THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
HOUSTON DIVISION

SWARM TECHNOLOGY LLC Plaintiff, v. HEWLETT PACKARD ENTERPRISE COMPANY Defendant.	Case No.: **COMPLAINT FOR PATENT INFRINGEMENT** **JURY TRIAL DEMANDED**

Plaintiff Swarm Technology LLC, an Arizona limited liability company ("Swarm"), hereby files its Complaint against Hewlett Packard Enterprise Company ("HPE") for patent infringement under Title 35 of the United States Code. Swarm alleges the following upon personal knowledge where applicable, and otherwise upon information and belief:

I. BACKGROUND

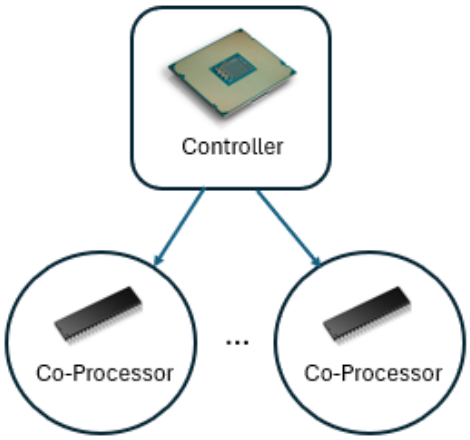
1. Alfonso Íñiguez is the sole inventor of four (4) United States Patents, namely,(i) U.S. Patent No. 9,852,004 issued December 26, 2017, entitled "System and Method for Parallel Processing Using Dynamically Configurable Proactive Co-Processing Cells" ("'004 Patent"); (ii) U.S. Patent No. 10,592,275 issued March 17, 2020, entitled "System and Method for Swarm Collaborative Intelligence Using Dynamically Configurable Proactive Autonomous Agents" ("'275 Patent"); (iii) U.S. Patent No. 9,146,777 issued September 29, 2015, entitled "Parallel Processing With Solidarity Cells By Proactively Retrieving From a Task Pool a Matching Task for the

Solidarity Cell to Process" ("'777 Patent"); and (iv) U.S. Patent No. 12,159,161 issued December 3, 2024, entitled "System and Method For Swarm Collaborative Intelligence Using Dynamically Configurable Proactive Autonomous Agents" ("'161 Patent"). In addition, a divisional U.S. Patent application, Serial No. 18/788,540, was filed July 30, 2024 ("'540 Application") and remains pending in the U.S. Patent and Trademark Office (USPTO).

2. True and correct copies of the '275 Patent and the '161 Patent (referred to herein as the "Patents-in-Suit") are attached hereto as Exhibits A and B, respectively, and are incorporated herein by this reference. HPE infringes at least Claims 1-4, 6-7, and 9-17 of the '275 Patent, and Claims 1-44 of the '161 Patent, directly, contributorily, and/or through inducement. Claim charts for the '275 and '161 Patents ("Claim Charts"), demonstrating such infringement, are attached hereto as Exhibits C and D, respectively. Additional documentation, including literature describing HPE's products and services, is cited in the Claim Charts and, along with the Claim Charts, are incorporated herein by this reference.

Conventional Architecture

3. Prior to Mr. Íñiguez' invention, conventional parallel processing systems included a central processing unit ("CPU") and one or more co-processors (see illustration below). According to the conventional system, the CPU (sometimes called a controller) directly managed and distributed computational tasks to a plurality of co-processors (sometimes called responders).



4. However, this controller/responder approach suffers from problems specifically arising in the realm of computing architectures, for example:

a) a significant amount of the controller's bandwidth is consumed by task distribution; waiting for tasks to be completed before distributing new tasks; responding to interrupts from co-processors when a task is completed; and responding to other messages from co-processors. '161 Patent, 1:66-2:6.[1]

b) dynamic changes to the system (by adding or removing co-processors) require communication with the controller which created additional overhead burden on the CPU. '161 Patent, 10:60-64.

c) the system's co-processors are frequently idle while awaiting a new computational task assignment from the controller. '161 Patent, 2:6-8.

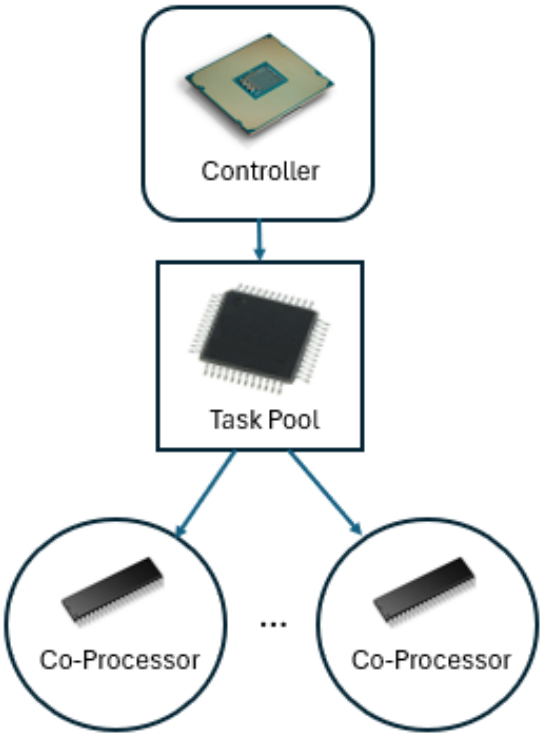
d) because task distribution is managed by the controller, if the controller becomes overloaded with processing demands, or if the controller becomes

[1] The specifications of the '275 and '161 Patents are substantially identical. For convenience, dual references have been omitted.

temporarily disconnected or unavailable, the processing activity of the co-processors may quickly come to a halt. '161 Patent, 1:66-2:6.

Swarm's Architecture

5. Mr. Íñiguez modified the structure, operation, and arrangement of components within the multiprocessor system, creating a new multiprocessor architecture (see illustration below), solving the technical problems described above.



6. Among other things, Swarm's system architecture interposed an intermediate device – the task pool – between the CPU and the co-processors. The task pool has on-board intelligence and can actively participate in the distribution of computational tasks. Moreover, within the Swarm architecture, the co-processors proactively retrieve and process tasks without requiring communication from the CPU. Additional co-processors can be accepted into Swarm's multiprocessor system without

communicating with the CPU. In this way, the system can harness computing power from underutilized computing resources without additional burden to the CPU.

7. By configuring the controller to deposit tasks into the task pool, and configuring the co-processors to proactively retrieve tasks from the task pool and process them, "the processing capacity of the [co-processors] may be more fully exploited, inasmuch as the [co-processors] need not wait idly for an instruction from the CPU 11. This 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." '161 Patent, 9:4-9.

8. Swarm's multiprocessor computing architecture is "more efficient than traditional computer architectures in which auxiliary modules and coprocessors are dependent on instructions from the main CPU." '161 Patent, 9:10-12. Consequently, the Swarm multiprocessor computing architecture is more resilient to CPU overloading, and temporary disconnection or unavailability of the CPU.

9. Additionally, Swarm's multiprocessor computing architecture addresses a controller's need for additional processing power by "harness[ing] the processing power of underutilized computer resources located within the vicinity of, or otherwise available to, the user." '161 Patent, 12:10-12. "Consequently, the smart phone [] becomes a cop-processor seamlessly assisting the laptop [], thereby enhancing [a] video game experience. … Indeed, even the processing power of an available light-bulb [] may become a co-processor to a laptop." '161 Patent, 12:24-30.

