. v. Superior Ct.*, 582 U.S. 255, 255 (2017) (rejecting jurisdiction where there was not “any adequate link between the State and the nonresidents’ claims” where the claimants “were not prescribed Plavix in California, did not purchase Plavix in California, did not ingest Plavix in California, and were not injured by Plavix in California”).

¹³⁸ See *supra* Part I.

an entirely virtual activity to a physical location is difficult to do, especially when that activity does not directly lead to more tangible activity, like a purchase. Of all the data collected by session replay code and similar software, only a relatively small percentage of those users will result in conversions.¹³⁹ In fact, one of companies' primary interests in collecting such data is to examine abandoned or incomplete sessions.¹⁴⁰ Moreover, courts have acknowledged that physical location of servers cannot alone justify jurisdiction,¹⁴¹ although servers are arguably more related to data extraction than a storefront. Using physical locations as an anchor will also become increasingly ineffective as companies no longer need storefronts or employees present in a state to conduct a significant amount of business there.

B. Data Extraction Under the Effects Test

Because the traditional test's ambiguous purposeful availment and relatedness requirements give preference to physical contacts, plaintiffs have also turned to the effects test to show a defendant's extraction efforts were "expressly aimed" at the forum state—but with equally little success. Although the test is better suited for data extraction causes of action than the traditional test, courts' lack of clarity on how to conceptualize data extraction—and when online data extraction amounts to express aiming—has resulted in widespread confusion over when jurisdiction is proper. Two circuit courts weighing the issue on materially similar facts ultimately came to opposite results.

In *Hasson v. FullStory*,¹⁴² claimant Schnur also made an alternative argument before the Third Circuit that Papa Johns's use of session replay code in violation of the Pennsylvania wiretapping statute satisfied the effects test under *Calder*.¹⁴³ Schnur alleged that because the website transmitted code to a browser in Pennsylvania and the data collection occurred there, Papa Johns "expressly aim[ed]" its conduct at the state.¹⁴⁴ Schnur "alleged that Papa Johns 'knowingly armed [its]"

¹³⁹ Approximately 97.6% of visits to e-commerce websites do not result in a purchase. See *Conversion Rate of Online Shoppers Worldwide as of December 2024, by Device*, STATISTA (Mar. 27, 2025), <https://www-statista-com.us1.proxy.openathens.net/statistics/1423823/online-shopping-conversion-rate-by-device/> [<https://perma.cc/N7D3-DXN3>] ("The e-commerce sector had an overall conversion rate of 2.4 percent.").

¹⁴⁰ See *The Definitive Guide to Session Replay*, *supra* note 11. A website's conversion rate is the percentage of users who complete a desired action, such as making a purchase. See *What Is Conversion Rate Optimization? How to Optimize Your Way to Success*, FULLSTORY: BLOG (Mar. 9, 2023), <https://www.fullstory.com/blog/conversion-rate-optimization/> [<https://perma.cc/T4B4-VTLR>].

¹⁴¹ See, e.g., *Hungerstation, LLC v. Fast Choice, LLC*, 857 F. App'x 349, 351 (9th Cir. 2021).

¹⁴² See discussion *supra* Section II.A.

¹⁴³ 114 F.4th 181, 188–90 (3d Cir. 2024).

¹⁴⁴ *Id.* at 190–91.

website with software that initiates a broad-spectrum wiretap,” but did not allege any conduct specific to Pennsylvania.¹⁴⁵ The court rejected Schnur’s argument, requiring that “[a]t a minimum, [he] had to allege that Papa Johns knew that a given user was in Pennsylvania *before* it sent the code to that user’s browser.”¹⁴⁶ Even if Papa Johns later learned that Schnur lived in Pennsylvania, the court said this was irrelevant under the “‘effects’ test’s ‘intentionality requirement.’”¹⁴⁷ As for the effect of Papa Johns’s other commercial activities in the forum on the analysis, the court noted that the session replay code “would have wiretapped him regardless of whether he purchased pizza via the website,” so the company’s in-state sales and store locations did “not demonstrate express aiming under *Calder*” either.¹⁴⁸

Plaintiff Hasson’s claims against FullStory fared no better with the court under the effects test than they would have with the traditional test. Hasson argued that because FullStory knew that Mattress Firm—the company whose website he visited—had a presence in Pennsylvania when FullStory sold it the software, FullStory’s actions met the “express[] aim[ing]” requirement of the test.¹⁴⁹ But the court reasoned “if a retailer does not expressly target Pennsylvania merely by operating a website that is accessible there, neither does a software company simply by providing code for that website.”¹⁵⁰ The code was sent to Hasson’s browser as a result of both Mattress Firm’s decision to host the code on its website accessible in Pennsylvania, combined with Hasson’s decision to interact with that website—not based on any independent actions by FullStory.¹⁵¹

The Ninth Circuit raised similar concerns when applying the *Walden* variation on the *Calder* effects test to data extraction in *Briskin v. Shopify, Inc.* (“*Briskin I*”).¹⁵² The court initially reached the same conclusion as the Third Circuit’s holding in *Hasson* but ultimately reversed itself on rehearing. The first time the Ninth Circuit heard the case in 2023, nearly six months prior to *Hasson*, it concluded that the defendant did not sufficiently target the state of California through data extraction for the conduct to be considered “express aiming.”¹⁵³ In a wiretapping claim against Shopify, Inc. (“Shopify”), a Canadian corporation with New York and Delaware subsidiaries, plaintiff Brandon Briskin argued that the defendant “expressly aimed” its conduct toward California by

¹⁴⁵ *Id.* at 190 (alteration in original) (citation omitted).

