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UNITED STATES DISTRICT COURT

DISTRICT OF ARIZONA

Swarm Technology, LLC, an Arizona
limited liability company,

Plaintiff,

v.

Amazon.com, Inc., and Amazon Web
Services, Inc.,

Defendants.

Case No.: CV-21-00438-PHX-DJH

**MOTION FOR LEAVE TO FILE
FIRST AMENDED COMPLAINT**

Oral Argument Requested

Plaintiff Swarm Technology, LLC (“Swarm”) respectfully moves the Court for leave to file the attached redlined First Amended Complaint (the “FAC”) (Exhibit 1). As a courtesy, a clean copy of the FAC is also attached as Exhibit 2. This Motion for Leave to file the FAC (the “Motion”) is made pursuant to Fed. R. Civ. P. 15(a)(2) and supported by the Declarations of Dr. Brent Nelson and Dr. Douglas Sylvester attached as Exhibits 3 (the “Nelson Dec.”) and 4 (the “Sylvester Dec.”).

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I. PROCEDURAL HISTORY

Swarm filed its Complaint for Patent Infringement against Defendants Amazon.com (“Amazon), Inc. and Amazon Web Services, Inc. (“AWS”) (collectively, “Amazon Defendants”) on March 15, 2021, asserting infringement of U.S. Patent Nos. 9,852,004 (the “‘004 Patent”) and 10,592,275 (the “‘275 Patent”) (Doc. 1, the “Complaint”). On May 26, 2021, Amazon Defendants filed a motion to dismiss pursuant to Fed. R. Civ. P. 12(b)(6), contending that asserted claim 1 of the ‘004 Patent and asserted claim 1 of the ‘275 Patent were ineligible under 35 U.S.C § 101 (Doc. 29). On September 20, 2021, the Court granted Amazon Defendants’ motion to dismiss (Doc. 64 at 9, the “Order”) and granted Swarm leave to file this Motion.

The FAC contains specific and concrete allegations of inventive concepts and improvements to computer functionality. The FAC also asserts infringement of U.S. Patent No. 9,146,777 (the “‘777 Patent”), in addition to the previously asserted ‘004 Patent and ‘275 Patent (collectively, the “Patents-in-Suit”).

II. BACKGROUND

Notwithstanding the superficial similarities to a scrum board, Swarm’s invention is not directed at organizing human behavior, and is legally non-abstract. Dr. Sylvester noted in his declaration that “while computing components, architectures, and processes can always be described using analogies to humans and human activities, the existence of such analogies does not imply that all such computing components, architectures, and processes are directed to organizing human activities.” (Sylvester Dec. at ¶ 7). Swarm invented a new computer processing architecture that reconfigures the elements of a computer’s processing system and introduces new code to operate those elements. In combination, these elements provide an improvement to the functionality of the computer itself. Swarm’s new architecture revolutionizes the interaction of computer components and addresses technology issues that only arise in a computer context. Simply put, Swarm’s new architecture provides a new way for computer parts (*e.g.*, a processing system) to interact with each other by modifying existing

parts (controller and co-processors) and interposing a new intermediary part (task pool) to manage communication among all the parts.

While humans can accomplish some tasks commonly attributed to computers (*e.g.*, remembering, adding, subtracting, transferring information, etc.), such similarities are wholly insufficient to render “chip architectures and the like” abstract. *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016). Humans are physically incapable of implementing Swarm’s new processing architecture (*e.g.*, reading from solid state storage, switching network packets, applying high frequency voltage switching to transistor gates, etc.). The Federal Circuit has consistently held that such improvements in computer-related technology are undoubtedly not abstract. *See id.* at 1335 (explaining that some computer-related improvements such as “chip architectures ... and the like” are undoubtedly not abstract). Even assuming, *arguendo*, that Swarm’s invention is *intuitively* abstract, for example, as being directed to organizing human behavior, it is not and cannot be *legally* abstract, under controlling Federal Circuit precedent. *Id.* at 1335.