10. Moreover, according to some embodiments, a co-processor that is configured to process tasks of a first task type can undergo reconfiguration by processing a device function reconfiguration task that enables the co-processor to perform tasks of a second task type. '161 Patent, 21:19-36. The configurability of Swarm's co-processors, using a device function reconfiguration task, enables the dynamic extension of the multiprocessor computing system's capabilities.

11. Mr. Íñiguez' new multiprocessor system architecture significantly improves the function and operation of parallel multiprocessor computing systems.

12. Alfonso and Alejandra Íñiguez founded Swarm Technology, LLC as an Arizona Limited Liability Company on January 17, 2014. Pursuant to written assignments from Mr. Íñiguez, the Patents-in-Suit are now owned by Swarm Technology, LLC.

13. In recent years the cloud computing industry, led by HPE, has migrated away from the traditional "controller/responder" model – in which a central controller directly controls a plurality of microprocessors – to a distributed "co-processing" model as described and claimed in the Patents-in-Suit. Swarm's new co-processing model does not require direct communication between the controller and the co-processors. Instead, coordination between the controller (typically a desktop, laptop, or hand-held computer) and the co-processors involves an intermediary data structure referred to as a "task pool." The controller populates the task pool with discrete tasks to be performed by the co-processors. Each co-processor proactively retrieves tasks directly from the task pool and notifies the task pool when each task is completed. This

allows the controller to indirectly accomplish multiple tasks without having to expend unnecessary processing cycles directly supervising the co-processors.

14. As detailed in the Claim Charts, the systems and methods used in HPE's cloud computing products and services are precisely the same as those claimed in the Patents-in-Suit. Consequently, HPE is liable to Swarm for infringing the Patents-in-Suit.

II. THE PARTIES

15. Swarm Technology LLC is an Arizona limited liability company (Arizona Entity ID L18990310) with its principal place of business at 732 East Lehi Road, Mesa, Arizona 85203.

16. Alfonso Íñiguez is the inventor of the Patents-in-Suit, a Member of Swarm Technology LLC, and a resident of Mesa, Arizona.

17. Alejandra Íñiguez is a Member of Swarm Technology LLC, and a resident of Mesa, Arizona.

18. Alfonso and Alejandra Íñiguez are husband and wife and are the sole owners of Swarm Technology, LLC.

19. HPE was incorporated in Delaware in 2015 and has its principal place of business in this Judicial District at 1701 East Mossy Oaks Road in Spring, Texas 77373.

20. HPE also has a regular and established place of business at 3001 Dallas Parkway in Frisco, TX 75034.

III. SUBJECT MATTER JURISDICTION

21. This action arises under the Patent Act of the United States of America, 35 U.S.C. § 1, *et seq*.

22. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

IV. PERSONAL JURISDICTION AND VENUE

23. 35 U.S.C. § 271 provides, in pertinent part:

> a. Except as otherwise provided in this title, whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor, infringes the patent.
>
> b. Whoever actively induces infringement of a patent shall be liable as an infringer.
>
> c. Whoever offers to sell or sells within the United States or imports into the United States a component of a patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer.

24. HPE has sold, has offered for sale, and continues to offer for sale, infringing products and services in this judicial District.

25. HPE resides in this judicial District.

26. This Court has personal jurisdiction over HPE pursuant to FRCP 4. Rule 4(k)(1)(a).

27. Venue is proper in this District pursuant to 28 U.S.C. § 1400(b).

V. THE STORY BEHIND MR. ÍÑIGUEZ' INVENTIONS

28. Alfonso Íñiguez was born in Tijuana, Mexico in 1965. He is pictured below (on the far right) with his mother and three siblings in approximately 1970:

29. Alfonso displayed remarkable abilities in science, technology, and mathematics at an early age. While Alfonso's mother was working at the American Consulate in Nogales, Mexico, she obtained a United States Green Card. After leaving her employment at the Consulate in 1975, she submitted a Green Card application for Alfonso when he was ten (10) years old. Instilled with an impeccable work ethic, Alfonso went on to receive a Bachelor of Science degree in Computer Engineering from the *Universidad Autonoma de Guadalajara*, México in 1989.

30. Alfonso obtained his Green Card in 1987 and emigrated to the United States in 1989 to pursue graduate studies. While working full-time in various

computer-related fields, Mr. Íñiguez attended the University of Arizona in Tucson, Arizona, and became a U.S. Citizen in 1994. In 1995, he was awarded a Master of Science degree in Electrical Engineering from the University of Arizona.

31. During the 2009 recession, Mr. Íñiguez was one of many employees laid off at Freescale Semiconductor (formerly Motorola, Inc.). After an extensive search, he secured an interview with a leading chip manufacturer as a Computer Architect.

32. Mr. Íñiguez prepared for his interview by reading books, papers, and performing extensive research in the field of computer architecture. He was struck by the inefficiencies associated with state-of-the-art computer processing architectures. He intuitively knew there was a better way for computer processors to cooperate with each other and with a central controller to perform complex processing tasks.

33. Drawing on his computer industry experience, Mr. Íñiguez identified two major drawbacks with existing multiprocessing frameworks. First, a significant portion of the CPU's processing cycles (bandwidth) was consumed assigning tasks to the co-processors. Second, the processors were often idle while waiting for a new task.

34. To address these shortcomings, Mr. Íñiguez invented a revolutionary new parallel processing paradigm, generally characterized by co-processors configured to proactively seek new tasks from a task pool without having to communicate directly with (or wait for) the CPU. These co-processors include hardware and/or software components which are variously referred to as "autonomous agents" configured to retrieve "tasks."

35. On January 25, 2013, Mr. Iñiguez filed his first utility patent application with the United States Patent and Trademark Office, and thereafter filed additional utility patent applications, each claiming priority to the original January 2013 filing date.

36. On September 29, 2015, the United States Patent and Trademark Office (the "USPTO") awarded U.S. Patent No. 9,146,777 entitled "Parallel Processing with Solidarity Cells by Proactively Retrieving from a Task Pool a Matching Task for the Solidarity Cell to Process" to Swarm.

37. On December 26, 2017, the USPTO awarded U.S. Patent No. 9,852,004 entitled "System and Method for Parallel Processing using Dynamically Configurable Proactive Co-Processing Cells" to Swarm.

38. On March 17, 2020, the USPTO awarded U.S. Patent No. 10,592,275 entitled "System and Method for Swarm Collaborative Intelligence using Dynamically Configurable Proactive Autonomous Agents" to Swarm.

39. Swarm is the sole owner of all right, title, and interest in and to each of the foregoing Patents-in-Suit.

40. Various products and services made, used, sold, offered for sale, or imported into the Unites States by HPE embody every element of at least one claim of the Patents-in-Suit, whether directly, contributorily, and/or through inducement (35 U.S.C. § 271), either literally or under the doctrine of equivalents.

41. The Patents-in-Suit disclose several embodiments, including a processing system having a controller configured to populate a task pool and one or more co-

processors configured to proactively retrieve tasks from the task pool. In this way, the controller communicates directly with the task pool, and indirectly with the co-processors through the task pool.

42. Mr. Iñiguez contemplated many practical applications of his inventions, one of which included networks comprising Internet of Things (IoT) networks and supporting devices. One problem faced by engineers and computer architects surrounds the control of large numbers of devices linked to an IoT network, and how to harness their collective processing capacity without over-burdening the CPU.

