

Subject Matter Eligibility Contentions Appendix B – U.S. Patent No. 8,040,232

The following charts contain Defendants' Subject Matter Ineligibility Contentions demonstrating that claims 1-12 of U.S. Patent No. 8,040,232 ("the '232 Patent") (collectively, "the Challenged Claims") are patent-ineligible under 35 U.S.C. § 101 pursuant to the Court's Standing Order Regarding Subject Matter Eligibility Contentions. Because the Court has yet to issue a claim construction in this case and—to the extent that KAIFI contends that there are factual disputes that relate to eligibility of the asserted claims of the '232 Patent—fact and expert discovery is ongoing, these contentions are preliminary only and Defendants reserve the right to supplement or modify these contentions in accordance with the Court's Local Rules and the Docket Control Order in this case. Additionally, and in further consideration of the preliminary stage of the case, Defendants note that the pinpoint citations referenced in these charts are not exhaustive, and Defendants reserve the right to rely on additional legal authority. Further, the citations to intrinsic and extrinsic evidence are exemplary only, and Defendants reserve the right to rely on other portions of intrinsic and extrinsic evidence not expressly cited herein, including but not limited to evidence from the prior art and evidence from the specification, claims and prosecution history of the asserted patents.

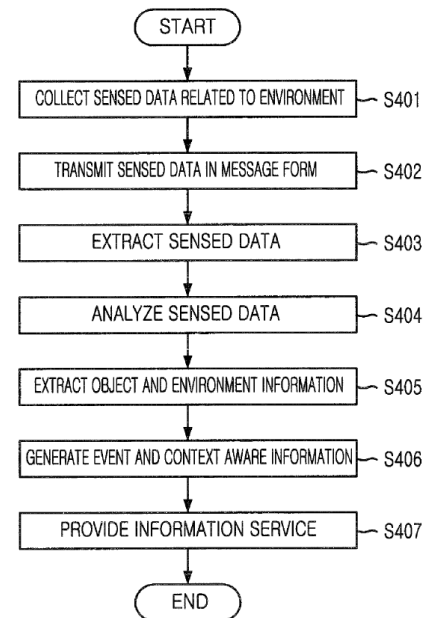
Further, these charts incorporate KAIFI's apparent interpretation of the elements within the asserted claims (to the extent they can be determined), as reflected in KAIFI's infringement contentions to date. Defendants do not concede that such interpretation is correct, and reserves its rights to supplement these contentions accordingly. As Defendants state in their Invalidity Contentions, Defendants contend that KAIFI's Initial Infringement Contentions do not provide the requisite level of specificity and fail to comply with the Court's Docket Control Order, the Local and Patent Rules of the Eastern District of Texas, and/or the Federal Rules of Civil Procedure, including for the reasons identified by Defendants in their letter to KAIFI dated November 25, 2024. In light of these deficiencies of KAIFI's infringement contentions, KAIFI's interpretation of numerous claim terms is not entirely clear. Defendants reserve their right to supplement or amend these contentions based on any claim constructions that are ultimately advanced by KAIFI, and Defendants provide these Subject-Matter Eligibility Contentions without waiving any right to receive from KAIFI full and complete specific infringement contentions.

Defendants reserve their right to supplement these contentions based on further discovery, including any supplemental infringement contentions or any interrogatory response provided by KAIFI purporting to rebut these ineligibility contentions. Defendants further reserve their right to supplement or amend these contentions based on any claim constructions provided by the Court.

Pursuant to the Court's Standing Order Regarding Subject Matter Eligibility Contentions, Defendants provide the following chart identifying each exception to eligibility (e.g., abstract idea, law of nature, and natural phenomenon) to which each Challenged Claim is directed and the factual and legal basis therefor. Defendants contend that Claims 1, 6, and/or 10 of the '232 Patent are each representative of Challenged Claims 1-12 of the '232 Patent, but Defendants separately sets forth herein the exception to eligibility for each.

Patent Claims	Exception to Eligibility, and Basis Therefor
1. A system for providing an information service based on heterogeneous sensor networks, comprising: a sensor node constructing a sensor network to sense environment information; a sensor network data transmitter for collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form; and a Ubiquitous Sensor Network (USN) middleware for extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program, the application program providing a user with information related to	The Challenged Claims are directed to the abstract idea of gathering environmental information, processing that information for practical use, and providing environment-related information to a user. Put another way, the Challenged Claims are directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment. Put yet another way, the Challenged Claims are directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user. The Challenged Claims cover the system equivalent of observing a location using one's senses and then providing relevant information to someone based on what is observed. It recites "broad and familiar concept[s] [in the realm of organizing human activity] that [are] untethered to any specific or concrete way of implementing it." <i>Affinity Labs of Texas, LLC v. DIRECTV, LLC</i>, 838 F.3d 1253, 1258 (Fed. Cir. 2016). The Challenged Claims cover the system equivalent of a person using his or her eyes and ears to determine that it is raining (based on the sound of rain and the appearance of rain), and then deciding to grab an umbrella before venturing outside. The below figure from the patent sums up the claimed inventions:

environment where the sensor network is installed.