Prior to Swarm’s invention, conventional multiprocessor computer systems included a central processor or controller (“CPU”) and one or more co-processors (Fig. 1). As described in the Background section of the ‘004 Patent: “[t]he CPU partitions the computational requirements into tasks and distributes the tasks to co-processors. Completed threads are reported to the CPU” ‘004 Patent at 1:57-60. This conventional approach is “disadvantageous in that a significant amount of CPU bandwidth is consumed by task distribution [and] co-processors often remain idle while waiting for a new task from the CPU.” ‘004 Patent at 1:62-2:3.



FIG. 1 – Conventional Architecture

Swarm's inventive concepts modify the arrangement of components in a multiprocessor system (Fig. 2), as well as the functionality of each of the individual components. As a result, Swarm's invention both improves the functionality of a multiprocessor system and defines a new multiprocessor system architecture altogether.

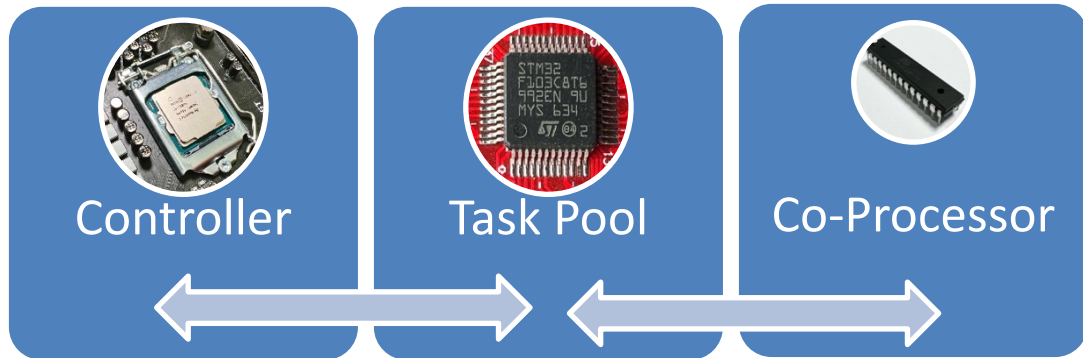


FIG. 2 – New Architecture

During prosecution, the U.S. Patent Office meticulously analyzed the Patents to ensure each element met the rigorous standards set forth in Title 35 of the U.S. Code. Amazon Defendants nevertheless invited this Court to override the U.S. Patent Office and summarily declare Swarm's Patents-in-Suit invalid without any serious analysis of the claim language. Amazon Defendants' reasoning is based on a one-dimensional comparison of Swarm's multiprocessor system to a scrum board. (Doc. 29 at 13; Doc. 42-1 at 14). This is exactly the type of oversimplification the U.S. Supreme Court warned against because "all inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas." *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66, 71 (2012); *see also, McRO v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1313 (Fed. Cir. 2016) (stating "courts 'must be careful to avoid oversimplifying the claims' by looking at them generally and failing to account for the specific requirements of the claims."); and *TECSEC, Inc. v. Adobe, Inc.*, 978 F.3d 1278, 1293 (Fed. Cir. 2020) (explaining that "characterizing the claims at 'a high level of abstraction' that is 'untethered from the language of the claims all but ensures that the exceptions to § 101 swallow the rule.'").

Dr. Sylvester opined that, “while generic computers could be used to more efficiently organize and manage teams of humans and their combined efforts, the multiprocessor systems claimed by the Patents-in-Suit are directed to far more specific and complex problems that are unique to computing environments. Said differently, the claimed elements and features do far more than apply computers to a pre-existing human process or practice.” (Sylvester Dec. at ¶ 10). The fact that one could transmute generic computer components to practice the invention does not, as Amazon Defendants suggests, foreclose eligibility. Indeed, reconfiguring and uniquely arranging formerly generic components, transforms them into new and useful machines capable of implementing Swarm’s inventive concepts. Consequently, to the extent smartphones, laptops and other off-the-shelf generic computers are used to implement the invention, they *cannot* be used in their off-the-shelf condition; rather, they must first be modified by changing their operating software to implement Swarm’s new architecture. As specifically alleged in the FAC, these configurations and arrangements amount to significantly more than “well-understood, routine, and conventional” activities. (*See, e.g.*, FAC at ¶¶ 124-253).