43. The demand for IoT devices and IoT networks continues to drive growth in cloud-based products and services involving computing, storage, networking, databases, analytics, application services, deployment, mobile tools, and developer tools. Present day IoT networks make these services available to virtually any device connected to the Internet.

44. Mr. Íñiguez and his family have presented his technology at trade shows and other industry events, such as the: i) "Internet of Things World Conference 2018," Santa Barbara California, May 14 – 17, 2018; ii) "IoT Tech Expo North America 2017," Santa Clara, California, November 29-30, 2017; iii) "International Conference on Intelligent Robots and Systems (IROS) 2017," Vancouver, Canada, September 24–28, 2017; and iv) "Internet of Things World Conference 2017," Santa Clara, California, May 16-18, 2017.

45. Below is a photograph (left-to-right) of the Íñiguez family including sons Ulises and Isaac, daughter Daniela, wife Alejandra, and husband Alfonso promoting

Swarm at an industry event in 2017:

46. Below is a photograph of Alfonso Íñiguez (right) and his cousin Pablo Garcia (B.S. Industrial Engineering - *Instituto Tecnológico de Sonora*, Mexico) promoting Swarm's technology at an industry event in 2018:

47. Mr. Íñiguez's technology has also been the subject of news articles and other press coverage, such as the IEEE News in May of 2017, the Business News in April of 2018, the East Valley Tribune in April 2016, the Business Journal in December of 2015, and the EE Times in December of 2017, among others.

48. Mr. Íñiguez is also the author of a peer reviewed research paper published by the International Conference on Agents and Artificial Intelligence held in Porto, Portugal, in 2017. The International Conference on Agents and Artificial Intelligence is the most prestigious Artificial Intelligence conference in the World. It is extremely rare to include a company researcher (as opposed to a university researcher) as a featured author.

49. Around 2015, Mr. Íñiguez began to discover that many technology companies were beginning to incorporate his technology into their own products and services and were marketing them to their customers. Mr. Íñiguez determined that at least the Aruba product line and related services promoted by HPE infringe the Patents-in-Suit. Product literature promoting and offering these services for sale in Texas may be viewed at: https://www.arubanetworks.com/.

50. After Mr. Íñiguez's first patent issued in September 2015, Swarm began offering patent licensing opportunities to various industry participants.

51. In 2019, Swarm sent written correspondence to HPE, offering to license Swarm's '004 and '777 Patents.

52. As detailed below, and in conjunction with publicly available literature, many of HPE's products and services embody all of the elements of Claim 1, as well

as all of the elements of claims 2-4, 6-7, and 9-17 of the ’275 Patent.

53. As a result of HPE’s infringement of the ’275 Patent, Swarm has incurred substantial monetary and other damages.

54. As detailed below, and in conjunction with publicly available literature, many of HPE’s products and services embody all of the elements of Claim 37, as well as all of the elements of claims 1-36 and 38-44 of the ’161 Patent.

55. As a result of HPE’s infringement of the ’161 Patent, Swarm has incurred substantial monetary and other damages.

56. HPE is building its future, in part, on the back of Mr. Íñiguez’ novel computing architecture. The widely recognized problem of controlling multiple IoT devices has been solved by Alfonso Íñiguez. The Patents-in-Suit directly addresses many of the challenges faced by today’s software developers, and HPE knows this.

57. 35 U.S.C. § 271(a) provides that whoever “makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention,” infringes the patent. As described below, the Claim Charts demonstrate HPE literally and directly infringes the Patent-in-Suit.

58. 35 U.S.C. § 271(b) provides that “[w]hoever actively induces infringement of a patent shall be liable as an infringer.” Inducement often involves a showing that the alleged inducer knew of the patent, knowingly induced the infringing acts, and possessed a specific intent to encourage another's infringement of the patent. As described herein, HPE was either aware of, or willfully blind to, the Patents-in-Suit, for example, as a result of pre-suit correspondence between Swarm and HPE.

59. 35 U.S.C. § 271(c) provides that whoever "offers to sell or sells within the United States or imports into the United States a component of a patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer."

60. Upon information and belief, early discovery will reveal facts and circumstances confirming that HPE and others made, used, sold, or offered for sale at least a material part of Swarm's inventions knowing that they would be used in the Infringing Products. Moreover, HPE's detailed product literature evidences a specific intent to encourage others to participate in the infringement of Patents-in-Suit.

VI. THE '275 PATENT

61. The '275 Patent describes a system and method for collaborative intelligence using dynamically configurable proactive autonomous agents.

62. Claim 1 of the '275 Patent sets forth a specific parallel multiprocessor computing architecture, including a collaborative intelligence system having a task pool, a controller configured to populate the task pool with a plurality of tasks, and first and second co-processors each configured to proactively retrieve tasks from the task pool and update the task pool to reflect completion of the task, without requiring direct communication with the controller, and to autonomously function together in solidarity with the task pool to complete a common computing objective.

63. The claimed collaborative intelligence system does not use conventional computer components in their conventional condition or according to a conventional multiprocessor architecture. Instead, the components must be "configured (e.g., programmed)" to operate according to the claimed computing system. '275 Patent, 2:49. For example, "[t]he CPU 11 may be any single or multi-core processor, applications processor or microcontroller," however, such a device must also 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, as described below." '275 Patent, 5:53-57. Similarly, the co-processors are "configured" to autonomously and proactively "retrieve tasks from a task pool populated by a [CPU]," as opposed to idly waiting to be instructed by the CPU. '275 Patent, 1:21-23; 2:8-10.

64. By assigning certain functions to particular components and having them interact in specified ways, the claimed computing system achieves improvements to the function and operation of the computer over conventional computing systems.

65. For example, as a direct result of the claimed configuration and architecture, a claimed controller (e.g., a laptop, gaming console, or smart phone) can seamlessly exploit the untapped computing resources of a swarm of autonomous co-processors (e.g., smart lightbulbs, home appliances, electrical receptacles, and vehicles) without burdening the controller with additional task distribution and device connection management overhead. '275 Patent, 11:51-12:39; 9:7-21.

66. Claim 1 of the '275 Patent is set forth below in its entirety:

A collaborative intelligence 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: proactively retrieve a first task from the task pool; 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: proactively retrieve a second task from the task pool; 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 collaborative intelligence 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;

the plurality of first tasks and the plurality of second tasks are associated with a common objective;

the first and second co-processors autonomously work together in solidarity with the task pool to complete the common objective.

'275 Patent, 14:24-49.

1. <u>Swarm Invented a New Parallel Multiprocessor Computing Architecture</u>

67. The preamble of Claim 1 recites:

A collaborative intelligence system, comprising:

'275 Patent, 14:24.

68. The ’275 Patent specification describes various collaborative intelligence systems, for example in the context of:

> [P]arallel processing computing systems and environments (such as IoT and collaborative intelligence environments), ranging from simple switching and control functions to complex programs and algorithms including, without limitation: robot control, data encryption; graphics, video, and audio processing; direct memory access; mathematical computations; data mining; game algorithms; ethernet packet and other network protocol processing including construction, reception and transmission of data the outside network; financial services and business methods; search engines; internet data streaming and other web-based applications; execution of internal or external software programs; switching on and off and/or otherwise controlling or manipulating appliances, light bulbs, consumer electronics, robotic vehicles, and the like, *e.g.*, in the context of the Internet-of-Things and/or collaborative intelligence systems.

’275 Patent, 4:18-34.