'232 patent, Fig. 4.

This is “a broad and familiar concept concerning information distribution that is untethered to any specific or concrete way of implementing it.” *Affinity Labs of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1258 (Fed. Cir. 2016). “While independent claim 1 refers to general components such as a [‘sensor network,’ a ‘data transmitter,’ a ‘middleware,’ and an ‘application program,’], the claimed invention is entirely functional in nature.” *Id.* “There is nothing in claim 1 that is directed to *how* to [analyze collected data to create “conditional events, context aware information, and knowledge contents”]. Rather, the claim is drawn to the idea itself.” *Id.*

35 U.S.C. § 101 lists four broad categories of patent-eligible subject matter, but is subject to “an important implicit exception” that “[l]aws of nature, natural phenomena, and abstract ideas,” which form the “basic tools of scientific and technological work,” are not eligible for patent protection. *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014) (internal quotation marks omitted). “The ‘abstract ideas’ category embodies ‘the longstanding rule that an idea of

	itself is not patentable.”” <i>Id.</i> at 209 (quoting <i>Gottschalk v. Benson</i>, 409 U.S. 63, 67 (1972) (quoting <i>Rubber-Tip Pencil Co. v. Howard</i>, 87 U.S. 498 (1874)). <i>Alice</i> set forth a two-step inquiry. “First, we determine whether the claims at issue are directed to one of those patent-ineligible concepts.” <i>Id.</i> at 217. In making this inquiry, the claims “must be considered as a whole.” <i>Alice</i>, 573 U.S. at 218 n.3 (quoting <i>Diamond v. Diehr</i>, 450 U.S. 175, 188 (1981)). If the claims recite an abstract idea, the second step requires a “search for an ‘inventive concept’— 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.’” <i>Id.</i> at 218 (quoting <i>Mayo Collaborative Servs. v. Prometheus Labs., Inc.</i>, 566 U.S. 66, 73 (2016)). “A claim that recites an abstract idea must include ‘additional features’ to ensure ‘that the claim is more than a drafting effort designed to monopolize the abstract idea.’” <i>Id.</i> at 221 (quoting <i>Mayo</i>, 566 U.S. at 78) (alterations omitted). The recited “additional features must be more than well-understood, routine, conventional activity.” <i>Ultramercial, Inc. v. Hulu, LLC</i>, 772 F.3d 1335, 1339 (Fed. Cir. 2013) (internal quotations omitted). Gathering, storing, analyzing, and reporting out on information is an abstract concept. <i>See, e.g., ICON Health & Fitness v. Polar Electro Oy</i>, 243 F. Supp. 3d 1229, 1239 (D. Utah 2019), <i>aff’d</i>, 717 F. App’x 1005 (Fed. Cir. 2018) (“Controlling precedent establishes that the idea of collecting and analyzing information or data, even when particularly limited, is an abstract idea under Section 101,” and “providing a notification” does not change that); <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 610 (Fed. Cir. 2016) (finding abstract claim “drawn to the abstract idea of classifying an image and storing the image based on its classification,” even though claim required the use of tangible components such as a telephone unit and a server, because the specification made clear that the physical components “merely provide[d] a generic environment in which to carry out the abstract idea of classifying and storing digital images in an organized manner.”); <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat’l Assn.</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (finding abstract claims directed to “extracting and storing data from hard copy documents using generic scanning and processing technology”); <i>see also id.</i> at 1347 (The “concept of data collection, recognition, and storage is undisputedly well-known. Indeed, humans have always performed these functions.”); <i>Intellectual Ventures I LLC v. Capital</i>
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	<i>One Bank (USA)</i>, 792 F.3d 1363 (Fed. Cir. 2015) (finding patent claims directed “to the abstract idea of tailoring website content based on the viewer’s location or the time of day when the user navigated to the website”); <i>Electric Power Group v. Alstom</i>, 830 F.3d 1350, 1353-54 (Fed. Cir. 2016) (“[W]e have treated collecting information, including when limited to particular content (which does not change its character as information) as within the realm of abstract ideas.”) (collecting cases). With computer-implemented patents, there is a distinction between claims that are directed to an improvement in the functioning of a computer, which are abstract, and claims that “simply add[] conventional computer components to well-known business practices” or consist only of “generalized steps to be performed on a computer using conventional computer activity,” which are not. <i>TLI Comms.</i> at 612. Claims directed to “the use of conventional or generic technology in a nascent but well-known environment” are abstract. <i>Id.</i> Similarly, claims that are “so result-focused, so functional, as to effectively cover any solution to an identified problem” are frequently held ineligible under section 101. <i>Elec. Power Grp. v. Alstrom</i>, 830 F.3d 1350, 1356 (Fed. Cir. 2016). Particularly relevant here, <i>ICON Health & Fitness v. Polar Electro Oy</i>, 243 F. Supp. 3d 1229, 1232 (D. Utah 2019), <i>aff’d</i>, 717 F. App’x 1005 (Fed. Cir. 2018), held abstract claims directed to: “(1) receiving information regarding physical characteristic(s) of subjects; (2) evaluating, or determining a course of action based on, the characteristic(s); and (3) providing a notification of the evaluation/course of action.” The “physical characteristics” included “temperature.” <i>Id.</i> The “evaluation” could include “summarizing, tabulating, charting, collecting, aggregating, averaging, comparing, correlating, etc., some or all of the raw physical characteristic data received.” <i>Id.</i> The court in <i>ICON</i> explained: [H]umans have received and assessed information and thereafter provided feedback to one or more people from time immemorial. The aggregation of information and the use of information to provide advices to people is a practice that has long existed. Today, the process of aggregating information and providing advice is much quicker than in the past due to, for example, the use of computers in the process. Likewise electronic sensors enable various information to be gathered comprehensively and quickly. Sensors have existed in refrigerators, in heaters and furnaces, and temperature controls for a long time.