¹⁴⁶ *Id.* at 191 (emphasis in original).

¹⁴⁷ *See id.* at 192 (citation omitted).

¹⁴⁸ *Id.*

¹⁴⁹ *See id.* at 195.

¹⁵⁰ *See id.* at 195–96.

¹⁵¹ *See id.* at 187, 195–96.

¹⁵² 87 F.4th 404 (9th Cir. 2023), *rev’d on reh’g*, 135 F.4th 739 (9th Cir. 2025) (en banc).

¹⁵³ *Id.* at 415–24.

collecting his personal information via their website because he resided there and “made his online purchase” while physically present in the state.¹⁵⁴ The court noted that the contacts Briskin alleged that were connected with the state were surrounding Briskin’s own conduct in California, not that of Shopify.¹⁵⁵ Because the contacts he raised were “entirely personal to him,” they “would follow him wherever he might choose to live or travel.”¹⁵⁶ The court determined that finding jurisdiction for these online contacts would run afoul of the Supreme Court’s holding in *Walden*, because the plaintiff’s contacts with the state, not the defendant’s contacts, would drive the personal jurisdiction inquiry under the effects test.¹⁵⁷ After analyzing Shopify’s practice of data extraction in the forum in isolation—rather than as part of a larger pattern of behavior violating the wiretapping law—the panel decided that personal jurisdiction in California over the company was improper.¹⁵⁸

Two years later, in 2025, the Ninth Circuit reheard *Briskin* (“*Briskin II*”) en banc, again focusing on the *Calder* effects test.¹⁵⁹ But this time, the court reversed and found that specific personal jurisdiction was proper.¹⁶⁰ Two changes in the court’s analysis led to this result. First, the Ninth Circuit overruled several of its precedents and clarified that “[e]xpress aiming does not require differential targeting” of the forum state by the defendant.¹⁶¹ This addressed an issue common among data extraction cases: Because defendants’ activity indiscriminately collects user data nationwide rather than targeting an individual state, they can often evade accountability by claiming they lacked the specificity required for personal jurisdiction.¹⁶² Second, the Ninth Circuit corrected its earlier overreading of *Walden* and distinguished the case at hand from it.¹⁶³ Whereas in *Walden* “the plaintiffs were ‘the only link’ between the defendant and the forum State,” in *Briskin II* “Shopify kn[ew] about its California consumer base, conduct[ed] its regular business in California, . . . install[ed] its software on [residents’] devices in California, and continue[d] to track their activities.”¹⁶⁴ The court therefore found that Shopify’s longstanding pattern of connection and

¹⁵⁴ *Id.* at 409–10.

¹⁵⁵ *Id.* at 416.

¹⁵⁶ *Id.* (quoting *Picot v. Weston*, 780 F.3d 1206, 1215 (9th Cir. 2015)).

¹⁵⁷ *Id.* at 416–17 (citing *Walden v. Fiore*, 571 U.S. 277, 284–86 (2014)).

¹⁵⁸ *See id.* at 422–23.

¹⁵⁹ *Briskin v. Shopify, Inc. (Briskin II)*, 135 F.4th 739, 750–52 (9th Cir. 2025) (en banc).

¹⁶⁰ *Id.* at 762.

¹⁶¹ *Id.* at 757–58.

¹⁶² *Id.* at 758 (“We therefore hold that an interactive platform ‘expressly aims’ its wrongful conduct toward a forum state when its contacts are its ‘own choice and not random, isolated, or fortuitous,’ even if that platform cultivates a ‘nationwide audience[] for commercial gain.’” (alteration in original) (citations omitted)).

¹⁶³ *Id.* at 758–61.

¹⁶⁴ *Id.* at 758–59 (quoting *Walden v. Fiore*, 571 U.S. 277, 285, 289 (2014)).

knowledge that it was benefitting from California residents sufficiently established that it expressly aimed its conduct at the state.¹⁶⁵

Although the Ninth Circuit ultimately found specific jurisdiction in *Briskin II*, the court's reversal in this case underscores the absence of clear guidance for applying the effects test to data extraction claims. The Ninth Circuit's second analysis still leaves many questions open about how the test would function in subsequent cases, especially those involving session replay code. Briskin's data extraction claim was the result of Shopify's direct contact with the customer during a purchase from a website—which courts have found to be an easier reason to assert jurisdiction. This is unlike the separate code developer and website operator in *Hasson* and *Rosenthal*, for which collection was not tied to an in-state purchase.