III. SUMMARY OF ARGUMENT

Leave to amend should be freely granted absent undue delay, bad faith, undue prejudice, or futility. Swarm’s FAC is not futile as it contains specific and concrete allegations that Swarm’s invention comprises non-abstract improvements to computer operation and functionality, as well as allegations of inventive concepts that amount to significantly more than an abstract idea. These allegations preclude dismissal under a 12(b)(6) analysis of § 101 eligibility. As a result, Swarm’s motion for leave to file the FAC should be granted.¹

¹ Any discussion of patent claims herein should not be used for infringement, validity, or claim construction purposes. The invention is defined by the combination of all elements of the claims in the context of the specifications, drawings, and prosecution history.

IV. LEGAL STANDARDS

A. Patent Eligibility under 35 U.S.C. § 101

35 U.S.C. § 101 provides that “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”

The Supreme Court in *Alice Corp. Pty. v. CLS Bank Int’l*, 573 U.S. 208 (2014), identified implicit exceptions to patent eligibility under Section 101, such as claims directed to “abstract ideas” which do not contain “an ‘inventive concept’ sufficient to ‘transform’ the claimed abstract idea into a patent-eligible application.” *Id.* at 216, 221 (quoting *Mayo*, 566 U.S. at 79).

Step one of *Alice*’s two-step framework asks “whether the claims at issue are directed to a patent-ineligible concept.” *Alice*, 573 U.S. at 217. The Federal Circuit states that some improvements in computer technology, such as “chip architecture[s] ... and the like,” when appropriately claimed, “are undoubtedly not abstract.” *Enfish*, 822 F.3d at 1335. Furthermore, for patents in the field of computer-related technology, claims “directed to an improvement to computer functionality” or claims focused on “specific asserted improvement[s] in computer capabilities” are simply not abstract under *Alice* step one. *Id.* at 1335-36. When claims are “not directed to an abstract idea under step one of the *Alice* analysis, we do not need to proceed to step two of that analysis.” *Id.* at 1339.

If it is determined at step one that the subject claims are directed to an abstract idea, then step two searches for an “inventive concept”—i.e., elements ‘sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.’” *Alice*, 573 U.S. at 217-218 (quoting *Mayo*, 566 U.S. at 73). In *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121 (Fed. Cir. 2018), the Federal circuit explained that “the second step of the *Alice/Mayo* test is satisfied when the claim limitations ‘involve more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” *Id.* at 1128 (quoting *Content Extraction and Transmission LLC v.*

Wells Fargo Bank, Nat'l Ass'n, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014)). The Federal Circuit further clarified that “[w]hether the claim elements or the claimed combination are well-understood, routine, conventional is a question of fact.” *Aatrix*, 882 F.3d at 1128. In *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014), the Federal Circuit found an inventive concept where the claims “override[] the routine and conventional sequence of events” in computer functionality. *Id.* at 1258 (referring to the events triggered by the click of a hyperlink).

B. Amendments to Pleadings under Rule 15(a)(2)

Fed. R. Civ. P 15(a)(2) states that a party may “amend its pleading [with] the court’s leave” and requires that “[t]he court should freely give leave when justice so requires.” The Ninth Circuit has noted that this policy “is to be applied with extreme liberality.” *Eminence Capital, LLC v. Aspeon, Inc.*, 316 F.3d 1048, 1051 (9th Cir. 2003). In *Foman v. Davis*, 371 U.S. 178 (1962), the Supreme Court provided the *Foman factors* for district courts to use in determining whether to grant leave to amend, including undue delay, bad faith, failure to previously cure, undue prejudice, and futility. *See id.* at 182.