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	Information gathering from particular sources through the use of sensors, absent uniqueness of a sensor, does not change the nature of the information gathering. <i>Id.</i> at 1238. The court concluded: Controlling precedent establishes that the idea of collecting and analyzing information or data, even when particularly limited, is an abstract idea under Section 101. <i>See Electric Power Group</i>, 830 F.3d at 1353-54 (collecting cases). The abstract idea claimed by the Asserted Claims recites three ordinary activities: (1) receiving data indicative of physical characteristics of two subjects; (2) evaluating the data, which can be as simple as collecting the received data; and (3) providing a notification regarding the evaluation, which can be as simple as displaying the received data. (See '271 patent, col. 6:56-60, 7:31-35). The Asserted Claims fall directly into the abstract idea category of collecting and analyzing information or data. <i>Id.</i> The Court further noted that fact that the claims asserted “providing a notification” and utilizing a “sensor” did not negate the abstract nature of the claim. <i>Id.</i>; <i>see also id.</i> at 1240 (“Icon discussed the claims as using conventional sensors to collect objective data and a conventional computer to evaluate data, send notifications, and make determinations. ... These are the ordinary functions of sensors and a computer.”). <i>Electric Power Group</i> is also particularly relevant here. The claims in that case were directed to “systems and methods for performing real-time performance monitoring of an electric power grid by collecting data from multiple data sources, analyzing the data, and displaying the results.” <i>Electric Power Group</i>, 830 F.3d at 1351. The court found those claims invalid, reasoning: “Though lengthy and numerous, the claims do not go beyond requiring the collection, analysis, and display of available information in a particular field, stating those functions in general terms, without limiting them to technical means for performing the functions that are arguably an advance over conventional computer and network technology. The claims, defining a desirable information-based result and not limited to inventive means of achieving the result, fail under § 101.” <i>Id.</i>
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	The similarity between the invalidated claims and the ones at issue here cannot be overstated. Without reproducing Claim 12 from <i>Electric Power</i> in its entirety, that claim recites: (1) receiving a plurality of data streams, (2) receiving data from other power system data sources, (3) receiving data from a plurality of non-grid data sources, (4) “detecting and analyzing events in real-time from the plurality of data streams from the wide area based on at least one of limits, sensitivities and rates of change for one or more measurements from the data streams and dynamic stability metrics derived from analysis of the measurements from the data streams including at least one of frequency instability, voltages, power flows, phase angles, damping, and oscillation modes, derived from the phasor measurements and the other power system data sources in which the metrics are indicative of events, grid stress, and/or grid instability, over the wide area”, (5) displaying the event analysis results and diagnoses of events ... in visuals, tables, charts, or combinations thereof, the data comprising at least one of monitoring data, tracking data, historical data, prediction data, and summary data, (6) displaying concurrent visualizations of measurements, (7) “accumulating and updating the measurements from the data streams and the dynamic stability metrics, grid data, and non-grid data in real time as to wide area and local area portions of the interconnected electric power grid, and (8) deriving a composite indicator of reliability that is an indicator of power grid vulnerability and is derived from a combination of one or more real time measurements or computations of measurements from the data streams and the dynamic stability metrics covering the wide area as well as non-power grid data received from the non-grid data source. <i>Id.</i> at 1351-52. Thus, Claim 1 of the '232 Patent and patent-ineligible Claim 12 of <i>Electric Power</i> share: (1) gathering real-time information from disparate, distributed sources, (2) analyzing that data, and (3) providing the results of that analysis to a user. Indeed, Claim 12 discloses each of “generating conditional events, context aware information, and knowledge contents.” The '232 patent explains an example of a conditional event: “notification of a specific error and alarm of crucial state.” '232 patent at 5:51-62. It further explains an example of context aware information: “detection of invasion and the best position for arousing customers’ interest.” <i>Id.</i> It explains that context-aware information can depend on “a predetermined rule set by the application program.” <i>Id.</i> Claim 12’s description of “detecting ... events in real-time ... based on at least one of limits, sensitivities, and rates of change for one or more measurements ... [and] ... displaying the event analysis results” is clearly an example of a conditional event. Claim 12’s description of “deriving
