United States Court of Appeals for the Federal Circuit

MIRROR WORLDS TECHNOLOGIES, LLC,
Plaintiff-Appellant

v.

META PLATFORMS, INC.,
Defendant-Cross-Appellant

2022-1600, 2022-1709

Appeals from the United States District Court for the Southern District of New York in No. 1:17-cv-03473-JGK, Judge John G. Koeltl.

Decided: December 4, 2024

BRIAN DAVID LEDAHL, Russ August & Kabat, Los Angeles, CA, argued for plaintiff-appellant. Also represented by MARC A. FENSTER, MINNA JAY, JAMES S. TSUEI, BENJAMIN T. WANG; CHARLES R. MACEDO, Amster Rothstein & Ebenstein LLP, New York, NY.

HEIDI LYN KEEFE, Cooley LLP, Palo Alto, CA, argued for defendant-cross-appellant. Also represented by DENA CHEN, MARK R. WEINSTEIN; PHILLIP EDWARD MORTON, Washington, DC.

Before PROST, TARANTO, and STARK, *Circuit Judges*.

TARANTO, *Circuit Judge*.

Mirror Worlds Technologies, LLC (Mirror Worlds) owns U.S. Patent Nos. 6,006,227; 7,865,538; and 8,255,439, which describe and claim methods for storing, organizing, and presenting data in time-ordered streams (*i.e.*, in a chronological manner) on a computer system. In 2017, Mirror Worlds brought the present action in district court against Meta Platforms, Inc.—which was formerly known as Facebook, Inc. and which we call "Facebook" to adhere to the usage of the parties and district court—alleging that Facebook, by providing several features of its social-networking service to its customers, was infringing the '227, '538, and '439 patents. After discovery was completed, Facebook moved for summary judgment of non-infringement of the asserted claims of the patents. The district court granted summary judgment. Although the court rejected Facebook's defense of invalidity of the asserted claims for ineligibility under 35 U.S.C. § 101, the court concluded that there was no infringement as a matter of law because, on several grounds, the evidence would not allow a reasonable finding that all claim limitations were satisfied by the accused features of Facebook's service. *Mirror Worlds Technologies, LLC v. Facebook, Inc.*, 588 F. Supp. 3d 526, 539, 550, 555, 557 (S.D.N.Y. 2022) (*Mirror Worlds 2022*).

Mirror Worlds appeals the grant of summary judgment of non-infringement, while Facebook cross-appeals the rejection of the invalidity defense. We agree with the district court's non-infringement ruling. Given that conclusion, and the fact that the patents at issue expired more than six years ago, we do not, and both parties agree that we need not, address the cross-appeal regarding invalidity.

I

A

The '227 patent titled "Document Stream Operating System" issued from an application filed June 28, 1996. The '538 and '439 patents, both titled "Desktop, Stream-based, Information Management System" (except for a slight punctuation difference), descend from the '227 patent through continuation applications and a continuation-in-part application. All three patents expired by the end of April 2018.

The three patents disclose methods for operating a computer system in which automatic storage of documents is organized by chronology—specifically, timestamps associated with the documents. *See* J.A. 67 ¶ 57, 90 ¶ 57, 115 ¶ 57. Such a system, Mirror Worlds explained, avoids "disadvantages of conventional" systems, which require users to give a file name to a document, manually choose where to store the document (in a user-created storage-organization scheme), and remember both the file name and location of the stored document. Mirror Worlds Opening Br. at 14; '227 patent, col. 2, lines 14–16; *id.*, col. 1, lines 41–59; *see also* '538 patent, col. 1, lines 47–65; '439 patent, col. 1, lines 49–67.

The '227 patent calls for storage of documents in a chronologically ordered "stream." *E.g.*, '227 patent, col. 1, lines 4–6; *id.*, col. 2, lines 30–32. A "stream" is a "time-ordered sequence of documents that functions as a diary of a person or an entity's electronic life." *Id.*, col. 4, lines 6–8. "The tail of a stream contains documents from the past," *id.*, col. 4, lines 10–11, with more recent and new documents added "toward [the] head of the stream." *Id.*, col. 4, lines 12–15. A stream can also "contain[] documents allotted to future times and events, such as, reminders, calendar items, and to-do lists." *Id.*, col. 4, lines 19–21. A "document," as described in the '227 patent, "can contain any type of data including but not limited to pictures,

correspondence, bills, movies, voice mail and software programs." *Id.*, col. 4, lines 16–18; *see id.*, col. 14, lines 33–36 ("'[D]ocument' . . . includes traditional text based files, electronic mail files, binary files, audio data, video data, and multimedia data.").

The '227 patent states that "*[e]very* document created and every document sen[t] to a person or entity is stored in a main stream." *Id.*, col. 4, lines 8–10 (emphasis added). In a prior appeal in the present case, we noted the following understanding of the "main stream" requirement (which is in the asserted claims of the '227 and '538 patents):

> The parties agree that the "main stream" has two properties: *first*, it includes every data unit received or generated by the "computer system"; *second*, it is a time-ordered sequence of data units.

Mirror Worlds Technologies v. Facebook, Inc., 800 F. App'x 901, 903 (Fed. Cir. 2020) (*Mirror Worlds 2020*); J.A. 3–4. The '227 patent also describes "substream[s]"—a "substream" being "a 'subset' of the main stream document collection," '227 patent, col. 5, lines 16–17, created by filtering based on user-generated search criteria. *See id.*, col. 4, line 48, through col. 5, line 13.