Amazon Defendants has not suggested, and the facts in no way support, the presence of undue delay, bad faith, previous amendments, or undue prejudice. Hence, to the extent any portion of the FAC includes “allegations of specific inventive concept,” the FAC cannot be “futile” and should be entered by this Court. *See Aatrix* 882 F.3d at 1126-27 (stating that “patentees who adequately allege their claims contain inventive concepts survive a § 101 eligibility analysis under Rule 12(b)(6)”).

V. ARGUMENT

A. Leave to Amend Should be Granted Because the FAC Includes Specific Allegations of Inventive Concepts

The *Alice* Court characterized step two as “a search for an ‘inventive concept’— i.e., an element or combination of elements that is “sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.”” *Alice*, 573

U.S. at 218 (quoting *Mayo*, 566 U.S. at 73). Furthermore, *Aatrix* explains that step two “is satisfied when the claim limitations ‘involve more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” *Aatrix*, 882 F.3d at 1128. Additionally, in *Berkheimer v. HP Inc.*, 881 F.3d 1360 (Fed. Cir. 2018), the Federal Circuit held that “[w]hether something is well-understood, routine, and conventional to a skilled artisan at the time of the patent is a *factual determination*.” *Id.* at 1369 (emphasis added).

Patent eligibility can be determined at the Rule 12(b)(6) stage only when “there are no factual allegations that, taken as true, prevent resolving the eligibility question as a matter of law.” *Aatrix*, 882 F.3d at 1125. “Plausible factual allegations may preclude dismissing a case under Section 101 where, for example, ‘nothing on th[e] record ... refutes those allegations as a matter of law or justifies dismissal under Rule 12(b)(6).’” *FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1097 (Fed. Cir. 2016) (quoting *BASCOM Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1352 (Fed. Cir. 2016)). For this reason, the Federal Circuit concluded in *Aatrix*, “patentees who adequately allege their claims contain inventive concepts survive a § 101 eligibility analysis under Rule 12(b)(6).” (*Aatrix*, 882 F.3d at 1126-27).

B. The FAC Contains Numerous Specific Allegations of Inventive Concepts

The following non-limiting examples of inventive concepts are alleged in the FAC²:

1. The FAC Specifically Alleges the “Controller Configured to Populate a Task Pool” Constitutes an Inventive Concept

The FAC alleges that claim 1 of the ‘004 Patent includes inventive concepts and improvements to the operation of a multiprocessor system. Specifically, the FAC describes the

² Swarm acknowledges the Court’s statement that Swarm does not dispute that “claim 1 of the ‘004 Patent exemplifies the other claims....” (Doc. 64 at 6.) However, prior to the FAC, only claim 1 of ‘004 and ‘275 had been specifically asserted. The FAC specifically asserts infringement of 43 claims (all claims of all three Patents-in-Suit), and the discussion of these claims in the FAC thoroughly distinguishes the claims from one another.

elements of “a controller configured to populate a task pool with a plurality of first tasks and a plurality of second tasks” as illuminated by the ‘004 specification. (*See, e.g.*, FAC at ¶¶ 134-137). Dr. Nelson elaborates on various non-conventional features of claim 1 and the advantages stemming therefrom. (Nelson Dec. at ¶¶ 7-8). Based on these distinctions, Dr. Nelson concludes that “claim 1 of the ‘004 Patent includes inventive concepts involving more than well-understood, routine, and conventional activities known to the field or industry” (Nelson Dec. at ¶ 8). Dr. Sylvester corroborates Dr. Nelson’s conclusions. (Sylvester Dec. at ¶ 20).

The FAC describes how claim 1 overrides the normal sequence of events performed by conventional processing architectures. For example, “the controller (CPU) ‘may be configured for use within the system 10 by programming it to recognize and communicate with the task pool 13 and divide the computing requirements into threads.’ (‘004; 5:40-43).” (*See, e.g.*, FAC at ¶¶ 134-137). This configuration of a controller “override[s] the routine and conventional sequence of events performed by prior art processing architectures.” (FAC at ¶ 137).