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	a composite indicator of reliability” is an example of context-aware information. And “accumulating and updating the measurements from the data streams and the dynamic stability metrics, grid data, and non-grid data” is an example of knowledge contents. In other words, Claim 1 of the ’232 Patent and Claim 12 of <i>Electric Power</i> are a matching set, and both recite ineligible subject matter. The specification of the ’232 patent itself admits that there is nothing new about using heterogenous sensor networks to gather environmental information, or to process that information in a way that assists a user. The “Background Art” portion of the ’232 patent shows that all of these concepts are part of the “Background Art”: When data sensed through sensor networks are used, an application program must directly process and integrate the sensed data in order to provide information to a user using a specific sensor network. This way requires a lot of manpower and is cost-consuming. In addition, as the number and kinds of sensor networks required for generating an information service increase, the application program must be modified and enlarged to meet a processing capability requirement with respect to a communication scheme, control protocol, functional features, and sensed data processing scheme of each sensor network. Furthermore, when the sensed data collected from the same sensor network is simultaneously used in one or more application programs, the control and communication cost of gateways and sensor networks increases, resulting in performance degradation of the sensor networks and reduction of power resources. In Ubiquitous Sensor Network (USN) environment, a plurality of sensor networks having different purposes and functions are expected to be installed or distributed in a wide area. Sensor nodes of each sensor network collect environment information in real-time while they are attached to objects, placed in a position, or in motion. ’232 patent at 1:37-59. According to the ’232 patent, all it adds to a standard sensor network is a middleware that helps process sensor information for the applications:
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	[T]here is a need for a means that can abstract one or more heterogenous sensor networks, generate events and context aware information by analyzing sensed data from a corresponding sensor network, and provide the generated information to the application rapidly and conveniently.” <i>Id.</i> at 1:60-67. In other words, take the data processing that people were <i>already expecting the applications to do</i>, and move it somewhere else, to something called a “middleware.” The result of this “invention” was that known sensor networks and known application software would have an easier time: “Therefore, utilization of the information service based on the sensor networks can be improved and the application program can be easily developed and expanded.” <i>Id.</i> at 3:32-35. <i>ICON Health & Fitness, Inc. v. Polar Electro Oy</i>, 243 F. Supp. 3d 1229, 1239 (D. Utah 2019), <i>aff’d</i>, 717 F. App’x 1005 (Fed. Cir. 2018) (“The ’271 patent does not disclose and Icon does not argue that the sensors are a unique and new structure. Instead, they are disclosed as simply conventional sensors being used conventionally, which is insufficient to transform the abstract idea into patent-eligible subject matter.”); <i>Specialized Monitoring Solutions, LLC v. ADT LLC</i>, 367 F. Supp. 3d 575, 591 (E.D. Tex. 2019) (“The collection of sensor data, ‘including when limited to particular content (which does not change its character as information) [is] within the realm of abstract ideas.’”) (citing <i>Elec. Power Grp.</i>, 830 F.3d at 1353); <i>Facetoface Biometrics, Inc. v. Apple, Inc.</i>, 2023 WL 2561758, at *6 (“Sensors that ‘are disclosed as simply conventional sensors being used conventionally’ are ‘insufficient to transform the abstract idea into patent-eligible subject matter.’” (quoting <i>ICON</i>, 243 F.Supp.3d at 1239)); <i>IPLearn-Focus, LLC v. Microsoft Corp.</i>, 2015 WL 4192092, at *1 (N.D. Cal. July 10, 2015) (“The patents claim the use of a computer and detached sensor to monitor a student’s concentration levels based on these intuitions and react accordingly. In essence, they claim a computer-implemented method of the tried-and-true practice of teachers in every culture and throughout history: keep an eye out for a wandering mind and, when necessary, motivate the student to focus.”); <i>see also, e.g., FullView, Inc. v. Polycom, Inc.</i>, 485 F. Supp. 3d 1156, 1167 (N.D. Cal. 2020) (agreeing with the district court that “once the abstract idea is removed from the claim, all that is left here is the ‘conventional technology’ of a digital camera, such as image sensors, lenses, circuitry, memory and a processor being used in conventional ways.”).