Representative claim 13 of the '227 patent reads as follows, the highlighted portion requiring the main stream just noted:

> A method which organizes each data unit received by or generated by a computer system, comprising the steps of:
>
> generating a main stream of data units and at least one substream, ***the main stream for receiving each data unit received by or generated by the computer system***, and each substream for containing data units only from the main stream;
>
> receiving data units from other computer systems;

> generating data units in the computer system;
>
> selecting a timestamp to identify each data unit;
>
> associating each data unit with at least one chronological indicator having the respective timestamp;
>
> including each data unit according to the timestamp in the respective chronological indicator in at least the main stream; and
>
> maintaining at least the main stream and the substreams as persistent streams.

Id., col. 16, lines 9–25 (emphasis added). Claims 14 and 17, which depend on claim 13, are also at issue here, but the added elements are not the basis of the non-infringement ruling before us on appeal.

The '538 and '439 patents similarly describe a "system [that] is stream-based in that it creates time-ordered streams of information items or assets, beginning with the oldest and continuing through current and on to future items." '538 patent, col. 1, line 65, through col. 2, line 1; '439 patent, col. 1, line 67, through col. 2, line 3; *see also* '538 patent, col. 2, lines 7–8 ("When a new document arrives . . . it appears at the head of the stream"); '439 patent, col. 2, lines 9–10 (same).

Claim 1 of the '538 patent and claim 1 of the '439 patent—the claims at issue from those patents—both contain a requirement not present in claims 13, 14, and 17 of the '227 patent: display of a "glance view," which is described as a "pop-up window" containing document-specific information such as the "document's title, application type and owner," and "rich multimedia cues," that is displayed when the user passes a cursor over the document. '538 patent, col. 7, lines 17–26; '439 patent, col. 7, lines 20–29. Independent claim 1 of the '538 patent reads as follows, with only the "glance view" limitations highlighted (the "main

stream" limitations not differing for present purposes from those of the '227 patent):

> A method of operating a computer system comprising:
>
> providing the computer system with documents from diverse applications in respective formats unique to the respective applications;
>
> causing the computer system to automatically, without user interaction and without requiring a user to designate directory structures or other preimposed document categorizations structures, store the provided documents as a time-ordered main stream of documents associated with respective automatically generated time indicators;
>
> said time-ordered main stream being unbounded to thereby accommodate documents associated with time indicators related to past, present and future times;
>
> said time-ordered main stream requiring no fixed beginning or end and being maintained and being selectively retrievable and searchable by the computer system;
>
> said computer system maintaining the main stream live and responsive to subsequent events by automatically incorporating therein new documents as provided to the computer system while maintaining the thus expanded main stream time-ordered;
>
> providing selected search criteria;
>
> causing said computer system to search said time-ordered main stream according to said search criteria and use search results to create a time-ordered substream of documents from the main time-ordered stream;

> further causing said computer system to maintain said substream live and responsive to subsequent events by automatically incorporating therein new document provided to the computer system that meet the search criteria while maintaining the thus expanded substream time-ordered;
>
> displaying at least selected portion of the live main stream or substream on computer display means as a display reflecting the time-ordered nature thereof;
>
> ***automatically showing on the display means a display of a glance view of a displayed document in response to touching with a cursor a screen area associated with the document;***
>
> ***said glance view being an abbreviated version of the document and indicative of content thereof; and***
>
> ***said showing of the glance view occurring essentially instantaneously in response to said touching with the cursor of the screen area associated with the document.***

'538 patent, col. 16, lines 20–63 (emphases added).

We do not set out claim 1 of the '439 patent. That claim is materially the same as the just-quoted claim 1 of the '538 patent in the "glance view" requirement. Although it differs from the other claims at issue here in another respect—it does not have a "main stream" or "substream" limitation, but instead has a "main collection" and a "subcollection" limitation, *see* '439 patent, col. 16, line 20, through col. 17, line 47—we need not and do not address that difference in deciding the appeal.

B

Facebook provides a popular social-networking computer service to its customer-users. Three features of the

service are at issue here. First, the "News Feed" feature provides "a scrolling display (or 'feed') that provides stories that might be of interest to a viewing user," such as comments, photos, or videos posted by another user. *Mirror Worlds 2022*, 588 F. Supp. 3d at 531 (internal quotation marks omitted). Second, the "Timeline" feature "allows a user to share information such as text, images, photos, videos, and other types of data, with other users on Facebook." *Id.* (internal quotation marks omitted). Third, the "Activity Log" feature lists actions taken by a specific user. *Id.* Mirror Worlds alleges that Facebook infringes the patents based on two of Facebook's "backend" computer systems (which are distinguished from the unaccused "frontend" systems that present material to users) related to the three just-noted features. Mirror Worlds Opening Br. at 16, 20, 38; *see also Mirror Worlds 2022*, 588 F. Supp. 3d at 531–32.

One of the backend systems at issue is "the Multifeed system, which serves Facebook's News Feed feature." Mirror Worlds Opening Br. at 16. The Multifeed system, which Mirror Worlds contends meets the "computer system" claim limitation, includes three parts: Multifeed Leaves, Tailer, and Aggregator. *Mirror Worlds 2022*, 588 F. Supp. 3d at 546; *Mirror Worlds 2020*, 800 F. App'x at 904. Leaves stores information about recent user actions. J.A. 7458; *Mirror Worlds 2022*, 588 F. Supp. 3d at 545.[1] Mirror Worlds contends that Leaves meets the claimed "main stream" or "main collection" limitation. Mirror Worlds Opening Br. at 20. Tailer writes user actions to Leaves for storage, *Mirror Worlds 2022*, 588 F. Supp. 3d at 546, and Aggregator retrieves and uses information from Leaves to provide "stories" to users through News Feed's frontend

[1] We use "Leaves" as a singular because the term names what is contended to be a main stream (or main collection).

system, which further processes stories before visually displaying them to users. J.A. 3525 (describing how "additional ranking and advertising data [] is used by the Multifeed Aggregator to produce News Feed stories"); Facebook Response Br. at 50; Mirror Worlds Opening Br. at 20; *Mirror Worlds 2020*, 800 F. App'x at 904.