Before *Briskin*'s rehearing, courts focused only on whether the defendant knew they were contacting a resident in the forum state in a single interaction, rather than any evidence of a sustained pattern involving thousands of contacts and retrievals of resident information.¹⁶⁶ If the courts in *Hasson* and *Briskin I* had looked at the patterns of the many times that each of the companies were extracting data from residents of these states, it would have likely been clear that the defendant met *Walden*'s requirement of a connection between the state and the defendant beyond the plaintiff's residence there. Even if defendants typically distribute cookies or session replay code to website users without targeting one state over another, the user's geolocation data still tells the company where a device is located at the time of installation.¹⁶⁷ And although a specific user's location may not matter to the defendant in their initial contact, over time defendants could see a larger pattern that they were repeatedly extracting data from forum residents.¹⁶⁸ Because the *Hasson* and *Briskin I* courts chose to only focus on the single data extraction instance involving the plaintiff rather than a pattern of collection in the forum state, they failed to view this as “express aiming” required by *Walden* and *Calder*.¹⁶⁹ But when the court in *Briskin II* viewed the defendant's activity as part of a larger pattern, it saw the defendant had in fact been intentionally targeting the forum in a way that made the forum's assertion of jurisdiction foreseeable and fair.¹⁷⁰

The courts in *Hasson* and *Briskin I* and *II* did not address whether session replay tools could be configured to avoid collecting and storing comprehensive data from users in states with stricter consumer data

¹⁶⁵ *Id.* at 755–62.

¹⁶⁶ *See supra* Part I.

¹⁶⁷ *See Briskin II*, 135 F.4th at 746 & n.2.

¹⁶⁸ *See Englehardt, supra* note 10.

¹⁶⁹ *See supra* Sections I.B–C.

¹⁷⁰ *See supra* notes 159–65 and accompanying text.

privacy laws, such as California.¹⁷¹ By failing to consider the extent of control that a website operator or code developer maintained over the scope of their data collection, the courts overlooked a key aspect of conduct that would inform an express aiming analysis.

III. PERSONAL JURISDICTION ANALYSIS IN ENVIRONMENTAL CASES

Although the problems of data extraction claims are unusual, courts have already worked through similar challenges in environmental pollution cases.¹⁷² Comparable jurisdictional challenges arise when pollution crosses state lines, and pollution cases involve similar intangible harm to data extraction. Despite similar frequency of interstate and international defendants in environmental pollution causes of action, courts have not had the same difficulties in finding jurisdiction in these cases as they have in data extraction cases—either because there is more precedent to guide courts’ analysis or because environmental cases involve more physical conduct and harm than data extraction. The elements courts consider when determining personal jurisdiction in environmental cases give insight into where the courts have gone wrong with their analysis of internet data extraction.

For example, in *Pakootas v. Teck Cominco Metals, Ltd.*,¹⁷³ the Ninth Circuit held in 2019 that Washington state could exercise specific jurisdiction over a Canadian company that discharged its slag into the Columbia River, because the company’s use of the river and knowledge that waste reached the forum with regularity constituted express aiming under the effects test.¹⁷⁴

Teck Cominco Metals, Ltd. (“Teck”), a mining company, regularly discharged slag¹⁷⁵ into the river in Canada, which led to detrimental pollution in the Upper Columbia River in Washington.¹⁷⁶ The Confederated Tribes of the Colville Reservation, who live along the river and use it as their primary food source, sued in Washington to enforce an Environmental Protection Agency order directing Teck to stop the

¹⁷¹ See *id.*; Casey Leins, *States with the Strongest Online Privacy Protections*, U.S. NEWS (Oct. 23, 2019, at 14:24 ET), <https://www.usnews.com/news/best-states/articles/2019-10-23/states-with-the-strongest-online-privacy-laws> [<https://perma.cc/KUX5-VQFC>].

¹⁷² See *infra* notes 173–208 and accompanying text.

¹⁷³ 905 F.3d 565 (9th Cir. 2018), *cert. denied*, 587 U.S. 1051 (2019).

¹⁷⁴ *Id.* at 578.

¹⁷⁵ Slag is a “glassy, granular” substance created during the smelting process from the impurities of raw lead or zinc ore. *Id.* at 572.

¹⁷⁶ *Id.* at 571–74, 577–78.

contamination.¹⁷⁷ Teck moved to dismiss the action, contending that Washington did not have personal jurisdiction over the company.¹⁷⁸

On appeal, the Ninth Circuit acknowledged that claims like the one at issue in *Pakootas* are “more akin to a tort claim than a contract claim,” and thus the *Calder* test was best suited to analyze personal jurisdiction.¹⁷⁹ The court reemphasized that “[e]xpress aiming” means “‘something more’ than ‘a foreign act with foreseeable effects in the forum state.’”¹⁸⁰ First, the court focused its analysis on the repeated nature of the defendant’s contacts with the state.¹⁸¹ There was evidence that Teck’s leadership knew that the Columbia River carried hazardous smelting byproduct away from the plant and that a considerable amount of the waste traveled downstream into Washington, but Teck still continued dumping the waste each day.¹⁸² Although if viewed in isolation, the single instance of pollution reaching Washington may seem unintentional, when considered in light of the company’s consistent spread of pollution over the course of many years, the conduct satisfies the foreseeability and intentionality requirements for express aiming under the *Calder* effects test.¹⁸³ The *Pakootas* court remedied the fact that a single instance of pollution seems intangible and insignificant, a *de minimis* harm, by instead focusing on a long-term pattern of pollution in the forum as evidence of intentionality.¹⁸⁴ The *Pakootas* case stands for the proposition that a company such as Teck that is aware its pollution consistently reaches a state cannot argue it was unable to foresee that it would continue to do so in the future.¹⁸⁵