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	Observing an environment and then providing information related to that environment based on the observation constitutes a method of organizing human activity and an abstract idea. <i>See, e.g., IpLearn, LLC v. K12 Inc.</i>, 76 F. Supp. 3d 525, 533 (D. Del. 2014) (finding abstract claims “addressed to fundamental human behavior related to instruction” performed by computer structures); <i>FullView, Inc. v. Polycom, Inc.</i>, 485 F. Supp. 3d 1156, 1167 (N.D. Cal. 2020) (agreeing with the district court that “once the abstract idea is removed from the claim, all that is left here is the ‘conventional technology’ of a digital camera, such as image sensors, lenses, circuitry, memory and a processor being used in conventional ways.”). To the extent this abstract idea is considered to be two or more ideas—<i>e.g.</i>, (1) collecting sensed data, and (2) providing information to an application program based on that data—the combination of these abstract ideas does not render Claim 1 any less abstract, <i>see Sensormatic Elecs., LLC v. Wyze Labs, Inc.</i>, 484 F. Supp. 3d 161, 165 (D. Del. 2020), <i>aff’d</i>, No. 2020-2320, 2021 WL 2944838 (Fed. Cir. July 14, 2021) (“Courts often invalidate patents that are directed to a combination of abstract ideas.”) (citing cases); <i>Broadband iTV, Inc. v. Amazon.com, Inc.</i>, No. 6:20-CV-00921-ADA, 2022 WL 4703425, at *14 (“Combing two abstract ideas . . . is not inventive.”); <i>RecogniCorp. LLC v. Nintendo Co.</i>, 855 F.3d 1322, 1327 (Fed. Cir. 2017) (“Adding one abstract idea . . . to another abstract idea . . . does not render the claim non-abstract.”); <i>Consumer 2.0, Inc. v. Tenant Turner, Inc.</i>, 343 F. Supp. 3d 581, 590-91 (E.D. Va. 2018), <i>aff’d</i> 796 F. App’x 752 (Fed. Cir. 2020) (“[T]he mere combination of these abstract processes is insufficient to bring the patent-at-issue out of the realm of the abstract.”) (citing cases). Claim 1 of the ’232 Patent does not contain an inventive concept such that it does more than claim an abstract idea (or the combination of abstract, ineligible ideas). Instead, it recites broad and result-based functional language. For example, it recites “providing an information service based on heterogenous sensor networks,” “constructing a sensor network to sense environment information,” “collecting sensed data sensed by the sensor in real-time,” “transmitting the collected sensed data in a message form,” “extracting object and environment information by cleaning, classifying and integrating the message,” “generating conditional events, context aware information, and knowledge contents from the extracted object and environment information,” “providing the information service to an application program,” and “providing a user with
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	information related to environment where the sensor network is installed.” But the ’232 Patent does not provide any meaningful explanation of <i>how</i> those functional steps are to be achieved. <i>See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC</i>, 874 F.3d 1329, 1337 (Fed. Cir. 2017) (finding the use of results-based functional language failed to “sufficiently describe how to achieve these results in a non-abstract way”). Instead, Claim 1 of the ’232 Patent seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that perform broad and result-based functional language. The generic and/or nonce “structures” that perform the results-based functions recited in Claim 1 include “a sensor node,” “a sensor network data transmitter,” “a Ubiquitous Sensor Network (USN) middleware,” and an “application program.” According to Claim 1, the generic and/or nonce “a sensor node,” performs the function(s) of “constructing a sensor network to sense environment information”; the “sensor network data transmitter,” performs the function(s) of “collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form”; the “Ubiquitous Sensor Network (USN) middleware,” performs function(s) including “extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program”; and the “application program,” performs the function(s) of “providing a user with information related to environment where the sensor network is installed.” But Claim 1’s recitation of these generic and/or nonce structures does not transform Claim 1’s broad, functional claiming into patent-eligible subject matter. <i>See Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.</i>, 955 F.3d 1317, 1326 (Fed. Cir. 2020) (finding that recitation of “functional computer components” did not specify how functions are performed or “direct the claim to anything other than [the] abstract idea.”). “Instructing one to ‘apply’ an abstract idea and reciting no more than generic computer elements performing generic computer tasks does not make an abstract idea patent-eligible.” <i>Intellectual Ventures I LLC v. Capital One Bank (USA)</i>, 792 F.3d 1363, 1368 (Fed. Cir. 2015) (citing <i>Alice</i>, 134 S. Ct. at 2359-60); <i>see also Alice</i>, 573 U.S. at 224 (“[W]holly generic computer implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical
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	assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.” (quoting <i>Mayo</i> 132 S. Ct. at 1297)). The generic and/or nonce “structures” recited in Claim 1 perform routine and generic processing capabilities typical of sensors and computer-driven software programs. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). <i>See also Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,” and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 1 (and/or in the specification) is functional. <i>See id.</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in claim 1 that is directed to <i>how</i> to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea ...’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 1 of the ’232 Patent, at least based on KAIFI’s apparent interpretation, require nothing other than “off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information,” the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed by these generic structures. The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants’ Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants’ Invalidity Contentions Further, as described in Defendants’ Invalidity Contentions, which are incorporated by reference herein, the Challenged Claims, including Claim 1, recite numerous generic and/or nonce terms
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	that perform various functions recited in the claims, but the claims and specification of the '232 fail to describe sufficient corresponding structures (or relevant algorithms) capable of actually performing the claimed functions. The only disclosure of relevant structures in the patent suggests that all of the claimed functions can be performed by a general purpose “computer” running “programs [] stored in a computer-readable recording medium that can execute the programs.” ’232 Patent at 8:12-17. As a result, Claim 1 simply applies the abstract idea(s) using generic electronic devices and does not contain an inventive concept such that it does more than claim the ineligible idea itself. Korean patent application No. 2006-0084353, which is incorporated by reference in the ’232 Patent, provides no additional structural information or disclosure that would take the subject matter recited in Claim 1 beyond the generic or nonce structures that are recited in the claims. <i>See</i> ’232 Patent at 8:17-21; <i>See also</i> Korean patent application No. 2006-0084353. Further, the subject matter of each of the Challenged Claims (including Claim 1) is tantamount to subject-matter that can be performed by a human actor. Patents that involve “the use of computers to conserve human resources by automating work otherwise performed through human labor” may be directed at abstract ideas. <i>Enco Sys., Inc. v. DaVincia, LLC</i>, 845 F. App'x 953, 957 (Fed. Cir. 2021) (quotation omitted); <i>see also, e.g., Ubisoft Entertainment, S.A. v. Yousician Oy</i>, 401 F.Supp.3d 644, 649 (finding claims to be directed toward abstract idea of teaching guitar by evaluating a user’s performance and generating appropriate exercises to improve that performance and noting that “[a] typical music teacher performs these steps when teaching a musical instrument.”), <i>aff’d</i>, 814 Fed. App’x 558, 591-592 (“The mini-game generation step is thus no different from the ordinary mental processes of a guitar instructor teaching a student how to play the guitar.”). For example, the Challenged Claims (including Claim 1) are tantamount to a human actor who observes an indoor or outdoor space and provide information about occurrences within the space or the status of that space. For example, a human actor could provide information about temperature, motion, sounds, and/or the presence or absence of animals or other people.