The second backend system at issue is "the Timeline backend system, which serves Facebook's Timeline and Activity Log features." Mirror Worlds Opening Br. at 16. The Timeline system includes two components of significance here: TimelineDB and Timeline Aggregator. *Mirror Worlds 2020*, 800 F. App'x at 904; *Mirror Worlds 2022*, 588 F. Supp. 3d at 550. TimelineDB—a database that stores information about actions taken by Facebook users—is what Mirror Worlds contends meets the "main stream" and "main collection" limitations. Mirror Worlds Opening Br. at 18; *Mirror Worlds 2022*, 588 F. Supp. 3d at 550; J.A. 7460. Timeline Aggregator receives and uses information, including by querying TimelineDB, that frontend systems further process for presentation to users as the Timeline and the Activity Log. *Mirror Worlds 2020*, 800 F. App'x at 904; *Mirror Worlds 2022*, 588 F. Supp. 3d at 551; J.A. 7460.

C

Mirror Worlds brought this case on May 9, 2017. After claim-construction briefing was complete, but before the fact discovery closed, Facebook moved for summary judgement of non-infringement. *See Mirror Worlds 2020*, 800 F. App'x at 905. Facebook argued that Mirror Worlds failed to provide evidence that the accused systems had a "computer system" in which *all* data that came into or was generated by the identified system was stored in a time-ordered "main stream," as the "main stream" claims at issue required. *Id.* (It made the same argument about "main collection" in the '439 patent. *Id.*) The district court granted Facebook summary judgment, concluding that the respective aggregators of the accused systems received

data from "The Association of Objects" (TAO)—Facebook's principal backend data storage of "objects" (*i.e.*, users and content, such as pictures and comments that are posted on Facebook) and "associations" (*i.e.*, the relationship between objects)—that was not stored in Multifeed Leaves or TimelineDB and not otherwise stored in a time-ordered manner. *Mirror Worlds Technologies, LLC v. Facebook, Inc.*, 320 F. Supp. 3d 538, 541, 544–45, 547–49 (S.D.N.Y. 2018) (*Mirror Worlds 2018*); *see Mirror Worlds 2022*, 588 F. Supp. 3d at 549. In 2020, however, we reversed the summary judgment, concluding that the evidence of record did not establish the absence of a triable issue on the pertinent fact. *Mirror Worlds 2020,* 800 F. App'x at 902, 908–09. We remanded for further proceedings, noting that, because fact discovery was not complete, our decision was "without prejudice to otherwise-appropriate consideration of non-infringement contentions on remand." *Id.* at 910.

On remand, the parties completed fact and expert discovery. On May 20, 2021, Mirror Worlds moved for partial summary judgment of no invalidity based on Facebook's prior-art defenses. *See Mirror Worlds 2022*, 588 F. Supp. 3d at 535; J.A. 177. The same day, Facebook moved for summary judgment, arguing that (1) the asserted claims are ineligible for patent protection under 35 U.S.C. § 101, (2) Facebook does not infringe the asserted claims, and (3) there was no willful infringement. *Mirror Worlds 2022*, 588 F. Supp. 3d at 535; J.A. 177, 7442.

With respect to non-infringement of all three patents at issue, Facebook argued that the record did not permit a reasonable finding that the accused systems met the "main stream" or "main collection" limitations—with the "every data unit" understanding quoted *supra*—and in support Facebook now had additional evidence pinpointing particular information that assertedly the accused "computer systems" receive, via their aggregators, but do not store in the accused "main streams" or "main collections." *See* J.A. 7442, 7445–46, 7457–58. For Multifeed Leaves,

Facebook, relying on testimonial evidence, specified the following such information (assertedly received by Multifeed Aggregator but not included in Leaves): a coefficient score (*i.e.*, "numerical weight that describes the strength of the relationship between a user and a friend on Facebook"), advertising information from "AdFinder," recommendations from the "Ego" system (*e.g.*, about which people a user may wish to be "friends" with or groups the user may wish to join), associations and objects from TAO, information about a user's recent interactions (*e.g.*, recently liked videos), and "ReadState" information (*i.e.*, information about "which stories were already recently presented to the user"). J.A. 7458–60; *Mirror Worlds 2022*, 588 F. Supp. 3d at 546–50. For TimelineDB, Facebook, again relying on testimonial evidence, specified the following information (assertedly received by Timeline Aggregator but not included in TimelineDB): a coefficient score as well as information about the user (*e.g.*, birthday) and major life events (*e.g.*, graduation) received from the TAO and user database (UDB). J.A. 7460–61; *Mirror Worlds 2022*, 588 F. Supp. 3d at 550–55.