Second, the Ninth Circuit emphasized the nature of the transportation system that Teck was using—the massive Columbia River—made it foreseeable that their pollution would reach plaintiffs in a distant state along that river.¹⁸⁶ The Ninth Circuit asserted, “it is no defense that Teck’s wastewater outfalls were aimed only at the Columbia River, which in turn was aimed at Washington. Rivers are nature’s conveyor belts. Teck simply made use of the river’s natural transport system”¹⁸⁷ Notably, *Pakootas* was decided by the Ninth Circuit post-*Walden*, which was arguably the Supreme Court’s most restrictive case thus far regarding

¹⁷⁷ *Id.* at 573.

¹⁷⁸ *Id.*

¹⁷⁹ *Id.* at 577 (quoting *Ziegler v. Indian River County*, 64 F.3d 470, 474 (9th Cir. 1995)).

¹⁸⁰ *Id.* (quoting *Bancroft & Masters, Inc. v. Augusta Nat’l Inc.*, 223 F.3d 1082, 1087 (9th Cir. 2000)).

¹⁸¹ *Id.* at 577–78.

¹⁸² *Id.* at 578.

¹⁸³ *See id.* at 577–78.

¹⁸⁴ *See id.*

¹⁸⁵ *See id.*

¹⁸⁶ *Id.*

¹⁸⁷ *Id.* at 557.

the effects test. The Supreme Court also denied certiorari, which may indicate the Court's belief that the Ninth Circuit's holding was not out of line with their understanding of *Calder's* effects test.¹⁸⁸

As another example, in *Triad Hunter, LLC v. Eagle Natrium, LLC*,¹⁸⁹ Ohio's Court of Appeals found that an Ohio trial court had personal jurisdiction over a chemical manufacturer that injected a hazardous solution into underground caverns leading to Ohio land.¹⁹⁰ Triad Hunter, an oil and gas company operating in Ohio, filed suit in Ohio against Eagle Natrium, a chemical manufacturer organized in Delaware with a principal place of business in Texas and operating a manufacturing plant in West Virginia, accusing the company of causing toxic gas and brine solution to seep onto their property from across the Ohio River.¹⁹¹ Since Triad Hunter sued in Ohio court, Eagle Natrium moved to dismiss claiming lack of personal jurisdiction.¹⁹² The court determined that "releas[ing] a substance while knowing it travels to a jurisdiction is considered purposeful direction of efforts toward that jurisdiction."¹⁹³

Even though the defendant company did not specifically try to send its pollution to Ohio, the court's approach to analyzing jurisdiction recognized that this did not make the harm it would cause in Ohio any less foreseeable for the purposes of due process.¹⁹⁴ The multiple indicators to the company that its pollution was traveling to Ohio and its continued activity knowing that this would keep happening constituted express aiming of such pollution in the eyes of the court.¹⁹⁵ Additionally, Eagle Natrium had control over the way that it conducted its activity and purposefully did so near the Ohio border.¹⁹⁶ Even though it did not send its pollution to Ohio in a literal, deliberate sense, the company's decision to conduct activity in that way, combined with evidence that its pollution was traveling to Ohio, indicated that the company was expressly aiming there.¹⁹⁷

In *Horne v. Mobile Area Water & Sewer System*,¹⁹⁸ the Mississippi Supreme Court found that defendants met the express aiming requirement of the *Calder* effects test by choosing to open their floodgates to full capacity, despite having the ability to prevent the overflow that

¹⁸⁸ See Natalie Collins, Note, *On the Borderline: Pakootas, NAFTA, and the Problem of Transboundary Pollution*, 47 *Ecology L.Q.* 251, 273–74 (2020).

¹⁸⁹ 2019-Ohio-940, 132 N.E.3d 1272 (Ohio Ct. App. 2019).

¹⁹⁰ *Id.* at 1276–78.

¹⁹¹ *Id.*

¹⁹² *Id.*

¹⁹³ *Id.* at 1285.

¹⁹⁴ *See id.*

¹⁹⁵ *Id.* at 1283–85.

¹⁹⁶ *Id.* at 1276–77.

¹⁹⁷ *See id.* at 1284–86.