69. The claimed collaborative intelligence system involves new and useful machines and processes, and new and useful improvements to machines and processes. Taken together, the controller, task pool, and co-processors confer a substantial advantage over conventional processing systems by allowing different types of co-processors to interact with the task pool without significantly compromising their individual performance. Claim 1 is thus directed to improvements to computer functionality, as opposed to merely being directed to an abstract idea.

70. Claim 1 includes inventive concepts that amount to significantly more than an abstract idea. For example, each co-processor may be configured to retrieve a task by sending its agent to the task pool when the co-processor is idle or otherwise able to contribute processing cycles without impeding its normal operation. In this context,

the term agent refers to a software module, analogous to a network packet, associated with a co-processor that interacts with the task pool to obtain tasks which are appropriate for that co-processor. '275 Patent, 3:21-24. Humans are not capable of performing tasks such as transmitting a network packet from a co-processor to a data structure (e.g., task pool), as they are specific to computer operations.

2. <u>Swarm Invented a New Parallel Multiprocessor Computing Architecture Comprising a Task Pool Interposed Between the CPU and the Co-Processors.</u>

71. Claim 1 further recites:

a task pool

'275 Patent, 14:25.

72. The '275 Patent specification describes the new processing architecture in terms of the interaction among the task pool, the controller (CPU), and the co-processors:

> The co-processors may also be capable of acting autonomously; that is, they may interact with the task pool independently of the CPU. In a preferred embodiment, each co-processor includes an agent that interrogates the task pool to seek a task to perform. As a result, the co-processors work together "in solidarity" with one another and with the task pool to complete aggregate computational requirements by autonomously retrieving and completing individual tasks which may or may not be inter-related.

'275 Patent, 2:28-36.

73. The task pool improves the operation of a computer by electronically communicating with the CPU as well as the co-processors. More particularly, conventional processors include a CPU and one or more co-processors, where "[t]he

CPU partitions the computational requirements into tasks and distributes the tasks to co-processors." '275 Patent, 1:63-64. Consequently, "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." '275 Patent, 2:3-8.

74. To address these shortcomings, Swarm invented a new parallel processing paradigm, including co-processors configured to proactively retrieve new tasks from the task pool without having to communicate directly with (or wait for) the CPU.

75. Claim 1 includes inventive concepts involving more than well-understood, routine, and conventional activities previously known to the industry. For example, the CPU may be programmed "to recognize and communicate with the task pool 13 and divide the computing requirements into threads…." '275 Patent, 5:54-56. 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." '275 Patent, 2:46-48.

3. Swarm Invented a New Parallel Multiprocessor Computing Architecture Comprising a Controller Configured to Place Tasks Into the Task Pool

76. Claim 1 further recites:

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

'275 Patent, 14:26-27.

77. The '275 Patent specification describes various controllers (CPUs), for example in the context of the multi-processor networks illustrated in FIGS. 1 and 4:

> Referring now to FIG. 4, an internet of things network 400 includes a controller (CPU) 402, a task pool 408, and various devices 410-422, some or all of which include an associated or embedded microcontroller, such as an integrated circuit (IC) chip or other component which embodies processing capacity.

'275 Patent, 11:51-56.

...

> In the illustrated embodiment, the controller 402 may be a smartphone, tablet, laptop, or other device which may include a display 404 and a user interface (e.g., keypad) 406 for facilitating user interaction with the various devices on the network.

275 Patent 11:62-66.

...

> For example, in FIG. 1, the system 10 may divides 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.

'275 Patent, 6:54-57.

78. Claim 1 is directed to improvements to the function and operation of a computer because the controller's operating code is specifically programmed to cause the controller to distribute tasks to the task pool, as opposed to conventional processing systems in which the controller distributes tasks directly to the co-processors.

79. Claim 1 includes inventive concepts involving more than well-understood, routine, and conventional activities previously known to the industry. For example, "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." '275 Patent, 5:54-56. By using the task pool as an intermediary device between the controller and the co-processors, the elements of

Claim 1, both individually and as a combination, specifically prevent and override the routine and conventional sequence of events performed by prior processing architectures.

4. Swarm Invented a New Parallel Multiprocessor Computing Architecture Comprising First and Second Co-Processors, Each Configured to Coordinate Tasks with the Task Pool instead of the CPU.

80. Claim 1 further recites:

> 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

'275 Patent, 14:28-33.

> 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.

'275 Patent, 14:34-39.

81. The '275 Patent specification describes the configuration and operation of the first and second co-processors:

> Various embodiments of a parallel processing computing architecture include a CPU configured to populate a task pool, and one or more co-processors configured to proactively retrieve threads (tasks) from the task pool. Each co-processor notifies the task pool upon completion of a task, and pings the task pool until another task becomes available for processing. In this way, the CPU communicates directly with the task pool, and communicates indirectly with the co-processors through the task pool.

’275 Patent, 2:19-27.

...

> Upon retrieving a task from the task pool, a cell may then process that task, typically by retrieving data from a particular location in first memory 304, processing that data, and storing the processed data at a particular location within second memory 306. When a task is completed, the cell notifies the task pool, the task pool marks the task as completed, and the task pool notifies the CPU that the task is completed.

’275 Patent, 11:37-44.

...

> Significantly, the retrieval of tasks and the processing of data by the cells may occur without direct communication between the CPU and the various cells.

’275 Patent, 11:47-50.

82. The first and second co-processors, both individually and in combination with each other and/or one or more additional co-processors, improve the operation of a computer by retrieving tasks from a task pool (rather than from the CPU). The co-processors further improve the operation of computers by updating the task pool to reflect task completion, as opposed to conventional processing architectures in which the co-processors directly update the CPU.

83. Claim 1 includes numerous inventive concepts. For example, the first and second co-processors are specifically programmed to retrieve respective tasks from the task pool, and subsequently update the task pool after completing their respective tasks, without directly communicating with the controller.

84. Moreover, the specification refers to the co-processors 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. The term "solidarity" implies that co-processing cells share a common objective in monitoring and executing all available tasks within the task pool. Prior to Swarm's invention, these inventive concepts had never been proposed before, and thus they involve more than well-understood, routine, and conventional activities previously known to the industry.

5. <u>Swarm Invented a New Parallel Multiprocessor Computing Architecture Configured to Dynamically Accept the First, Second, and an Additional Co-Processor on a Plug-and-Play Basis.</u>

85. Claim 1 further recites:

> wherein the collaborative intelligence 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

'275 Patent, 14:40-44.

86. The '275 Patent specification describes the dynamic plug-and-play feature of the invention:

> [I]nteroperability among the CPU and co-processors may be facilitated by configuring the CPU to compose and/or structure tasks at a level of abstraction which is independent of the instruction set architecture associated with the various co-processors, thereby allowing the components to communicate at a task level rather than at an instruction level. As such, devices and their associated co-processors may be added to a network on a 'plug and play' basis.

'275 Patent, 3:42-50.

87. Dynamically accepting co-processors on a plug-and-play basis improves the operation of a computer network by integrating co-processors with different instruction set architectures into the same network. '275 Patent, 3:42-52.

88. Claim 1 includes numerous inventive concepts. For example, 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. '275 Patent, 6:49-7:2. These inventive concepts had never been proposed before Swarm invented them.

6. Swarm Invented a New Parallel Multiprocessor Computing Architecture in Which the First and Second Tasks are Associated with a Common Objective.