For the asserted claims of the '538 and '439 patents, Facebook presented an additional ground of non-infringement—that Mirror Worlds could not show that the accused systems satisfied the "glance view" limitation of those claims. J.A. 7442, 7461–66; *Mirror Worlds 2022*, 588 F. Supp. 3d at 555–56. The "hover-over content [of the accused systems]," Facebook argued, "merely provides information about *the source or author of the link* . . . [but] has nothing to do with the *content* of any underlying document." J.A. 7462–63. Thus, Facebook contended, the "glance view" limitation was not met because "the accused hover-over functionality . . . does not provide '*an abbreviated version of the document*' that is '*indicative of content thereof*.'" J.A. 7464.

On March 8, 2022, the district court agreed with Facebook about non-infringement and granted summary

judgment on that basis. *Mirror Worlds 2022*, 588 F. Supp. 3d at 557. It determined that no genuine dispute of fact existed as to whether Multifeed Leaves or TimelineDB satisfied the "main stream" or "main collection" limitations, "mean[ing] that Facebook is entitled to summary judgment of non-infringement with respect to all the asserted claims." *Id.* at 555. With respect to News Feed, the court concluded:

> [W]hile Facebook is not entitled to summary judgment of non-infringement based on data received from TAO, recent interaction information, or ReadState,[2] Facebook is entitled to summary judgment of non-infringement on three independent bases: the record conclusively establishes that the Multifeed Aggregator (part of the Multifeed System, the alleged computer system) receives information from (1) Coefficient service, (2) AdFinder, and (3) Ego that is not stored in the Multifeed Leaves (the alleged main stream).

Id. at 550 (footnote added). With respect to Timeline and Activity Log, the court held summary judgment warranted because:

> Facebook has proven that the Timeline Aggregator receives the following data that is not contained in the TimelineDB: (1) background user information; (2) major life event information; and (3) coefficient data. Each of these sets of information constitutes an independent basis entitling Facebook to summary judgment of non-infringement with respect to Timeline and Activity Log.

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[2] The district court identified a material factual dispute over whether such information was stored in Multifeed Leaves. *Mirror Worlds 2022*, 588 F. Supp. 3d at 549–50.

Id. at 555. The district court wrote that "Mirror Worlds has failed to create a dispute of material fact as to whether the Timeline Aggregator receives" any of these types of data, concluding that each of Mirror Worlds' arguments either lacked record support or necessarily failed under the district court's construction of "data unit." *Id.* at 554–55.

Regarding the asserted claims of the '538 and '439 patents, the district court also determined that "Mirror Worlds presents no admissible evidence to create a dispute of material fact as to whether Facebook's contextual dialog box indicates the content of the underlying story or document," which would be required in order to meet the glance view limitation. *Id.* at 557; *see also id.* at 556 (granting Facebook's motion to exclude Mirror Worlds' expert's testimony relying on unauthenticated screenshots).

The district court denied Facebook's motion for summary judgment, however, insofar as Facebook argued invalidity under 35 U.S.C. § 101. The court held that the asserted claims were not invalid under § 101. *Mirror Worlds 2022*, 588 F. Supp. 3d at 557.

The district court entered final judgment dismissing the case on March 8, 2022. J.A. 66. Mirror Worlds timely appealed. Facebook cross-appealed regarding the rejection of its § 101 contention. We have jurisdiction under 28 U.S.C. § 1295(a)(1).

II

Following Second Circuit law, we review the grant of summary judgment "without deference, construing the evidence in the light most favorable to the nonmovant and drawing all reasonable inferences in that party's favor." *Medgraph, Inc. v. Medtronic, Inc.*, 843 F.3d 942, 947 (Fed. Cir. 2016) (citing *Kuebel v. Black & Decker Inc.*, 643 F.3d 352, 358 (2d Cir. 2011); *Tracy v. Freshwater*, 623 F.3d 90, 95 (2d Cir. 2010)). As relevant here, when, on a properly made record, the evidence precludes a reasonable finding

of a fact that plaintiff must prove to prevail on a claim of its complaint, summary judgment under Federal Rule of Civil Procedure 56(a) for the defendant on that claim is warranted, other issues regarding that claim thus being immaterial to the outcome. *See Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 247–48 (1986). Here, Mirror Worlds asserts literal infringement of specified patent claims (there is no live doctrine-of-equivalents contention), and Mirror Worlds has the burden of persuasion (by a preponderance of the evidence) on literal infringement, requiring (for a given patent claim) that it proves that an accused process meets "each and every limitation" of that claim. *See Ericsson, Inc. v. D-Link Systems, Inc.*, 773 F.3d 1201, 1215 (Fed. Cir. 2014).

For literal infringement, "the court first determines the scope and meaning of the claims asserted, and then the properly construed claims are compared to the allegedly infringing device (for an apparatus claim) or allegedly infringing act (for a method claim)." *Niazi Licensing Corp. v. St. Jude Medical S.C., Inc.*, 30 F.4th 1339, 1350 (Fed. Cir. 2022). The first step, claim construction, presents an issue of law, and our review is de novo when intrinsic evidence is controlling and involves clear-error review to the extent that underlying findings of fact relevant to claim meaning may have been made by the district court. *See id.* at 1351; *Teva Pharmaceuticals USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331–32 (2015). Application of the construed claim limitations to the accused products or processes presents an issue of fact. *See Niazi*, 30 F.4th at 1351. Regarding the exclusion of certain evidence by the district court, the abuse-of-discretion standard of review—specifically, the standard requiring deference unless the ruling is "manifestly erroneous"—governs here. *SEB S.A. v. Montgomery Ward & Co., Inc.*, 594 F.3d 1360, 1372–73 (Fed. Cir. 2010) (applying Second Circuit law); *see also Picard Trustee for SIPA Liquidation of Bernard L. Madoff Investment Securities LLC v. JABA Associates, LP*, 49 F.4th 170, 180–81 (2d

Cir. 2022); *Torcivia v. Suffolk County, New York*, 17 F.4th 342, 365–66 (2d Cir. 2021).