¹⁹⁸ 2002-CA-01874-SCT, 897 So. 2d 972 (Miss. 2004).

damaged property across state lines.¹⁹⁹ Mississippi residents brought suit against an Alabama city and its board of water commissioners after their release of water from a reservoir damaged the plaintiffs' homes.²⁰⁰ The City and the Board moved to dismiss in the Mississippi court, arguing that the court lacked personal jurisdiction over the Alabama defendants.²⁰¹ The trial court agreed with the defendants, but the reviewing Mississippi Supreme Court disagreed.²⁰² It reversed the lower court's decision, finding the defendants "'purposefully directed' their activities toward Mississippi property owners, by opening the spillway to its maximum capacity."²⁰³ The foreseeability and intentionality requirements for personal jurisdiction were met because the City and the Board "knew the water would flow into Mississippi."²⁰⁴

The *Horne* court's analysis showed that express aiming turned on two aspects of the defendants' conduct.²⁰⁵ First, there was evidence that the City and Board knew that the water had reached cities outside of the state in the past.²⁰⁶ Second, the City had control over how wide it opened its floodgates.²⁰⁷ By choosing to open them fully, it knew it would lose the ability to direct and limit where the water flowed.²⁰⁸ Because the defendant could still have easily conducted its desired activity of releasing the water without causing such widespread damage, the court properly viewed this as an intentional choice akin to sending the water to the plaintiffs.

IV. SOLUTION

Courts' application of the *Calder* effects test in environmental pollution cases offers a model to resolve parallel problems in the context of data extraction. Courts have been able to develop a cogent method of understanding jurisdiction in pollution cases, even though they similarly involve intangible, cross-border connections, making them a logical template for addressing data extraction jurisdiction. To remedy the inconsistency and uncertainty surrounding specific jurisdiction in this context, courts should supplement the *Calder* effects test with three factors from environmental pollution cases to assess whether data extraction was "expressly aimed" at the forum.

¹⁹⁹ *Id.* at 974.

²⁰⁰ *Id.*

²⁰¹ *See id.*

²⁰² *Id.*

²⁰³ *Id.* at 974, 979.

²⁰⁴ *See id.*

²⁰⁵ *Id.* at 979–81.

²⁰⁶ *See id.* at 979.

²⁰⁷ *See id.*

²⁰⁸ *See id.*

First, the court should examine evidence that the “pollutant” regularly reaches the forum and any knowledge that the defendant had of this repeated contact. Second, the court should analyze the nature of the system connecting the forum and the defendant and how that might make contact with the forum state foreseeable. Third, the court should consider the defendant’s ability to control or limit the spread of pollution resulting from its desired activity and view a decision not to exercise such control as a deliberate choice to continue contact with the forum.

A. *Elements of Solution*

1. *Evidence that Harmful “Pollutant” Has Reached Forum State with Regularity*

In several of the previously discussed environmental cases, it was apparent that the defendant had knowledge that its harmful pollutant was reaching the forum state with some regularity.²⁰⁹ The courts especially noted when the defendant had knowledge that the pollutant was not only reaching the state, but that its presence in the state was violating that state’s laws.²¹⁰ This knowledge that the pollutant was reaching the state with regularity was enough to show express aiming, even if the pollutant had not reached the individual plaintiff until it caused the harm giving rise to the cause of action.²¹¹

In a similar way, courts should look to evidence that the defendant was aware that session replay code or similar software—essentially a “pollutant” stemming from the defendant’s website—was regularly gathering personal information from people in a state with a comprehensive wiretapping law, such as Pennsylvania, or a state that is generally known to have more restrictive data collection laws, such as California.²¹² Regardless of whether a company conducts data extraction directly or contracts with a third party to perform it, the purpose of that extraction is usually to obtain information about the users accessing the company’s website.²¹³ Where the website owner receives reports indicating that users are from one of these states—through geolocation data connected to visitors’ internet protocol (“IP”) addresses or through information like a shipping address that users type into the website—and observes this evidence with regularity over a prolonged period, those impacts are

²⁰⁹ See, e.g., *Pakootas v. Teck Cominco Metals, Ltd.*, 905 F.3d 565, 578 (9th Cir. 2018); *Triad Hunter, LLC v. Eagle Natrium, LLC*, 2019-Ohio-940, 132 N.E.3d 1272, 1285 (Ohio Ct. App. 2019).

²¹⁰ See *Pakootas*, 905 F.3d at 578.

²¹¹ See *id.*

²¹² See Leins, *supra* note 171.

²¹³ See *The Definitive Guide to Session Replay*, *supra* note 11.

not “random, isolated, or fortuitous,”²¹⁴ but part of an ongoing pattern that makes jurisdiction in that forum foreseeable.

This approach also resolves courts’ concerns about conforming with the requirements of *Walden*. If a defendant is aware that its actions consistently violate a state’s laws, the harm goes beyond the individual resident bringing suit, because the defendant is disrespecting the sovereignty of the forum state.²¹⁵ When examining only the single contact which gave rise to the claim, it may appear the defendant was unaware of its connection with the state.²¹⁶ But considering evidence of a broader pattern of collection often reveals that the defendant’s contact with the forum was foreseeable.²¹⁷

2. *Nature of System Connecting Defendant to Injured Party*

Second, the court should look to the nature of the system connecting the defendant to the injured party. In the environmental pollution cases, this system was frequently a body of water such as a river.²¹⁸ The courts found express aiming more likely based on how strong and continuous the current of the system was and how wide-reaching the defendant knew it to be.²¹⁹

When applied to the data extraction context, the court would focus on the inherent nature of the defendant’s business and the structure of the website that serves as a vehicle for the code. Courts would examine the site itself and its target audience, as demonstrated through the website’s content, cross-site linking, advertising, and search engine optimization. Courts could also consider whether the defendant had stores or physical locations nationwide or in the forum, but only to the extent that they are discoverable through the site, because this would indicate an expectation of attracting website users specifically from that state. The owner of a website designed for nationwide reach could more easily foresee causing harm in a distant state than one meant to serve a localized audience.²²⁰

²¹⁴ *Keeton v. Hustler Mag., Inc.*, 465 U.S. 770, 774 (1984).