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	The Challenged Claims (including Claim 1) are likewise tantamount to a scientist who monitors activities and experiments in his/her laboratory and provides a report based on what he/she perceives. The Challenged Claims (including Claim 1) are likewise tantamount to the work of security guard(s) who patrol an area and trigger alarms, alert authorities, or take other appropriate actions in response to perceived dangers or threats. Security guards can also indicate “all clear” to interested parties when no threats or dangers are perceived. The Challenged Claims (including Claim 1) are similarly tantamount to a private investigator who monitors an area of interest, such as the area in and around a suspect’s home, and reports to other(s) about what he/she perceives, such as the whereabouts or activities of that suspect, or whether unusual or innocuous activity is observed. The Challenged Claims (including Claim 1) are similarly tantamount to an inspector who inspects an area of interest and reports on his/her findings. For example, structural/building inspectors routinely inspect bridges, buildings, and/or other structures and report their findings on issues such as structural integrity and safety based on what they are able to perceive. Similarly, health inspectors routinely inspect restaurants or other businesses and report findings based on their perceptions. Moreover, the Challenged Claims (including Claim 1) would preempt the broad subject matter of collecting and analyzing information from a network of sensors and providing related information to a user, at least according to KAIFI’s apparent interpretation of the claims. This further suggests that the Challenged Claims are directed to an abstract idea and patent-ineligible subject matter. <i>See, e.g., Bancorp Servs., LLC v. Sun Life Assur. Co. of Canada (U.S.)</i>, 687 F.3d 1266, 1280 (Fed. Cir. 2012) (finding that claimed abstract idea would improperly preempt broad subject matter).
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	Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “‘transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98). The abstract idea of the Challenged Claims is similar to those found abstract in various other cases, including but not limited to: <i>Bridge & Poast v. Verizon Commc’ns</i>, 778 Fed. App’x 882, 887 (Fed. Cir. 2019) (finding claims reciting steps of “retrieving a persistent device identifier,” “determining” and “retrieving” information associated with the identifier, “analyzing” the information, and “placing directed media” based on that analysis’ were directed to the abstract idea of implementing targeted marketing using a persistent identifier,” which “is a form of tailoring information based on provided data, which we have previously held is an abstract idea.” (internal quotation omitted)). <i>Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC</i>, 874 F.3d at 1337 (Fed. Cir. 2017) (finding claims reciting “result-based functional language” and requiring functional results of “converting,” “routing,” “controlling,” “monitoring,” and “accumulating records” failed to “sufficiently describe how to achieve these results in a nonabstract way,” and were thus directed to an abstract idea”). <i>CyberFone Sys., LLC v. CNN Interactive Grp., Inc.</i>, 558 F. App’x 988, 992 (Fed. Cir. 2014) (finding claims directed to “obtaining data transaction information,” “forming a plurality of different exploded data transactions,” and “sending” the exploded data transaction to different locations based on the data transaction information was directed to “the well-known concept of categorical data storage, i.e., the idea of collecting information in classified form, then separating and transmitting that information according to its classification,” which “is an abstract idea that is not patent-eligible”). <i>Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.</i>, 758 F.3d 1344, 1351 (Fed. Cir. 2014) (finding claims reciting “a process of taking two data sets and combining them into a single data set, the device profile” when “[t]he two data sets are generated by taking existing information—
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	<i>i.e.</i>, measured chromatic stimuli, spatial stimuli, and device response characteristic functions—and organizing this information into a new form” were directed to “an ineligible abstract process of gathering and combining data that does not require input from a physical device”). <i>Dealertrack, Inc. v. Huber</i>, 674 F.3d 1315, 1331 (Fed. Cir. 2012) (finding abstract claims directed to a “computer aided method” of “receiving” data, “selectively forwarding” data to a remote terminal device, and the remote terminal device further forwards the data to a remote application entry and display device). <i>Specialized Monitoring Sols., LLC v. ADT LLC</i>, 367 F. Supp. 3d 575, 591 (E.D. Tex. 2019) (patent about “process of gathering information (by detecting a signal event in the plurality of protected spaces), analyzing that information (by coding the signal event into a packet message and determining a type of signal event of the packet message), storing the information (in a secure area and subarea of the plurality of secure storage areas of the database), and displaying the results to a user (by providing access to information of the coded message packet through an Internet connection between the manager and the database based upon the password assigned to the manager)” was directed to an abstract idea of “storing information in discrete categories”). <i>First-Class Monitoring, LLC v. Ups of Am., Inc.</i>, 389 F. Supp. 3d 456, 467 (E.D. Tex. 2019) (explaining that “The process of requesting, collecting, analyzing, and transmitting information, without more, is directed to an abstract idea” and finding claims directed to abstract idea of requesting, collecting, analyzing, and transmitting information invalid under § 101 when “[t]he specification makes clear that the technology on which the claims rely is conventional and well known,” and “merely look to the use of known technology to communication information of a type that, according to [plaintiff], has not previously been transmitted using that technology”). <i>Intellectual Ventures I LLC v. T-Mobile USA, Inc.</i>, 2017 WL 3706495, at * 9-*11 (D. Del. Aug. 23, 2017) (finding idea “converting a multimedia message into a common format – an email message – for sending to another party and the converting the received common format back into [a] multimedia message” to be an abstract idea because it addressed the longstanding issue of “incompatibility in communication” and limitation to “multi-carrier environment” was not