We proceed as follows. We first address, and reject, Mirror Worlds' challenge to the summary-judgment determination that the evidence would not allow a reasonable finding that the accused features meet the "glance view" limitations of the '538 and '439 patents. Our conclusion on that matter forecloses infringement regarding those two patents, so we need not address the "main collection" limitation, which appears only in the '439 patent. What remains is the '227 patent. For that patent, we address, and reject, Mirror Worlds' challenge to the "data unit" claim construction (a ruling that settles non-infringement regarding the News Feed feature) and its challenge to application of that construction to the evidence regarding the Timeline and Activity Log features. Those conclusions suffice to support the district court's grant of summary judgment of non-infringement. As the parties have agreed, Oral Arg. at 16:02–16:56, 17:19–44, https://oralarguments.cafc.uscourts.gov/default.aspx?fl=22-1600_10112024.mp3, if we uphold the non-infringement determination of the district court, there is no possible further dispute between the parties over these patents (which expired by the end of April 2018), so we need not, and we do not, address the ineligibility issue raised by Facebook on cross-appeal.

A

Mirror Worlds argues that the district court erroneously "overlooked" evidence that demonstrates "at least a genuine dispute of material fact as to whether the accused system satisfied the 'glance view' limitations." Mirror Worlds Opening Br. at 61–62. The evidence alleged to have been improperly "overlooked" was testimony from Mirror Worlds' expert Dr. Eric Koskinen. *Id.* (citing J.A. 13326–34, 13400–05). The district court excluded parts of that testimony and held that, on the proper record, a jury could not reasonably find that the accused processes meet that

limitation of the '538 and '439 patents. *Mirror Worlds 2022*, 588 F. Supp. 3d at 555–57. Specifically, the district court concluded that Mirror Worlds failed to present "admissible evidence to create a dispute of material fact as to whether Facebook's contextual dialog box"—which Mirror Worlds identified as the relevant component of the accused features for this purpose—"indicates the content of the underlying story or document" and thus meets the "glance view" limitation. *Mirror Worlds 2022*, 588 F. Supp. 3d at 557. We see no reversible error in the district court ruling.

The testimony on which Mirror Worlds relies included certain screenshots and referred to certain source code supposedly demonstrating that the Timeline and Multifeed systems met the "glance view" limitation by displaying "'an abbreviated version of the document' and 'indicative of content thereof,'" as required by the uncontested claim construction. *See id.* at 556. The screenshots were unauthenticated and from third-party websites. *Id.* The district court explained that it is "plainly unreasonable for a technical expert to rely on unauthenticated, undated screenshots in forming an opinion" and that such screenshots "are not independently admissible" under Federal Rules of Evidence 901. *Id.* We see no abuse of discretion in the district court's exclusion of the screenshots and Dr. Koskinen's testimony relying on them.

The district court's grant of summary judgment on the remaining record was proper. Dr. Koskinen refers to certain Facebook source code, which is not itself presented to us, and the most specific assertion Mirror Worlds makes about the code to support its "glance view" argument is that the code is used "to create a contextual-dialog component containing a member-bio-story component and displays it on hover." Mirror Worlds Opening Br. at 62; J.A. 13326 ¶ 178, 13329–30 ¶ 183, 13332 ¶ 188, 13400 ¶ 365, 13403 ¶ 370. Dr. Koskinen's testimony does not supply a reasonable basis for finding that the accused systems display an

"abbreviated version" of the underlying document indicative of its *content*, as the claim requires. *Mirror Worlds 2022*, 588 F. Supp. 3d at 556. And Facebook's expert, using authenticated screenshots, testified to the contrary—that the contextual dialog boxes, created by the cited source code, show only information about the source or author, not a summary of the information contained within the document. J.A. 8158–59 ¶¶ 14, 16 (testimony from Facebook's Mr. Yifei Tang that although "these source code files are responsible for a 'hover over' functionality," it "merely provides information about the source or author of the link," not "information about the underlying content of the linked-to article"); J.A. 8160–61 ¶¶ 17–18. According to this uncontroverted evidence, "[t]he content of the underlying story, in fact, is not even input or otherwise provided to the source code responsible for creating the contextual dialog box, and thus, it cannot take that content into account when generating" the hover-over contextual dialog box. J.A. 8161 ¶ 19.

On this record, we affirm the district court's grant of summary judgment of non-infringement of the '538 and '439 patents based on the "glance view" limitation. We turn to the '227 patent.

B

The infringement issue before us regarding the asserted claims of the '227 patent, which focuses on the "main stream" limitation, comes down to what findings the summary-judgment record indicates could reasonably be made about whether Multifeed Leaves and Timeline DB (*i.e.*, the accused main streams, organized chronologically) include *every data unit received or generated* by, respectively, the Multifeed and Timeline backend systems (*i.e.*, the accused computer systems). *See Mirror Worlds 2022*, 588 F. Supp. 3d at 531, 540–41; *Mirror Worlds 2020*, 800 F. App'x at 903. If there is a single data unit received or generated by the specified computer system that does not get put into the

corresponding main stream, the limitation is not met by the specified system-stream combination. The district court concluded that the record compels a finding that there is such a data unit (or more than one) for each of the Multifeed and the Timeline system-stream combinations and on that basis granted Facebook summary judgment.