²¹⁵ *See Walden v. Fiore*, 571 U.S. 277, 283–84 (2014).

²¹⁶ *See, e.g., Rosenthal v. Bloomingdales.com, LLC*, 101 F.4th 90, 96–97 (1st Cir. 2024).

²¹⁷ *See, e.g., Pakootas v. Teck Cominco Metals, Ltd.*, 905 F.3d 565, 577–78 (9th Cir. 2018).

²¹⁸ *See, e.g., id.* at 571–72; *Triad Hunter, LLC v. Eagle Natrium, LLC*, 2019-Ohio-940, 132 N.E.3d 1272, 1276–77 (Ohio Ct. App. 2019).

²¹⁹ *See, e.g., Pakootas*, 905 F.3d at 571, 578; *Horne v. Mobile Area Water & Sewer Sys.*, 2002-CA-01874-SCT, 897 So. 2d 972, 979–80 (Miss. 2004).

²²⁰ For example, the website of a local library that does not pay for cross-site advertising, does not engage in search engine optimization, and serves a small, concentrated audience of members of their community would less easily foresee that it would attract visitors from a distant state than a website that does all of those things and attempts to attract visitors from a wide cross section of the country, or from specific other states.

3. *Defendant's Ability to Control or Limit Spread of Pollution Resulting from Its Desired Activity*

Third, the court should evaluate the extent of control the defendant had to carry out its desired activity without causing pollution that violates state laws and whether it took steps to exercise such control. A defendant's deliberate choice not to limit the spread of pollution when it had the power to do so can be evidence of intentionality.²²¹ For example, in *Horne* where the defendant chose to open the floodgates so wide that it lost control over the direction of the water, the court viewed this as evidence that the defendant expressly aimed its conduct, rather than evidence against express aiming.²²² The *Horne* court reasoned that before making that decision, the board had the ability to limit the spread of the water, even if it lost that control after opening the floodgates.²²³

Similarly, if a defendant makes a deliberate choice not to implement restrictions and instead allows its data pollution to spread indiscriminately for business advantage, this should weigh in favor of a finding that their conduct was expressly aimed. There are many simple ways that defendants can limit who session replay code is sent to ex ante—such as through geofencing,²²⁴ requiring user consent to session replay code before someone can use the website, or implementing regional privacy settings.²²⁵ Almost any internet user is familiar with how websites typically require consent to cookies before the site can be accessed.²²⁶ Website hosts can require consent from users before using the website

²²¹ See, e.g., *Horne*, 897 So. 2d at 979.

²²² *Id.*

²²³ *Id.*

²²⁴ Geofencing is a technology that uses global positioning system, Wi-Fi, or cellular data to set up a virtual perimeter around a geographic boundary in the real world. See Matt D'Angelo, *What Is Geofencing and How Can It Benefit Businesses?*, BUS. NEWS DAILY (Oct. 20, 2023), <https://www.businessnewsdaily.com/10627-geofencing-understand-customers.html> [<https://perma.cc/22ZE-GAJ8>]. When a geofence is configured, web developers can ensure that a preset action—in this case, data collection—only occurs when users are within a specified geographic region. See *id.*

²²⁵ Major businesses with websites accessible in California who use data in ways specified by the California Consumer Privacy Act provide California consumers with a “Limit the Use of My Sensitive Personal Information” link before they may access the website, demonstrating the feasibility of such an opt-in system. See, e.g., *United States Regional Privacy Notice*, META (Jan. 1, 2025), <https://www.meta.com/legal/united-states/> [<https://perma.cc/T4DM-97J7>].

²²⁶ Websites began requiring users to consent to cookies—pieces of data placed on the user's computer so that a website can “remember” them the next time that computer visits it—shortly after the General Data Privacy Regulation, Council Regulation 2016/679, 2016 O.J. (L 119) 1, was enacted in the European Union in May 2018. Emily Stewart, *Why Every Website Wants You to Accept Its Cookies*, VOX (Dec. 10, 2019, at 08:00 ET), <https://www.vox.com/recode/2019/12/10/18656519/what-are-cookies-website-tracking-gdpr-privacy> [<https://perma.cc/C6HU-AT8D>]. Although there is evidence that cookie banners asking users for consent are ineffective in actually securing informed consent from users, they show how easy it is for websites to at least facially apprise users that they will be subject to data collection and can opt out. *Id.*

for something such as session replay code. If the defendant chooses not to take this simple precaution and there is a repeated pattern of extracting data from plaintiffs who are living in jurisdictions with these types of wiretapping laws, then the website cannot say the collection was out of their control or unforeseeable.²²⁷ This factor will often carry more weight for a website operator who has the power to implement guardrails limiting who accesses the site or requiring consent before access, rather than for a code developer who merely licenses the tool and lacks meaningful control over when and where it is deployed. This factor also aligns with the principles underlying the stream-of-commerce line of cases, which emphasize control over the destination of a product as pertinent to the jurisdictional analysis.²²⁸