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	sufficient prevent idea from being abstract), <i>aff'd Intellectual Ventures I LLC v. T-Mobile USA, Inc.</i>, 748 Fed. App'x 330 (Fed. Cir. 2019). <i>Mobile Telcoms. Techs., LLC v. Blackberry Corp.</i>, 2016 WL 2757371, at *1-*5 (N.D. Tex. May 12, 2016) (finding process of sending and receiving coded messages abstract). <i>Novo Transforma Techs., LLC v. Sprint Spectrum L.P.</i>, 2015 WL 5156526, at *1-*4 (D. Del. Sep. 2, 2015) (finding abstract idea of using different media for communicating information to address the purported problem of “incompatibility between different communication services employing different media for communicating information”). <i>See also, e.g., Electronic Commc'n Techs. LLC v. ShoppersChoice.com, LLC</i>, 958 F.3d 1178 (Fed. Cir. 2000); <i>Ericsson Inc. v. TCL Commc'n Tech. Holdings, Ltd.</i>, 955 F.3d 1317 (Fed. Cir. 2020); <i>BitSight Techs., Inc. v. NormShield Inc.</i>, 2024 WL 428373 (D. Mass. Sep. 20, 2024); <i>Electric Power Grp, LLC v. Alstom S.A.</i>, 830 F.3d 1350 (Fed. Cir. 2016); <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass'n</i>, 776 F.3d 1343 (Fed. Cir. 2014); <i>Affinity Labs of Texas, LLC v. DIRECTV, LLC</i>, 838 F.3d 1253 (Fed. Cir. 2016).
2. The system as recited in claim 1, wherein the ubiquitous sensor network middleware comprises: a sensor network abstraction unit for extracting the sensed data from the message received from the sensor network data transmitter; a sensor network intelligence unit for extracting the object and environment information by analyzing the sensed data extracted by the sensor network	See above analysis for Claim 1, which is incorporated by reference herein. Like Claim 1, this claim is directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user. Put another way, this claim is directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment. Claim 2 is substantially similar and linked to the same abstract idea as representative claims 1, 6 and 10. Claim 2 depends from Claim 1 and recites the additional limitations of “<i>wherein the ubiquitous sensor network middleware comprises:</i> <i>[a] a sensor network abstraction unit for extracting the sensed data from the message received from the sensor network data transmitter;</i>

abstraction unit, and generating the conditional events including notification and alarm about a certain condition, and the context aware information from the extracted object and environment information; and a service platform management unit for providing the events and the context aware information to the application program in a form suitable for the application program.	<i>[b] a sensor network intelligence unit for extracting the object and environment information by analyzing the sensed data extracted by the sensor network abstraction unit, and generating the conditional events including notification and alarm about a certain condition, and the context aware information from the extracted object and environment information; and</i> <i>[c] a service platform management unit for providing the events and the context aware information to the application program in a form suitable for the application program.”</i> These additional claim limitations, individually or as an ordered combination, do not change the abstract idea, function(s) or process recited in Claim 1 and recite only broad, generic functional language without specifying how the recited functions are achieved. Claim 2 of the ’232 Patent does not contain an inventive concept such that it does more than claim an abstract idea (or combination of abstract ideas). Instead, it recites broad and result-based functional language. For example, it recites “extracting the sensed data from the message received from the sensor network data transmitter,” “extracting the object and environment information by analyzing the sensed data extracted by the sensor network abstraction unit,” “generating the conditional events including notification and alarm about a certain condition, and the context aware information from the extracted object and environment information; and “providing the events and the context aware information to the application program in a form suitable for the application program.” But the ’232 Patent does not provide any meaningful explanation of <i>how</i> those functional steps are to be achieved. <i>See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC</i>, 874. F.3d 1329, 1337 (Fed. Cir. 2017) (finding the use of results-based functional language failed to “sufficiently describe how to achieve these results in a non-abstract way”). Instead, Claim 2 seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that perform broad and result-based functional language. The generic and/or nonce “structures” that perform the results-based functions recited in the additional limitations of Claim 2 include a “sensor network abstraction unit,” a “sensor network intelligence unit,” and a “service platform management unit.” According to Claim 2, the “sensor network abstraction unit,” performs the function(s) of “extracting the sensed data from the