2. The FAC Specifically Alleges That the “First Co-Processor” and “Second Co-Processor,” Each Configured to “Retrieve” Tasks From “A Task Pool” Rather Than From a “Controller” Constitute Inventive Concepts

The FAC alleges that claim 1 of the ‘004 Patent includes inventive concepts and improvements to the functionality of a multiprocessor system. Specifically, the FAC describes the elements of “a first co-processor configured to ... retrieve a first task from the task pool ... without any communication between the first co-processor and the controller; and a second co-processor configured to ... retrieve a second task from the task pool ... without any communication between the second co-processor and the controller” as illuminated by the ‘004 specification. (*See, e.g.*, FAC at ¶¶ 128 and 138-142).

Dr. Nelson elaborates on various unconventional features of claim 1 and the advantages stemming therefrom (Nelson Dec. at ¶ 10). Based on these distinctions, Dr. Nelson concludes that “claim 1 of the ‘004 Patent includes inventive concepts involving more than well-

understood, routine, and conventional activities known to the industry.” (Nelson Dec. at ¶ 12). Dr. Sylvester corroborates Dr. Nelson’s conclusions. (Sylvester Dec. at ¶ 24).

The FAC describes how claim 1 involves more than well understood, routine, and conventional activities previously known to the industry. For example, the co-processors act “as autonomous, proactive solidarity cells” and “may be configured (*e.g.*, programmed) to periodically send an agent to monitor the task pool for available tasks appropriate to that co-processor” (*See, e.g.*, FAC at ¶¶ 128 and 138-142). This configuration of a co-processor involves “more than well-understood, routine, and conventional activities previously known to the industry.” (FAC at ¶ 142).

3. The FAC Specifically Alleges the “Task Pool” Constitutes Inventive Concepts

The FAC alleges that claim 1 of the ‘275 Patent includes inventive concepts and improvements to the functionality of a multiprocessor system. Specifically, the FAC describes the elements of “a task pool” interposed between “a controller” and “co-processors” as illuminated by the ‘275 specification. (*See, e.g.*, FAC at ¶¶ 164-168).

Dr. Nelson elaborates on various unconventional features of claim 1 and the advantages stemming therefrom. (Nelson Dec. at ¶ 19). Based on these distinctions, Dr. Nelson concludes that “claim 1 of the ‘275 Patent includes inventive concepts involving more than well-understood, routine, and conventional activities known to the industry.” (Nelson Dec. at ¶ 20). Dr. Sylvester corroborates Dr. Nelson’s conclusions. (Sylvester Dec. at ¶ 30).

The FAC describes how claim 1 includes inventive concepts by overriding the conventional sequence of events performed by conventional processing architectures. For example, the FAC describes that the controller (CPU) may be configured “to recognize and communicate with the task pool 13 and divide the computing requirements into threads” and that “as a result, ‘a co-processor may interact with the task pool without being instructed to do so by the CPU or by the task pool,’” (FAC at ¶ 168). This configuration of a “collaborative

intelligence system” includes “inventive concepts involving more than well-understood, routine, and conventional activities previously known in the industry.” (FAC at ¶ 168).

4. The FAC Specifically Alleges that the Elements “Configured to Dynamically Accept the First Co-Processor, the Second Co-Processor, and an Additional Co-Processor” on a “Plug-and-Play Basis Without Any Communication With the Controller” Constitute Inventive Concepts

The FAC alleges that claim 1 of the ‘275 Patent includes elements that comprise inventive concepts and improvements to the functionality of a multiprocessor system. Specifically, the FAC describes the elements of “configured to dynamically accept the first co-processor, the second co-processor, and an additional co-processor” on a “plug-and-play basis without any communication with the controller” as illuminated by the ‘275 specification. (*See, e.g.*, FAC at ¶¶ 178-181).

Dr. Nelson elaborates on various unconventional features of claim 1 and the advantages stemming therefrom. (Nelson Dec. at ¶ 24). Based on these distinctions, Dr. Nelson concludes that “claim 1 of the ‘275 Patent includes inventive concepts involving more than well-understood, routine, and conventional activities known to the industry.” (Nelson Dec. at ¶ 24). Dr. Sylvester corroborates Dr. Nelson's conclusions. (Sylvester Dec. at ¶ 35).