B. *Benefits of an Environmental Solution to Digital Pollution*

Using environmental pollution cases as a guide for data extraction jurisdiction helps judges understand this novel cause of action and expands the precedent available for them to support their decision. In general, comparing a complex, technical cause of action to a more easily understood, traditional one is necessary for judicial understanding of a highly technical and novel issue.²²⁹ Judges on district or state courts who make jurisdictional determinations do not have the time or repetition of cases to understand the minutiae of technology like session replay code, and comparing to a cause of action with which they are more familiar will help them understand whether jurisdiction is proper.²³⁰ Moreover, analogizing across cases that are analyzing the same legal issue is more sound jurisprudence than creating an abstract analogy.²³¹ Looking to personal jurisdiction analysis in environmental pollution cases also makes more precedent available for courts to rely on, as there have been more cases addressing environmental pollution over time—both cross-state and internationally—than the newer development of data extraction.²³²

²²⁷ See *Horne*, 897 So. 2d at 979; see also *Noyes*, *supra* note 58, at 45–46 (proposing a specific jurisdiction test that presumes a company’s purposeful availment of a state “where it is reasonably feasible for a nonresident defendant to sever its connection to a state but it [chooses] not [to do] so”).

²²⁸ See *supra* Section I.A.

²²⁹ See Frederick Schauer & Barbara A. Spellman, *Analogy, Expertise, and Experience*, 84 U. CHI. L. REV. 249, 252 (2017).

²³⁰ See Cass R. Sunstein, *Commentary, On Analogical Reasoning*, 106 HARV. L. REV. 741, 790–91 (1993).

²³¹ See Schauer & Spellman, *supra* note 229, at 252.

²³² See, e.g., *Ex parte Aladdin Mfg. Corp.*, 305 So. 3d 214, 230–40 (Ala. 2019) (holding an Alabama court had specific personal jurisdiction over a Georgia-based company for discharging toxic chemicals into industrial wastewater); *Successor Agency to the Former Emeryville Redevelopment Agency v. Swagelok Co.*, 364 F. Supp. 3d 1061, 1067–68, 1071–77 (N.D. Cal. 2019) (holding a California court had jurisdiction over a London-based corporation for contamination of property

There are parallel governmental and individual interests—important touchstones for due process under the Fourteenth Amendment—at stake in both environmental pollution and data extraction cases.²³³ In both categories of cases, statutes providing both a public and private right of action are common.²³⁴ States have a sovereign interest in protecting their residents’ digital property from intrusion by data extraction,²³⁵ similarly to how they have an interest in protecting their residents’ physical property from environmental harm and pollution.²³⁶ Without a template articulating when data extraction constitutes express aiming, courts will continue to underassert jurisdiction and fail to protect their forum state’s legitimate interest that the law is designed to protect.

Use of supplemental factors to the effects test, rather than the traditional test, is the best way to address jurisdiction in the context of data extraction. For the reasons discussed above, the traditional test is best suited for instances where there are physical contacts.²³⁷ That is why in environmental pollution cases, courts typically prefer using the effects test.²³⁸ Using a test that allows a moderate assertion of jurisdiction is further necessary to prevent states from taking matters into their own hands. States could choose to include consent provisions in the statutes that authorize companies to conduct business within their borders, thereby subjecting those companies to general jurisdiction there.²³⁹ This could result in overassertion of jurisdiction and would not serve the

in California caused by industrial activity); North Carolina *ex rel.* Stein v. E.I. Du Pont de Nemours & Co., 879 S.E.2d 537, 539–49 (N.C. 2022) (holding a North Carolina court had jurisdiction over a Delaware holding company that had acquired a chemical company that released harmful chemicals into the environment in North Carolina).

²³³ See *Bristol-Myers Squibb Co. v. Superior Ct.*, 582 U.S. 255, 255, 263 (2017) (“In determining whether personal jurisdiction is present, a court must consider a variety of interests. These include ‘the interests of the forum State and of the plaintiff in proceeding with the cause in the plaintiff’s forum of choice.’” (quoting *Kulko v. Superior Ct.*, 436 U.S. 84, 92 (1978))).

²³⁴ See, e.g., Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601–9628 (federal environmental statute providing both public and private rights of action); Electronic Communications Privacy Act, 18 U.S.C. §§ 2510–2523 (federal privacy statute providing both public and private rights of action); California Environmental Quality Act, CAL. PUB. RES. CODE §§ 21000–21189.91 (West 2025) (state environmental statute providing both public and private rights of action); California Consumer Privacy Act of 2018, CAL. CIV. CODE §§ 1798.100–1798.199.100 (West 2025) (state privacy statute providing both public and private rights of action).

²³⁵ See *Hasson v. FullStory, Inc.*, 114 F.4th 181, 198 (3d Cir. 2024).

²³⁶ See *Pakootas v. Teck Cominco Metals, Ltd.*, 905 F.3d 565, 571 (9th Cir. 2018).

²³⁷ See discussion *supra* Part I.

²³⁸ See discussion *supra* Part III.