We agree with the district court. We first consider Mirror Worlds' challenge to the district court's construction of the phrase "data unit," which Mirror Worlds argues is "overly broad and inconsistent with the scope of the term in light of the intrinsic record." Mirror Worlds Opening Br. at 42. We reject that challenge, and that rejection, it is undisputed, ends Mirror Worlds' infringement case as to the News Feed feature (which uses the Multifeed computer system). We then consider Mirror Worlds' argument that, even under the claim construction adopted by the district court (and upheld here), "[t]he district court erred in concluding that Facebook presented 'unequivocal evidence' that the Timeline backend system receives data units that are not stored in the TimelineDB." *Id.* at 31. We reject that argument, finding it sufficient to focus on the coefficient score as a data unit that is received by the specified computer system but not included in the specified main stream.

1

The district court construed "data unit" as "an item of information." *Mirror Worlds 2022*, 588 F. Supp. 3d at 543; *id.* at 547 n.17 (explaining that, as a consequence of accepting Mirror Worlds' argument that "'data unit' can refer to data in *any* format (that is, textual or otherwise)," "there is no subject matter or format limitation built into the term 'data unit'"). Although the district court rejected Facebook's proposed construction of "data unit" as a "document," *id.* at 543, Mirror Worlds argues the district court incorrectly refused to exclude from "data unit" a search query (request) as well as information not of direct user

interest. Mirror Worlds Opening Br. at 41–56. We reject Mirror Worlds' claim-construction challenge.

a

There is no sound basis for concluding that a search query, or information contained within a search query (like search criteria), falls outside the broad term "data unit." *See Mirror Worlds 2022*, 588 F. Supp. 3d at 547; *id.* n.17. We generally give claim terms "their ordinary and customary meaning" to a relevant artisan as understood in light of the intrinsic evidence. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14, 1317 (Fed. Cir. 2005) (en banc). The phrase "data unit" has a facially broad ordinary meaning that does not exclude a query or a search criterion.

Nothing in the specification limits the format or subject matter of "data unit" to support the proposed exclusion. The specification in fact underscores, rather than undermines, the propriety of giving the term its ordinary breadth. When describing the main stream as storing "[e]very document created and every document sen[t] to a person or entity," the specification states that "[a] document can contain any type of data, including but not limited to pictures, correspondence, bills, movies, voice mail and software programs." '227 patent, col. 4, lines 8–10, 16–18; *see also id.*, col. 3, lines 6–7 ("each data unit includes textual data, video data, audio data and/or multimedia data"); *id.*, col. 14, lines 33–36 (explaining that document "includes traditional text based files, electronic mail files, binary files, audio data, video data, and multimedia data"). And we see nothing in the specification to the contrary that justifies curtailing the claim language's breadth to exclude a query or information in a query. Although the specification describes use of search queries to create substreams, *see id.*, col. 6, lines 61–64; *see also id.*, col. 4, lines 48–56, that description does not negate the broader ordinary scope of the claim phrase (itself reinforced by the specification generally). *See Mirror Worlds 2022*, 588 F. Supp. 3d at 547

(stating that "[a] query is plainly an 'item of information,'" a phrase proposed by Mirror Worlds, and that this conclusion is consistent with Mirror Worlds' own statement, in the prosecution history (noted *infra*), "that 'data unit' includes any type of data"). Mirror Worlds itself, in prosecution history, stressed the broad scope. J.A. 1348–50, 1498, 1502.

For those reasons, Mirror Worlds' query-focused argument is contrary to the strong intrinsic evidence. Because this construction dispute is fully resolvable on the intrinsic record alone, as the district court also concluded, we need not address the slight extrinsic evidence invoked by Mirror Worlds.

b

We also agree with the district court's conclusion that a relevant artisan "would not understand 'data unit' to refer only to those units of data that happen to interest a particular user at a particular time." *Mirror Worlds 2022*, 588 F. Supp. 3d at 541. The broad claim language, "data unit," does not suggest any such limitation. And neither does the rest of the intrinsic evidence, which nowhere limits data units to information "of direct user interest" or an equivalent expression.

It is hardly enough that "*one* of the principal goals of the invention" is "managing personal electronic information." Mirror Worlds Opening Br. at 49 (emphasis added) (citing '227 patent, col. 3, lines 61–62); *see also* '227 patent, col. 2, lines 49–51 ("Another object of the present inventions is to provide an operating system in which personal data is widely accessible anywhere . . . ."). It is not clear how that language justifies limiting the claim term to information "of direct user interest," and in any event other objectives do not invoke such a notion. *See* '227 patent, col. 2, lines 13–48. And the broad ordinary meaning does allow achievement of the goal invoked here by Mirror Worlds. The suggested narrowing is similarly unsupported by the

specification's mention of a "diary" as an analogy for the invention. *Id.*, col. 4, lines 6–8, 27–28. The analogy is about time-based organization, not about "personal" content. We see nothing in the specification to justify adoption of the ill-defined narrowing that Mirror Worlds proposes. *See Phillips*, 415 F.3d at 1326–27 (explaining that a term "should not be read restrictively" according to one of the multiple objectives set forth in the written description); *Northrop Grumman Corp. v. Intel Corp.*, 325 F.3d 1346, 1354–55 (Fed. Cir. 2003) (explaining that a principal use or object of an invention does not "constitute[] a limitation on the scope of the invention" and that "statements from the description of the preferred embodiment" do not "indicate that the invention can be used only" according to those statements).