The FAC describes how claim 1 includes inventive concepts. For example, the FAC points out that “the system may include a plurality of cells, wherein some of the cells are capable of performing the same task types as other cells, to thereby create redundancy in the system. This redundancy allows the system to continue functioning seamlessly when cells are removed from the system or are otherwise unavailable. The system also functions seamlessly when cells are dynamically added to the system.” (FAC at ¶ 181). As a result, the FAC alleges that claim 1 “includes numerous inventive concepts.” (FAC at ¶ 181).

5. The FAC Specifically Alleges that the Elements “First Solidarity Cell” Configured to “Retrieve” a “Matching Task” From the “Task Pool” “Without Requiring an Instruction From the CPU” Constitute Inventive Concepts

The FAC alleges that claim 1 of the ‘777 Patent includes inventive concepts and improvements to the functionality of a multiprocessor system. Specifically, the FAC describes the elements of “the first solidarity cell comprising a first agent configured to proactively retrieve, from the task pool, without requiring an instruction from the CPU, a matching task for the solidarity cell to process” as illuminated by the ‘777 specification. (*See, e.g.*, FAC at ¶¶ 215-219).

Dr. Nelson elaborates on various unconventional features of claim 1 and the advantages stemming therefrom. (Nelson Dec. at ¶ 30). Based on these distinctions, Dr. Nelson concludes that “claim 1 of the ‘777 Patent includes inventive concepts involving more than well-understood, routine, and conventional activities known to the industry.” (Nelson Dec. at ¶ 30). Dr. Sylvester corroborates Dr. Nelson’s conclusions. (Sylvester Dec. at ¶ 42).

The FAC describes how claim 1 includes inventive concepts. For example, the FAC points out that “the solidarity cell is equipped with a software agent to retrieve a matching task from the task pool, without directly communicating with the CPU ... this inventive concept had never been proposed before, and thus claim 1 involves more than well-understood, routine, and conventional steps.” (FAC at ¶¶ 218-219).

C. Under *Enfish*, “Improvement[s] to Computer Functionality” are Not Abstract

The Federal Circuit’s decision in *Enfish* has been cited in more than 500 federal cases and is the *de facto* standard for determining the eligibility of computer-related patents.

Enfish presents *Alice*’s first step as a dichotomy:

Therefore, we find it relevant to ask whether the claims are directed to an improvement to computer functionality versus being directed to an abstract idea, even at the first step of the *Alice* analysis.

For that reason, the first step in the *Alice* inquiry in this case asks whether the focus of the claims is on the specific asserted improvement in computer capabilities ... or, instead, on a process that qualifies as an ‘abstract idea’

Enfish, 822 F.3d at 1335.

In addition to establishing that improvements to computer functionality are non-abstract, the Federal Circuit also certifies certain categories of computer functionality improvements as undoubtedly not abstract, “such as a chip architecture, an LED display, and the like.” *Id.* at 1335.

Chip architecture can be described as “the structure, organization, and behavior of functional components within an integrated circuit (IC) or ‘chip’.” (Nelson Dec. at ¶ 13). In a like fashion, computer and multiprocessor architectures can be described as “the structure, organization, and behavior of functional components within a computer processing system.” (Nelson Dec. at ¶ 14).

1. Swarm’s Controller and Task Pool are Directed to Improvements to Computer Functionality, and Therefore, Not Directed Abstract.

The ‘004³ specification describes conventional computer functionality:

[a] typical multiprocessor system includes a central processing unit (“CPU”) and one or more co-processors. The CPU partitions the computational requirements into tasks and distributes the tasks to co-processors. (‘004, 1:56-59).

The ‘004 Patent describes this as disadvantageous because:

a significant amount of CPU bandwidth is consumed by task distribution; waiting for tasks to be completed before distributing new tasks (often with dependencies on previous tasks); responding to interrupts from co-processors when a task is completed; and responding to other messages from co-processors. (‘004 1:63-2:1).

³ The analysis set forth herein with respect to the ‘004 claims also applies to the claims of the ‘275 and ‘777 Patents.