89. Claim 1 further recites:

> the plurality of first tasks and the plurality of second tasks are associated with a common objective

'275 Patent, 14:45-46.

90. The '275 Patent specification describes the relationship of the first and second tasks to a common objective:

> The term solidarity implies that co-processing cells share a common objective in monitoring and executing all available tasks within the task pool.

'275 Patent, 2:51-54.

91. Associating the first and second tasks with a common objective improves the operation of a computer network by promoting swarm (or collaborative) intelligence. '275 Patent, 1:1.

92. Claim 1 includes numerous inventive concepts. For example, the invention facilitates collaborative intelligence through the use of dynamically configurable proactive autonomous agents. '275 Patent, 1:2-4.

7. <u>Swarm Invented a New Parallel Multiprocessor Computing Architecture Comprising First and Second Co-Processors Which Autonomously Work Together in Solidarity with the Task Pool to Complete the Common Objective.</u>

93. Claim 1 further recites:

> the first and second co-processors autonomously work together in solidarity with the task pool to complete the common objective

'275 Patent, 14:47-49.

94. The '275 Patent specification describes the autonomous action of the co-processors:

> The present invention generally relates to parallel-process computing, and collaborative intelligence, and particularly relates to a processing architecture which involves autonomous co-processors (such as robotic vehicles, Internet of Things (IoT) components, and networked devices) configured to proactively retrieve tasks from a task pool populated by a central processing unit.

'275 Patent, 1:17- 23.

95. By autonomously working together in solidarity with the task pool to complete the common objective, the first and second co-processors improve the

operation of a computer network by effectively harnessing and exploiting available co-processing resources. '275 Patent, 2:14-15.

96. Claim 1 includes numerous inventive concepts. For example, by more effectively harnessing available co-processing resources, the invention reduces CPU management overhead. '275 Patent, 2:13. These inventive concepts had never been proposed before Swarm invented them.

97. Accordingly, Claim 1 of the '275 Patent is directed to a new processing architecture which improves the operation of computer, and which includes significantly more than well-understood, routine, and conventional activities.

98. Claims 2 – 17 of the '275 Patent are also directed to various features of a new processing architecture which improve the operation of computer, and which include significantly more than well-understood, routine, and conventional activities.

99. As explained in detail in the '275 Patent specification, each of the foregoing claims are directed to improvements to the operation of computer, and include significantly more than well-understood, routine, and conventional activities.

VII. THE '161 PATENT

100. The '161 Patent describes a system and method for swarm collaborative intelligence using dynamically configurable proactive autonomous agents.

101. Claim 37 of the '161 Patent sets forth a system for dynamically controlling processing resources in a network, including a first cell capable of executing a reconfiguration task to enable the device to perform other task types.

102. The claimed cell's proactive search for a device reconfiguration task—to reconfigure a device to perform another task type—constitutes a specific asserted improvement in computer capabilities, as opposed to the improvement of a process that qualifies as an abstract idea for which computers are invoked merely as a tool.

103. The claimed solution is necessarily rooted in computer technology in order to overcome problems specifically arising in the realm of computer networks. For example, as a direct result of the claimed configuration and architecture, the claimed cell (e.g., network switch, network router) can update its operating system version to perform new task types without burdening the controller.

104. Claim 37 of the '161 Patent is set forth below in its entirety:

> A system for dynamically controlling processing resources in a network, the system comprising:
>
> a task pool;
>
> a primary controller configured to populate the task pool with a plurality of tasks, each task having a task type;
>
> a first cell programmed to: process a first task having a first task type, send a notification to the task pool in response to completing the first task, and include a first agent configured to: proactively search within the task pool for tasks comprising a first task type from the plurality of tasks: in response to finding the first task in the plurality of tasks, retrieve the first task from the task pool; and deliver the first task to the first cell;
>
> wherein: the first cell is further configured to operate a device;
>
> the first task type comprises a device function reconfiguration task; and
>
> the first task comprises a reconfiguration of a device function of the device to perform a second task from the plurality of tasks having a second task type.

1. Swarm Invented a New System for Dynamically Controlling Processing Resources in a Network.

105. The preamble of Claim 37 recites:

> A system for dynamically controlling processing resources in a network, the system comprising:

'161 Patent, 21:14-15.

106. The '161 Patent specification describes various systems for dynamically controlling processing resources in a network, for example in the context of:

> A multiprocessor architecture in thus needed which reduces CPU management overhead, and which also more effectively harnesses and exploits available co-processing resources.

'161 Patent, 2:9-12.

> A method is also provided for dynamically controlling processing resources in a network.

'161 Patent, 13:16-17.

> In various embodiments cells may be dynamically paired, ohmically (plug and play) or wirelessly (on the fly), with a task pool.

'161 Patent, 4:65-67.

> Consequently, the CPU 11 may be configured to "learn" or be taught how to create tasks of the fourth type in order to more fully exploit the available processing resources.

'161 Patent, 9:36-38.

> FIG. 3 is a schematic block diagram of a network including co-processing cells and their corresponding agents interacting with a task pool in accordance with an embodiment.

'161 Patent, 4:1-3.

107. The claimed system for dynamically controlling processing resources in a network involves new and useful machines and processes, and new and useful improvements to machines and processes. Taken together, the task pool, the primary controller, and the first cell confer a substantial advantage over conventional processing systems by, *inter alia*, dynamically reconfiguring a device to perform a different task type. Claim 37 is thus directed to improvements to computer functionality, and is not merely directed to an abstract idea.

108. Claim 37 includes inventive concepts that amount to significantly more than an abstract idea. For example, the first task may dynamically reconfigure a device to perform a second task.

2. <u>Swarm Invented a New System for Dynamically Controlling Processing Resources in a Network Comprising a Task Pool Interposed Between the Primary Controller and the First Cell</u>

109. Claim 37 further recites:

> a task pool

'161 Patent, 21:16.

110. The '161 Patent specification describes the new processing architecture in terms of the interaction among the task pool, the primary controller (CPU), and the first cell:

> Various embodiments of a parallel processing computing architecture include a CPU configured to populate a task pool, and one or more co-processors configured to proactively retrieve threads (tasks) from the task pool.

'161 Patent, 2:16-19.

111. The task pool improves the operation of computers by electronically communicating with the primary controller and the first cell. More particularly, conventional processors include a CPU and one or more co-processors, where "[t]he CPU partitions the computational requirements into tasks and distributes the tasks to co-processors." '161 Patent, 1:62-64. Consequently, "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." '161 Patent, 2:1-6.

112. To address these shortcomings, Swarm invented a new parallel processing paradigm, including co-processors (cells) configured to proactively retrieve new tasks from the task pool without having to communicate directly with (or wait for) the CPU (primary controller).

113. Claim 37 includes inventive concepts involving more than well-understood, routine, and conventional activities previously known to the industry. For example, the first cell may be programmed to process a first task having a first task type, send a notification to the task pool in response to completing the first task, and to include a first agent configured to proactively search within the task pool for tasks comprising a first task type.

3. Swarm Invented a New System for Dynamically Controlling Processing Resources in a Network Comprising a Primary Controller Configured to Place Tasks Into the Task Pool.

114. Claim 37 further recites:

> a primary controller configured to populate the task pool with a plurality of tasks, each task having a task type

'161 Patent, 21;17-18.