²³⁹ See, e.g., *Mallory v. Norfolk S. Ry. Co.*, 600 U.S. 122, 166–70 (2023) (Barrett, J., dissenting) (warning that state statutes requiring companies to consent to general jurisdiction as a condition of doing business risk infringing state sovereignty and the individual due process principles underlying personal jurisdiction doctrine).

goal of restricting jurisdiction to the forum with the strongest interest in adjudicating a matter.

C. *Applying Environmental Three-Factor Test to Past Data Extraction Cases*

1. *Rosenthal v. Bloomingdales.com*

If the *Rosenthal* court had used the environmental pollution template, it still likely would have found that the defendant did not allege sufficient facts to prove that jurisdiction was proper. The court would have considered whether Bloomingdales knew that the session replay code on their website was reaching Massachusetts residents with regularity.²⁴⁰ This would likely depend on whether the reports that Bloomingdales received from the session replay code indicated that users with a Massachusetts IP address visited the site regularly, and it could also be deduced by whether online sales were regularly sent to Massachusetts, as those individuals would have to access the site containing session replay code in order to make their purchases. Bloomingdales's website is accessible and likely marketed to people across the United States, but this second component of the environmental pollution template alone would be insufficient to establish that jurisdiction over the retailer was proper. More information would be needed about whether Bloomingdales had knowledge that their session replay code was reaching Massachusetts with regularity, and their ability to control whom session replay code is sent to or gathers data from, to make a definitive determination of whether Massachusetts's personal jurisdiction over Bloomingdales would be proper.

2. *Hasson v. FullStory, Inc.*

Applying the environmental pollution template to *Hasson*, jurisdiction over website operator Papa Johns would be proper. Schnur presented evidence that Papa Johns was aware that the session replay code was reaching Pennsylvania residents with regularity.²⁴¹ The evidence that the stores advertised within the state and nationwide and that the main purpose of the website was to direct online orders to Papa Johns stores, including those in Pennsylvania, would be enough to establish jurisdiction under the proposed analysis.²⁴² This would demonstrate that Papa Johns expressly aimed its session replay code at Pennsylvania. Also, Papa Johns would know it is necessary to visit the website to place

²⁴⁰ See generally *Rosenthal v. Bloomingdales.com, LLC*, 101 F.4th 90 (1st Cir. 2024) (the court did not make such a consideration in its decision).

²⁴¹ See *Hasson v. FullStory, Inc.*, 114 F.4th 181, 190–92 (3d Cir. 2024).

²⁴² See *id.*

an order in their Pennsylvania stores and would know that there are privacy laws in Pennsylvania.

Jurisdiction over code developer FullStory would still be improper, because there was no evidence that FullStory was aware that Papa Johns's website was repeatedly sending code to residents of Pennsylvania.²⁴³ Once session replay code is licensed to a company, that company has complete control over how it is implemented on its website.²⁴⁴ Under the second factor, FullStory was probably aware that Papa Johns sold its products nationally when it licensed its code to the company, so this would weigh in favor of finding express aiming. But what kind of data was collected and any preventative measures such as requiring user consent or implementing regional privacy settings were in the control of Papa Johns as website operator, not FullStory.²⁴⁵ Under the proposed analysis, because FullStory lacked the ability to limit Papa Johns's data collection, FullStory did not expressly aim its conduct at Pennsylvania, and personal jurisdiction over the company would not be proper.²⁴⁶

3. *Briskin v. Shopify, Inc.*

Jurisdiction over Shopify in the *Briskin* case would be proper under the environmental pollution template because there was significant evidence that Shopify knew that its services were reaching California with regularity.²⁴⁷ The environmental pollution template would solve the court's concerns about the contacts following the plaintiff, because it would depend mostly on the fact that Shopify knew that it was frequently collecting data from Californians and that California has especially restrictive privacy laws.²⁴⁸ Additional information would be needed about Shopify's intended reach—whether it chooses to take on clients nationwide and worldwide. Finally, unlike in data extraction cases involving session replay code where the developer simply licensed its code to an independent website operator, Shopify had control over restricting the data collection on its sales platform. This would weigh in favor of California exercising personal jurisdiction over Shopify. Application of the environmental pollution template would have achieved the same result as the Ninth Circuit did in its rehearing, but would allow the court to rely less on Shopify's physical presence in the state, which in most data extraction cases is fortuitous and has no bearing on the data extraction activity at issue.

²⁴³ *See id.* at 196.

²⁴⁴ *See id.* at 186.

²⁴⁵ *See id.* at 196.

²⁴⁶ *See id.*

²⁴⁷ *See Briskin II*, 135 F.4th 739, 759 (9th Cir. 2025) (en banc).

²⁴⁸ *Id.*

CONCLUSION

As internet data extraction suits become more common, courts across the country will continue to confront personal jurisdiction issues in these cases. As courts grapple with these jurisdictional questions, analogizing to environmental pollution cases will expand the available precedent and help judges understand the technical fact patterns associated with data extraction. By utilizing these three factors to determine when a defendant “expressly aims” its actions at the forum state under the *Calder* test, courts will have a clearer, more consistent framework that aligns with due process principles and is better suited to the realities of virtual conduct.