Before Swarm's invention may be implemented on conventional computer components, the components must first be modified as explained in the '004 specification:

[i]t is further contemplated that the system 10 may be implemented retroactively on any computer or computer network having an operating system that may be modified or otherwise configured to implement the functionality described herein. ('004, 5:45-49).

Swarm improves the functionality of a computer by reconfiguring the controller (CPU) to parse and distribute tasks to a task pool in lieu of a co-processor:

the CPU 11 may be configured for use within the system 10 by programming it to recognize and communicate with the task pool 13 and divide the computing requirements into threads ('004, 5:40-43).

The '004 specification further describes the configuration:

[f]or example, in FIG. 1, the system 10 may divide an aggregate computational problem into a group of tasks, and populate the task pool 13 with a first type, a second type, and a third type of tasks. ('004, 6:39-42).

Swarm's improved computer functionality is ultimately captured in Claim 1, which requires:

1. A processing system, comprising:

a task pool;

a controller configured to populate the task pool with a plurality of first tasks and a plurality of second tasks;

a first co-processor configured to successively: retrieve a first task from the task pool ... **all without any communication between the first co-processor and the controller;** and

a second co-processor configured to successively: retrieve a second task from the task pool ... **all without any communication between the second co-processor and the controller;**

wherein the processing system is configured to dynamically accept the first co-processor ... into the processing system on a plug-and-play basis **without any communication with the controller.** ('004, 14:10-32)(emphasis added).

Notably, *Enfish* states that:

[a] conclusion that the claims are directed to an improvement of an existing technology is bolstered by the specification's teachings that the claimed invention achieves other benefits over conventional [databases], such as increased flexibility, faster search times, and smaller memory requirements.

Enfish, 822 F.3d at 1337.

Swarm's invention achieves many benefits over conventional computer functionality:

[t]his approach has the additional benefit of reducing CPU overhead by relieving the CPU of the need to send a request to a cell to retrieve a task from the task pool. These advantages render the system 10 more efficient than traditional computer architectures in which auxiliary modules and co-processors are dependent on instructions from the main CPU. ('004, 8:66 – 9:5).

In sum, the claims of the '004 Patent are not directed to an abstract idea because they are directed to improvements to computer functionality, including a controller configured to parse and distribute tasks to a task pool, increasing efficiency and CPU bandwidth.

2. Swarm's Co-processors and Task Pool are Directed to Improvements to Computer Functionality and Are Therefore Not Abstract

Swarm improves computer functionality by reconfiguring the co-processors to act autonomously and proactively retrieve, process, and complete tasks without communicating with the CPU. Regarding conventional computer functionality, Swarm's '004 specification teaches:

[a] typical multiprocessor system includes a central processing unit ("CPU") and one or more co-processors. The CPU partitions the computational requirements into tasks and distributes the tasks to co-processors. ('004, 1:56-59).

One reason that this conventional computer functionality is disadvantageous is because:

co-processors often remain idle while waiting for a new task from the CPU. ('004, 2:1-3).

In order to implement Swarm's invention, a conventional system must first be modified as described in the '004 specification:

[i]t is further contemplated that the system 10 may be implemented retroactively on any computer or computer network having an operating system that may be modified or otherwise configured to implement the functionality described herein. ('004, 5:45-49).

Swarm's improvement to computer functionality includes configuring the co-processors to act autonomously and proactively:

[i]n various embodiments the co-processors are referred to as autonomous, proactive solidarity cells. In this context, the term autonomous implies that a co-processor may interact with the task pool without being instructed to do so by the CPU or by the task pool. The term proactive suggests that each co-processor may be configured (*e.g.* programmed) to periodically send an agent to monitor the task pool for available tasks appropriate to that co-processor. ('004, 2:36-43).