115. The '161 Patent specification describes various controllers (CPUs), for example in the context of the multi-processor networks illustrated in FIGS. 1 and 4:

> Referring now to FIG. 4, an internet of things network 400 includes a controller (CPU) 402, a task pool 408, and various devices 410-422, some or all of which include an associated or embedded microcontroller, such as an integrated circuit (IC) chip or other component which embodies processing capacity.

'161 Patent, 11:42-47.

> A parallel processing architecture 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.

'161 Patent, Abstract.

> A task 22 may have a task type and a descriptor. The task type indicates which cells 12 are capable of performing the task 22.

'161 Patent, 7:22-24.

116. Claim 37 is directed to improvements to computer functionality because the controller's operating code is specifically programmed to cause the controller to distribute tasks to the task pool, as opposed to conventional processing systems in which the controller distributes tasks directly to the co-processors.

117. Claim 37 includes inventive concepts involving more than well-understood, routine, and conventional activities previously known in the industry. For example, the primary controller "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." '161 Patent, 5:47-51. By using the task pool as an intermediary device between the controller and the co-processors, the elements of Claim 37, both individually and as a combination, specifically prevent and override the routine and conventional sequence of events performed by prior processing architectures.

4. <u>Swarm Invented a New System for Dynamically Controlling Processing Resources in a Network Comprising a Task Pool Interposed Between the Primary Controller and the First Cell.</u>

118. Claim 37 further recites:

> a first cell programmed to: process a first task having a first task type, send a notification to the task pool in response to completing the first task, and include a first agent configured to:
>
> proactively search within the task pool for tasks comprising a first task type from the plurality of tasks: in response to finding the first task in the plurality of tasks retrieve the first task from the task pool; and
>
> deliver the first task to the first cell.

'161 Patent, 21:19-29.

119. The '161 Patent specification describes the configuration and operation of the first cell:

> Various embodiments of a parallel processing computing architecture include a CPU configured to populate a task pool, and one or more co-processors configured to proactively retrieve threads (tasks) from the task pool. Each co-processor notifies the task pool upon completion of a task, and pings the task pool until another task becomes available for processing. In this way, the CPU communicates directly with the task pool, and communicates indirectly with the co-processors through the task pool.

'161 Patent, 2:16-24.

> Upon retrieving a task from the task pool, a cell may then process that task, typically by retrieving data from a particular location in first memory 304, processing that data, and storing the processed data at a particular location within second memory 306. When a task is completed, the cell notifies the task pool, the task pool marks the task as completed, and the task pool notifies the CPU that the task is completed.

'161 Patent, 11:28-35.

> the agent 30A searches the task 22 descriptors for an executable instruction that matches one or the instructions that that cell 12A is capable or executing. When a matching task 22 is found, the agent 30A delivers the descriptor or the matching task 22 to the cell 12A, whereupon the cell 12A begins 10 process the task 22.

'161 Patent, 9:39-44.

120. The first cell, both individually and in combination with each one or more additional co-processors, improve the operation of a computer by retrieving tasks from a task pool (rather than from the CPU). The first cell further improves the operation of computers by sending a notification to the task pool to reflect task completion, as opposed to conventional processing architectures in which the co-processors directly update the CPU.

121. Claim 37 includes numerous inventive concepts. For example, the first cell is specifically programmed to search within and retrieve tasks from the task pool, and to notify the task pool after completing a task.

5. <u>Swarm Invented a New System for Dynamically Controlling Processing Resources in a Network Configured to Dynamically Accept the First, Second, and an Additional Co-Processor on a Plug-and-Play Basis.</u>

122. Claim 37 further recites:

> wherein: the first cell is further configured to operate a device;

'161 Patent, 21:30-31.

123. The '161 Patent specification describes devices and their associated co-processors:

> As such, devices and their associated co-processors may be added to a network on a 'plug and play' basis.

'161 Patent, 3:46-48.

> Referring now to FIG. 5, an internet of things network 500 use case illustrates the dynamic harnessing of nearby (or otherwise available) devices. Network 500 includes a primary control unit 502 (e.g., a laptop, tablet, or gaming device), a task pool 504, a first co-processor device 506, and a second co-processor device 508.

'161 Patent, 11:63-12:1.

> Referring now to FlG. 4, an internet-of-things network 400 includes a controller (CPU) 4()2, a task pool 408, and various devices some or all of which include an associated or embedded microcontroller, such as an integrated circuit (IC) chip or other component which embodies processing capacity.

'161 Patent, 11:42-47.

124. Configuring the first cell to operate a device improves the function and operation of a computer network by, for example, allowing the network (such as an Internet-of-Things network) to dynamically harvest the processing capacity of nearby devices.

125. Claim 37 includes numerous inventive concepts. For example, the system can dynamically control processing resources in a network by configuring the first cell

to dispatch an agent to proactively search the task pool and return an appropriate task to the first cell. This and other inventive concepts had never been proposed before Swarm invented them.

6. <u>Swarm Invented a New System for Dynamically Controlling Processing Resources in a Network in Which the First and Second Tasks are Associated with a Common Objective.</u>

126. Claim 37 further recites:

> the first task type comprises a device function reconfiguration task

'161 Patent, 21:32-33.

127. The '161 specification describes a device function reconfiguration task:

> A cell 12 may be a general or special purpose co-processor configured to supplement, perform all of, or perform a limited range of functions of the CPU, or functions that are foreign to the CPU 11 such as ambient monitoring and robotic actuators, for example. A special-purpose processor may be a dedicated hardware module designed, programmed, or otherwise configured to perform a specialized task, or it may be a general-purpose processor configured to perform specialized tasks such as graphics processing, floating-point arithmetic, or data encryption.

'161 Patent, 6:6-15.

> Various embodiments relate to parallel processing computing systems and environments (such as 10T and collaborative intelligence environments), ranging from simple switching and control functions to complex programs and algorithms including, without limitation: robot control, data encryption; graphics, video, and audio processing; direct memory access; mathematical computations; data mining; game algorithms; ethernet packet and other network protocol processing including construction, reception and transmission of data the outside

> network; financial services and business methods; search engines; internet data streaming and other web-based applications; execution of internal or external software programs; switching on and off and/or otherwise controlling or manipulating appliances, light bulbs, consumer electronics, robotic vehicles, and the like, e.g., in the context of the Internet-of-Things and/or collaborative intelligence systems.

'161 Patent, 4:17-3.

> Each cell 12 configured to perform one or a plurality of specialized tasks, as illustrated in the following sequence of events.

'161 Patent, 6:25-27.

> Referring now to FIG. 3, a network 300 includes a CPU 302, a first memory 304, a second memory 306, a task pool 308, a switching fabric 310, a first co-processing cell 312 configured to perform (execute) type A tasks, a second cell 314 configured to perform type B tasks, a third cell 316 configured to perform type C tasks, and a fourth cell 318 configured to perform both type A and type B tasks.

'161 Patent, 10:65-11:4.

> In various embodiments cells may be dynamically paired, ohmically (plug and play) or wirelessly (on the fly), with a task pool when the following three conditions are met.

'161 Patent, 4:65-67.

> 3) At least one of the available tasks within the task pool is compatible with the capabilities of the solidarity cell.

'161 Patent, 5-13-14.

128. Providing a first task type which comprises a device function reconfiguration task improves the function and operation of computer networks by dynamically reconfiguring a network resource to perform a different task from that

which it previously performed. For example, a particular device may perform a first function such as data routing, and after executing a device function reconfiguration task the same device may perform a different task such as, for example, executing an internal or external software program.