Our conclusion is reinforced by Mirror Worlds' representations to the Patent and Trademark Office. *See Mirror Worlds 2022*, 588 F. Supp. 3d at 542. In opposing an indefiniteness challenge presented to the Office (in a Covered Business Method proceeding[3]), Mirror Worlds told the Office: "The definitions of 'data unit' in both the specification and prosecution history do not include the narrowing limitation that forms the basis of [the] indefiniteness challenge—i.e., 'an item of information that is of direct user interest in the user's timeline.'" J.A. 2009–10. Although that statement was made in connection with a different claim-construction standard (the broadest-reasonable-interpretation standard), it is consistent with the broad "data

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[3] *See* § 18 of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284, 329–31 (2011). Such proceedings were part of the Transitional Program for Covered Business Method Patents, which expired in 2020. *See Trading Technologies International, Inc. v. IBG LLC*, 921 F.3d 1378, 1382 (Fed. Cir. 2019); *GTNX, Inc. v. INTTRA, Inc.*, 789 F.3d 1309, 1310 (Fed. Cir. 2015).

unit" "definition[]" provided by Mirror Worlds in prosecuting the '227 patent's application, J.A. 1498 ("A 'data unit' is a 'document' because a 'document can contain any type of data' . . . ."), and with the most natural reading of Mirror Worlds' remarks indicating that "all data units" are "of significance to the user (in the broadest sense)," J.A. 1497–98. We therefore reject Mirror Worlds' second proposed claim-construction limitation on "data unit."

2

The foregoing claim-construction conclusion suffices to affirm the summary judgment of non-infringement by Facebook's News Feed feature, which is served by the Multifeed system. In this court, Mirror Worlds' only argument against summary judgment regarding News Feed depends on our agreeing with its "data unit" claim-construction argument. Mirror Worlds Opening Br. at 56. Having rejected that argument, we need not discuss News Feed, and the Multifeed system, further.

What remains is Mirror Worlds' argument that, even under the claim construction of "data unit" adopted by the district court, the evidence sufficed to avoid summary judgment of non-infringement regarding the Timeline system (which serves the Timeline and Activity Log features). Mirror Worlds Opening Br. at 31–41. The district court determined that Mirror Worlds failed to create a genuine dispute of material fact as to whether several Facebook-identified items of information ("data units") are received or created by the Timeline Aggregator (one of the two components of the specified Timeline "computer system") but not included in TimelineDB (the specified "main stream"): background user information, major life-event information, and coefficient data. *Mirror Worlds 2022*, 588 F. Supp. 3d at 555. It is sufficient for us to discuss the coefficient information—about which we agree with the district court that the evidence of record allows only one reasonable finding, namely, that it is (a) received by the Timeline Aggregator

but (b) not included in TimelineDB. *Id.* at 554–55 (referring back, in part, to finding about News Feed feature). That is enough for non-infringement given the demanding "each" claim language chosen by Mirror Worlds in its patent, with its undisputed "every" meaning.

Mirror Worlds accepts that coefficient information is "provided to the Timeline Aggregator to construct requests." Mirror Worlds Opening Br. at 47 (citing Facebook's expert Ravin Balakrishnan, J.A. 8286 ¶ 300, who cited testimony by Facebook's Mr. Tang, *see* J.A. 14161). The nature of this coefficient information is undisputed on appeal. It is information "used to identify the other users on Facebook who are believed to have a closer friendship with the user in question." J.A. 7460; *see also* J.A. 8158 ¶ 12 (testimony by Mr. Tang about Timeline); J.A. 8169 ¶ 12 (testimony by Mr. Yun Mao, in the context of the Multifeed Aggregator, that "a 'coefficient score' . . . . provides a numerical weight that describes the strength of the relationship between the user and a particular friend"); J.A. 8291–92 ¶¶ 308–13 (explaining how the source code demonstrates that the Timeline aggregator "get[s] the coefficients" and uses "[t]he coefficients (stored with the coeff variable) . . . via the *getCoefficientScore* function"). A Coefficient service produces and transmits such information to the Multifeed Aggregator. *Mirror Worlds 2022*, 588 F. Supp. 3d at 547. But Mirror Worlds contends that it provided evidence that all data used by the Timeline backend system is stored in TimelineDB, Mirror Worlds Opening Br. at 34–38, and "show[ed] an absence of interaction between . . . Coefficient and the Timeline Aggregator." *Id.* at 36. Like the district court, we disagree.

To show that TimelineDB could be found to meet the "main stream" limitation, Mirror Worlds does not focus specifically on coefficient data; instead, it relies on evidence it characterizes as establishing its own generalization that TimelineDB stores *all* information used by the Timeline backend system. Mirror Worlds Opening Br. at 31–34