Swarm's improved functionality is ultimately captured in Claim 1, which requires:

1. A processing system, comprising: ...

a first co-processor configured to successively: retrieve a first task from the task pool; deliver the first task to the first co-processor; process the first task; generate first resulting data; and update the task pool to reflect completion of the first task, all without any communication between the first co-processor and the controller; and

a second co-processor configured to successively: retrieve a second task from the task pool; deliver the second task to the second co-processor; process the second task; generate second resulting data; and update the task pool to reflect completion of the second task, all without any communication between the second co-processor and the controller;

wherein the processing system is configured to **dynamically accept the first co-processor, the second co-processor, and an additional co-processor into the processing system on a plug-and-play basis without any communication with the controller.** ('004, 14:10-32)(emphasis added).

Swarm’s ‘004 invention achieves many benefits over conventional computer systems. For example, the ‘004 specification highlights benefits of Swarm’s approach to autonomous and proactive co-processors as follows:

[i]n this way, the processing capacity of the solidarity cells 12 may be more fully exploited, inasmuch as the cells need not wait idly for an instruction from the CPU 11. (‘004, 8:63-66).

In sum, the claims of the ‘004 Patent are not and cannot be directed to an abstract idea because they recite improvements to computer functionality, including by using co-processors that act autonomously and proactively to retrieve, process, and complete tasks without communication between the co-processors and the CPU. In contrast, conventional co-processors wait idly for instructions from a CPU.

3. The Claims of the ‘004, ‘275, and ‘777 Patents are Directed to “chip architecture[s] ... and the like” and are Therefore Undoubtedly Not Abstract

Each of the Patents describes a multiprocessor architecture. For example, the ‘004 specification describes “a parallel processing architecture” which “includes a CPU, a task pool populated by the CPU, and a plurality of autonomous co-processing cells each having an agent configured to proactively interrogate the task pool to retrieve tasks appropriate for a particular co-processor.” (‘004, Abstract). The claims of the Patents are directed to multiprocessor architectures. For example, claim 1 of the ‘004 Patent describes elements of “[a] processing system, comprising: a task pool; a controller ... a first co-processor ... a second co-processor ... an additional co-processor” (‘004, 14:10-30). The claims also describe the organization and behavior of these elements within the multiprocessor architecture. As a result, the claims of the Patents fall squarely within *Enfish*’s undoubtedly non-abstract category of “chip architecture ... and the like.” (*Enfish*, 822 F.3d at 1335) (emphasis added).

Certain dependent claims, such as claims 4 and 5 of the ‘004 Patent and claim 5 of the ‘275 Patent, include specific limitations that various elements reside on a “monolithic integrated circuit (IC)” (*See, e.g.*, ‘004, 15:38-16:3; and ‘275, 15:5-6). These claims are

undoubtedly directed to integrated circuit (“IC” or “chip”) architectures and therefore fall squarely within *Enfish*’s non-abstract category of “*chip architecture ... and the like.*” (*Enfish*, 822 F.3d at 1335) (emphasis added).

VI. CONCLUSION

Swarm’s FAC provides concrete allegations that the claims of the ‘004, ‘275, and ‘777 Patents include inventive concepts which are not well-understood, routine, or conventional activities. These allegations are further illuminated by the specification and are supported by the accompanying Declarations.

Swarm’s claims are directed to non-abstract improvements to computer functionality, including “chip architecture[s] ... and the like,” and are thus patent eligible under *Alice* step one.

Swarm’s FAC is not futile because it adequately alleges inventive concepts and because Swarm’s patent claims are directed to non-abstract improvements to computer functionality. Therefore, under Fed. R. Civ. P. Rule 15(a)(2), the Court should freely grant this motion for leave to file the FAC.

DATED this 20th day of October 2021.

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CERTIFICATE OF SERVICE

I hereby certify that on October 20th, 2021, I electronically transmitted the foregoing document to the Clerk's Office using the ECF System for filing. A copy of the foregoing was electronically provided by the ECF System to all counsel of record.

/s/Nancy Leahy
Nancy Leahy

EXHIBIT LIST

<u>Exhibit</u>	<u>Title</u>
1	Redlined First Amended Complaint
2	Clean First Amended Complaint
3	Declaration of Dr. Brent Nelson
4	Declaration of Dr. Douglas Sylvester