129. Claim 37 includes numerous inventive concepts. For example, the invention facilitates the dynamic reconfiguration of network resources to perform different device functions in response to executing a device function reconfiguration task. This and other inventive concepts had never been proposed before Swarm invented them.

7. <u>Swarm Invented a New System for Dynamically Controlling Processing Resources in a Network Configured to Reconfigure a Device to Perform a Second Task.</u>

130. The final element of Claim 37 recites:

> the first task comprises a reconfiguration of a device function of the device to perform a second task from the plurality of tasks having a second task type

'161 Patent, 21:34-36.

131. The '161 Patent specification describes the reconfiguration of the device function to perform a second task:

> SYSTEM AND METHOD FOR SWARM COLLABORATIVE INTELLIGENCE USING DYNAMICALLY CONFIGURABLE PROACTIVE AUTONOMOUS AGENTS

'161 Patent, Title.

> Moreover, the software programs to be executed and data to be processed may be contained within one or more memory units. In a typical computer system, for example, a software program

> consists of a series of instructions that may require data 10 be used by the program. For example, if the program corresponds to a media player, then the data contained in memory may be compressed audio data which is read by a co-processor and eventually played on a speaker.

'161 Patent, 2:56-64.

> The present invention generally relates to parallel-process computing, and collaborative intelligence, and particularly relates to a processing architecture which involves autonomous co-processors (such as robotic vehicles, Internet of Things (IoT) components, and networked devices) configured to proactively retrieve tasks from a task pool populated by a central processing unit.

'161 Patent, 1:19- 23.

132. By dynamically reconfiguring a device to perform a second task, the task pool and the first cell improve the operation of a computer network by effectively harnessing and exploiting available co-processing resources.

133. Claim 37 includes numerous inventive concepts. For example, by more effectively harnessing available co-processing resources, the invention reduces CPU management overhead. These inventive concepts had never been proposed before Swarm invented them.

134. Accordingly, Claim 37 of the '161 Patent is directed to a new processing architecture which improves the operation of computer, and which includes significantly more than well-understood, routine, and conventional activities.

135. As described in detail in the '161 Patent specification, claims 1-36 and 38-44 of the '161 Patent are also directed to various features of a new processing

architecture which improves the operation of computers, and which include significantly more than well-understood, routine, and conventional activities.

VIII. HPE'S PRODUCTS AND SERVICES

136. HPE's websites describe various networking products and services. Many of these products and services infringe one or more of the Patents-in-Suit either directly under 35 U.S.C. § 271(a), through inducement under § 271(b), and/or by way of contributory infringement under § 271(c).

137. HPE's websites describe various networking products and services. Many of these products and services infringe one or more of the Patents-in-Suit either directly under 35 U.S.C. § 271(a), through inducement under § 271(b), and/or by way of contributory infringement under § 271(c).

138. For example, the web page located at https://www.arubanetworks.com/ reveals a variety of product families, systems, and sub- systems, including references to HPE Aruba networking products.

139. The attached Claim Charts, which are incorporated herein, provide non-limiting illustrations which "map" Claim 1 of the '275 Patent and Claim 37 of the '161 Patent to exemplary infringing products as represented by the following References:

Reference 1: Aruba GreenLake Platform (https://www.arubanetworks.com/techdocs/VSG/docs/005-edge-service-platform/esp-na-025-GLP/);

Reference 2: Aruba Central Is Now Part of HPE GreenLake (https://community.arubanetworks.com/discussion/aruba-central-is-now-part-of-hpe-greenlake-1);

Reference 3: About Aruba Central (https://www.arubanetworks.com/techdocs/central/2.5.7/content/nms/overview/overview.htm#:~:text=Aruba%20Central%20is%20a%20powerful,SMBs%20with%20limited%20IT%20personnel);

Reference 4: Accessing the Aruba Central Portal (https://www.arubanetworks.com/techdocs/central/2.5.0/content/nms/get-started/access_portal.htm);

Reference 5: HPE GreenLake for Device Management (https://developer.greenlake.hpe.com/docs/greenlake/services/);

Reference 6: About the Aruba Central App User Interface (https://www.arubanetworks.com/techdocs/central/2.5.5/content/nms/overview/user_interface.htm);

Reference 7: Device Configuration Methods in Aruba Central (https://www.arubanetworks.com/techdocs/central/2.5.5/content/aos10x/overview/concepts.htm?Highlight=browser%20user%20interface);

Reference 8: Configuring Access Points in HPE Aruba Networking Central (https://www.arubanetworks.com/techdocs/central/2.5.8/content/nms/landing-pages/cfg-ap.htm);

Reference 9: Automatic Retrieval of Configuration (https://www.arubanetworks.com/techdocs/Instant_811_WebHelp/Content/instant-ug/autoconfiguration/auto-conf.htm);

Reference 10: How do devices communicate with HPE Aruba Networking Central? (https://www.arubanetworks.com/techdocs/central/2.5.8/content/faqs/getting-started.htm?Highlight=WebUI);

Reference 11: Automatic Rollback Configuration (https://www.arubanetworks.com/techdocs/centralonprem/2.5.3/content/nms-on-prem/switches/cfg/conf-rollback.htm);

Reference 12: Viewing Configuration Status (https://www.arubanetworks.com/techdocs/central/2.5.5/content/nms/cfg-audit/config-audit.htm?Highlight=status);

Reference 13: Managing Sites (https://www.arubanetworks.com/techdocs/central/2.5.5/content/nms/sites/sites.htm?Highlight=manage);

Reference 14: Example Use Case (https://www.arubanetworks.com/techdocs/central/2.5.5/content/allowlist/acn/example%20use%20case.htm?Highlight=goal);

Reference 15: VXLAN Interoperability | ArubaOS-Switch Configuration Guide (https://higherlogicdownload.s3.amazonaws.com/HPE/MigratedAssets/ArubaOS-Switch%20VxLAN%20Interoperability%20Configuration%20Guide.pdf);

Reference 16: Network management and operations (https://www.hpe.com/us/en/networking/network-management-and-operations.html);

Reference 17: Supported Deployment Types (https://www.arubanetworks.com/techdocs/central/2.5.5/content/nms/policy/sup-deployment.htm?Highlight=Supported%20Deployment%20Types).

IX. EXEMPLARY CLAIM CHARTS

A. THE '275 PATENT

140. The attached representative Claim Charts satisfy the pleading requirements of FRCP Rule 8 and applicable case law and local practice. The Claim Charts are based upon information known at the time of their preparation and prior to discovery, including an understanding of the information currently available to Swarm regarding HPE's Aruba products. The Claim Charts do not represent all potential

bases for or theories of infringement, all assertable patent claims, or all infringing products. Nothing in the Claim Charts shall limit Swarm's claim construction analyses or arguments, which will be governed by the Court's scheduling orders and Section 4 of the Rules of Practice for Patent Cases in the Southern District of Texas. Infringement analyses provided for any preamble should not be construed as an admission that such preamble is limiting. Swarm reserves the right to assert additional theories of infringement, including infringement under the doctrine of equivalents and/or secondary liability for patent infringement.

141. With regard to Claim 1 of the '275 Patent, the "collaborative intelligence system" preamble is illustrated, *inter alia*, in Reference 1, Reference 2, Reference 3, and in FIGS. 1 and 2 attached to the '275 Patent Claim Chart.

142. The "task pool" element may be found at, *inter alia*, Reference 3 and in FIGS. 1 and 2 attached to the '275 Patent Claim Chart.