(citing J.A. 13304, 13306, 13309–10, 13291–92, 13294, 13296, 14291, 14454–55, 14532, 14272–77, 15241–46). But the cited exhibits and testimony cannot be reasonably understood to establish that generalization. Some indicate at most that data about user actions through the Timeline feature is stored, *at least some of the time*, or under certain circumstances, in TimelineDB, J.A. 14273; J.A. 14275 ("If the first write is against UDB, system will then attempt to write the same data into TimelineDB synchronously . . . ."); J.A. 14291 ("We have a whole architecture set up for retrying writes to TimelineDB if the UDB write succeeds, but TimelineDB write fails."). Other cited exhibits indicate no more than that the Timeline *feature*—through its frontend system—displays "everything relating to [a user]." J.A. 14532. Others are nontechnical high-level promotions about the Timeline *feature* as a whole, not reasonably read as either comprehensive or focused on the specific issue of Timeline Aggregator and Timeline DB. J.A. 14532 ("The centrality of timeline is important here - everything relating to you is here and you can review it"); J.A. 15244 ("building timeline involved backfilling . . . minutiae, new friendships, photos, life events"); J.A. 15245 ("Timeline: Time-ordered index for all time"); J.A. 15246 (flowchart showing arrows between Aggregator and TimelineDB). The remaining cited evidence demonstrates only that a specific type of data not encompassing the system-generated coefficient information—*i.e.*, "user actions"—is stored in the TimelineDB. *See* J.A. 13304, 13306, 13309–10, 13291–92, 13294, 13296, 14555 ("Timeline is a backend system that persists *all actions by users* and pages and indexes them chronologically." (emphasis added)). The exhibits simply cannot be reasonably understood to support a generalization that TimelineDB contains "all" the data received or generated by the Timeline backend system.

On the other hand, there was focused concrete evidence, from Facebook witnesses with first-hand knowledge, that the Timeline backend system does receive

information—coefficient data in particular—that is not stored in TimelineDB. *See*, *e.g.*, J.A. 8289–93 ¶¶ 305–16 (Dr. Balakrishnan explaining that the Timeline "aggregator [will] talk to both UDB and the Timeline DB" and that, in response to a "request received by the Timeline Aggregator," the "Timeline Aggregator receives many fields containing data units that are not written to TimelineDB"); J.A. 8269 (Dr. Balakrishnan explaining system receives information not stored in TimelineDB); J.A. 8158 ¶ 12 (declaration by Mr. Tang explaining that "[t]he Timeline Aggregator also obtains information known as 'coefficient' data . . . [that] is not stored in the TimelineDB; the Aggregator obtains this information from a separate and distinct system called Coefficient."); J.A. 8290–92 ¶¶ 307–13 (testimony by Dr. Ravin Balakrishnan confirming that source code demonstrated that the Timeline Aggregator received a coefficient score from "Coefficient 2," which was not stored in TimelineDB); J.A. 14161, 77:6–19 (testimony by Mr. Tang explaining the Timeline Aggregator will use the coefficient score "from Coefficient 2 system"); *see also* J.A. 14162, 78:6–13; J.A. 8286–87 ¶¶ 300–301.

The testimony of Mirror Worlds' expert Dr. Koskinen does not create a genuine dispute. To the extent that he made the "all" data generalization argued by Mirror Worlds, it is at most in a few conclusory assertions. *See*, *e.g.*, J.A. 13302 ¶ 108; J.A. 13303 ¶ 112; J.A. 13306 ¶ 118. Dr. Koskinen's discussion of specific evidence about Facebook products, which is largely limited to the "user actions" subcategory of "data units," *see* J.A. 13291–300 ¶¶ 82–100; J.A. 13304–06 ¶¶ 114–116, does not reasonably support a generalization about all data units. No cited testimony from Dr. Koskinen addresses coefficient data or the specifics of Facebook's concrete evidence—not itself undermined—that Timeline Aggregator receives information not stored in TimelineDB. Nor is there an answer to the explanation by Facebook's expert that Dr. Koskinen, while addressing some source code, disregarded other source code

showing that Timeline receives data not stored in TimelineDB. *See* J.A. 8269–70. There is, in short, no discernible grounding that can reasonably support the generalization argued by Mirror Worlds.

We are equally unpersuaded by Mirror Worlds' contention that it presented evidence supporting a reasonable inference that the coefficient data is never received by the Timeline backend system and, thus, does not need to be stored in TimelineDB to meet the claim requirements. None of the evidence Mirror Worlds cites for this contention, including exhibits and testimony describing or depicting the Timeline system, refers to the coefficient data. *See* Mirror Worlds Opening Br. at 34–39 (citing J.A. 13626, 13642, 13664–65, 14273, 14281–82, 14285, 14301, 14542). According to Mirror Worlds, the lack of reference to coefficient data in this evidence can reasonably support an inference that the coefficient data does not enter the Timeline system at all. We, like the district court, find this evidence insufficient to create a genuine dispute of fact. It is nothing more than speculation to treat the lack of reference to coefficient data in Mirror Worlds' selected documents as having the import Mirror Worlds advocates. Accordingly, Mirror Worlds' evidence does not create a genuine dispute of fact.

"It is well-established that unsupported expert opinions do not create a genuine issue of material fact." *Minkin v. Gibbons, P.C.*, 680 F.3d 1341, 1352 n.5 (Fed. Cir. 2012); *see also Major League Baseball Properties, Inc. v. Salvinco, Inc.*, 542 F.3d 290, 311 (2d Cir. 2008); *Garcia v. Hartford Police Department*, 706 F.3d 120, 128 (2d Cir. 2013). In these circumstances, even resolving all ambiguities and drawing all reasonable inferences against Facebook, *see Matsushita Electrical Industrial Co., Ltd. v. Zenith Radio Corp.*, 475 U.S. 574, 588 (1986), we conclude that the district court did not err in concluding that the record would require a reasonable jury to find that the Timeline Aggregator in the Timeline backend system received

information, namely coefficient information, that is not contained within TimelineDB.

III

For the foregoing reasons, we affirm the judgment of the district court with respect to non-infringement of the '227, '538, and '439 patents, and we dismiss Facebook's cross-appeal.

Costs are awarded to Facebook.

AFFIRMED AS TO THE APPEAL & DISMISSED AS TO THE CROSS-APPEAL