143. The "controller configured to populate the task pool with a plurality of first tasks and a plurality of second tasks" element may be found at, *inter alia*, Reference 4, Reference 5, Reference 6, and Reference 7.

144. The "first co-processor" element may be found at, *inter alia*, Reference 8, Reference 9, Reference 10, and Reference 11.

145. The "proactively retrieve a first task from the task pool" element may be found at, *inter alia*, Reference 8, Reference 9, Reference 10, and Reference 11.

146. The "process the first task" element may be found at, *inter alia*, Reference 9.

147. The "generate first resulting data" element may be found at, *inter alia*, Reference 12.

148. The "and update the task pool to reflect completion of the first task, all without any communication between the first co-processor and the controller" element may be found at, *inter alia*, Reference 12.

149. The various elements pertaining to the "second co-processor" which are common to the analogous elements pertaining to the aforementioned "first co-processor" may be found at, *inter alia*, Reference 8, Reference 9, Reference 10, and Reference 11.

150. The "wherein the collaborative intelligence 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" element may be found at, *inter alia*, Reference 1, Reference 10, and Reference 12.

151. The "plurality of first tasks and the plurality of second tasks are associated with a common objective" element may be found at, *inter alia*, Reference 13.

152. The "first and second co-processors autonomously work together in solidarity with the task pool to complete the common objective" element may be found at, *inter alia*, Reference 9, Reference 14, and Reference 15.

B. <u>THE '161 PATENT</u>

153. With regard to Claim 37 of the '161 Patent, the "system for dynamically controlling processing resources in a network" preamble may be found at, *inter alia*, Reference 16 and in FIGS. 1 and 2 attached to the '161 Patent Claim Chart.

154. The "task pool" claim element may be found at, *inter alia*, Reference 16 and in FIGS. 1 and 2 attached to the '161 Patent Claim Chart.

155. The "primary controller configured to populate the task pool with a plurality of tasks, each task having a task type" claim element may be found at, *inter alia*, Reference 5, Reference 6, Reference 7, and Reference 17.

156. The "first cell programmed to process a first task having a first task type" claim element may be found at, *inter alia*, Reference 9.

157. The "send a notification to the task pool in response to completing the first task" claim element may be found at, *inter alia*, Reference 12.

158. The "first agent configured to proactively search within the task pool for tasks comprising a first task type from the plurality of tasks" claim element may be found at, *inter alia*, Reference 9 and Reference 10.

159. The "in response to finding the first task in the plurality of tasks, retrieve the first task from the task pool" claim element may be found at, *inter alia*, Reference 9.

160. The "deliver the first task to the first cell" claim element may be found at, *inter alia*, Reference 9.

161. The "wherein: the first cell is further configured to operate a device" claim element may be found at, *inter alia*, Reference 9.

162. The "first task type comprises a device function reconfiguration task" claim element may be found at, *inter alia*, Reference 7, and Reference 9.

163. The "the first task comprises a reconfiguration of a device function of the device to perform a second task from the plurality of tasks having a second task type" claim element may be found at, *inter alia*, Reference 9.

X. CLAIM FOR RELIEF

A. COUNT 1

Infringement of the '275 Patent (35 U.S.C. § 271)

164. Swarm incorporates and realleges Paragraphs 1 through 163 of this Complaint as if fully set forth herein.

165. HPE has infringed and continues to infringe Claims 1-4, 6-7, and 9-17 of the '275 Patent by making, using, selling, offering to sell, and/or importing infringing products and services into the United States.

166. HPE's actions as described herein constitute direct, induced, and/or contributory infringement of the '275 Patent in violation of 35 U.S.C § 271(a), (b), and/or (c).

167. HPE's actions as described herein constitute infringement of the '275 Patent either literally or under the doctrine of equivalents.

168. As a proximate result of HPE's infringement of the '275 Patent, Swarm has been damaged and HPE has unfairly profited in amounts to be proven at trial.

169. HPE's infringement of the '275 Patent has been and continues to be willful, entitling Swarm to recover treble damages and/or attorney fees pursuant to 35 U.S.C. § 284.

170. HPE's knowing, intentional, and/or willful actions make this an exceptional case, entitling Swarm to an award of reasonable fees pursuant to 35 U.S.C. § 285.

171. Defendant's direct, inducement, and/or contributory infringement of the '275 Patent has caused and will continue to cause Swarm irreparable harm unless they are enjoined by this Court.

B. COUNT 2

Infringement of the '161 Patent (35 U.S.C. § 271)

172. Swarm incorporates and realleges Paragraphs 1 through 163 of this Complaint as if fully set forth herein.

173. HPE has infringed and continues to infringe Claims 1-44 of the '161 Patent by making, using, selling, offering to sell, and/or importing infringing products and services into the United States.

174. HPE's actions as described herein constitute direct, induced, and/or contributory infringement of the '161 Patent in violation of 35 U.S.C § 271(a), (b), and/or (c).

175. HPE's actions as described herein constitute infringement of the '161 Patent either literally or under the doctrine of equivalents.

176. As a proximate result of HPE's infringement of the '161 Patent, Swarm has been damaged and HPE has unfairly profited in amounts to be proven at trial.

177. HPE's infringement of the '161 Patent has been and continues to be willful, entitling Swarm to recover treble damages and/or attorney fees pursuant to 35 U.S.C. § 284.

178. HPE's knowing, intentional, and/or willful actions make this an exceptional case, entitling Swarm to an award of reasonable fees pursuant to 35 U.S.C. § 285.

179. Defendant's direct, inducement, and/or contributory infringement of the '275 Patent has caused and will continue to cause Swarm irreparable harm unless they are enjoined by this Court.

XI. PRAYER FOR RELIEF

WHEREFORE, PLAINTIFF SWARM prays for the following relief against HPE:

A. A judgment that HPE has infringed one or more claims of each of the Patents-in-Suit;

B. An order and judgment temporarily and permanently enjoining HPE and their officers, directors, agents, servants, employees, affiliates, attorneys, and all others acting in privity or in concert with them, and their parents, subsidiaries, divisions, successors and assigns, from further acts of infringement;

C. A judgment awarding Swarm all damages adequate to compensate for Defendant's infringement, but in no event less than a reasonable royalty, including all pre- judgment and post-judgment interest at the maximum rate permitted by law;

D. A judgment awarding Swarm all relief (including money damages) contemplated 35 U.S.C. § 154(d);

E. A judgment awarding Swarm all damages, including treble damages, based on any infringement found to be willful, pursuant to 35 U.S.C. § 284, together with prejudgment interest;

F. A judgment awarding Swarm its costs pursuant to 35 U.S.C. § 284;

G. A judgment finding that this case is exceptional and awarding Swarm its attorneys fees in accordance with 35 U.S.C. § 285; and

H. Any other remedy to which Swarm may be entitled to or the Court deems just and proper.

XII. DEMAND FOR JURY TRIAL

Pursuant to Federal Rule of Civil Procedure 38(b), Swarm requests a trial by jury of all aspects properly triable by jury.

Dated this 13th day of December, 2024.

Respectfully Submitted,

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Attorneys for Plaintiff Swarm Technology LLC

EXHIBIT LIST

Exhibit	Title
A	U.S. Patent No. 10,592,275
B	U.S. Patent No. 12,159,161
C	Claim Chart - U.S. Patent No. 10,592,275
D	Claim Chart - U.S. Patent No. 12,159,161