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	message received from the sensor network data transmitter”; the “sensor network intelligence unit,” performs the function(s) of “extracting the object and environment information by analyzing the sensed data extracted by the sensor network abstraction unit, and generating the conditional events including notification and alarm about a certain condition, and the context aware information from the extracted object and environment information”; and the “service platform management unit,” performs the function(s) of “providing the events and the context aware information to the application program in a form suitable for the application program.” But Claim 2’s recitation of these generic and/or nonce structures does not transform Claim 2’s broad, functional claiming into patent-eligible subject matter. <i>See Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.</i>, 955 F.3d 1317, 1326 (Fed. Cir. 2020) (finding that recitation of “functional computer components” did not specify how functions are performed or “direct the claim to anything other than [the] abstract idea.”). “Instructing one to ‘apply’ an abstract idea and reciting no more than generic computer elements performing generic computer tasks does not make an abstract idea patent-eligible.” <i>Intellectual Ventures I LLC v. Capital One Bank (USA)</i>, 792 F.3d 1363, 1368 (Fed. Cir. 2015) (citing <i>Alice</i>, 134 S. Ct. at 2359-60); <i>see also Alice</i>, 573 U.S. at 224 (“[W]holly generic computer implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.’” (quoting <i>Mayo</i> 132 S. Ct. at 1297)). The generic and/or nonce “structures” recited in Claim 2 perform routine and generic processing capabilities typical of sensors and computer-driven software programs. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). <i>See also Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,” and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 2 (and/or in the specification) is functional. <i>See id.</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to <i>how</i> to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>,
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	823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 2 of the '232 Patent, at least based on KAIFI's apparent interpretation, require nothing other than "off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information," the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed by these generic structures. The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants' Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants' Invalidity Contentions. Thus, either "individually" or "as an ordered combination," the elements of this claim do not add enough to "'transform the nature of the claim' into a patent-eligible application." <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
3. The system as recited in claim 2, wherein the sensor network abstraction unit comprises: a sensor network interface for extracting the sensed data by referring to a message transfer protocol; a sensor network interface protocol storage for managing a rule for the message transfer protocol; and a sensor network monitor for monitoring a state of the sensor network, based on the data	See above analysis for Claim 2, which is incorporated by reference herein. Claim 3 is substantially similar and linked to the same abstract idea as representative claims 1, 6 and 10. Like Claims 1, 6, and 10, this claim is directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user. Put another way, this claim is directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment. Claim 3 is substantially similar and linked to the same abstract idea as representative claims 1, 6 and 10. Claim 3 depends from Claim 2 and recites the additional limitations of "<i>wherein the sensor network abstraction unit comprises:</i>

received from the sensor network interface.	<i>[a] a sensor network interface for extracting the sensed data by referring to a message transfer protocol;</i> <i>[b] a sensor network interface protocol storage for managing a rule for the message transfer protocol; and</i> <i>[c] sensor network monitor for monitoring a state of the sensor network, based on the data received from the sensor network interface.”</i> These additional claim limitations, individually or as an ordered combination, do not change the abstract idea, function(s) or process recited in Claims 1 and/or 2 and recite only broad, generic functional language without specifying how the recited functions are achieved. Claim 3 of the ’232 Patent does not contain an inventive concept such that it does more than claim an abstract idea (or a combination of abstract ideas). Instead, it recites broad and result-based functional language. For example, it recites “extracting the sensed data by referring to a message transfer protocol,” “managing a rule for the message transfer protocol,” and “monitoring a state of the sensor network, based on the data received from the sensor network interface.” But the ’232 Patent does not provide any meaningful explanation of how those functional steps are to be achieved. <i>See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC</i>, 874. F.3d 1329, 1337 (Fed. Cir. 2017) (finding the use of results-based functional language failed to “sufficiently describe how to achieve these results in a non-abstract way”). Instead, Claim 3 of the ’232 Patent seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that perform broad and result-based functional language. The generic and/or nonce “structures” that perform the results-based functions recited in the additional limitations of Claim 3 include a “sensor network interface,” a “sensor network interface protocol storage,” and a “sensor network monitor.” According to Claim 3, the “sensor network interface,” performs the function(s) of “extracting the sensed data by referring to a message transfer protocol”; the “sensor network interface protocol storage,” performs the function(s) of “managing a rule for the message transfer protocol”; and the “sensor network monitor,” performs the function(s) of “monitoring a state of the sensor network, based on the data received from the sensor network interface.” But Claim 3’s recitation of these generic and/or
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	nonce structures does not transform Claim 3’s broad, functional claiming into patent-eligible subject matter. <i>See Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.</i>, 955 F.3d 1317, 1326 (Fed. Cir. 2020) (finding that recitation of “functional computer components” did not specify how functions are performed or “direct the claim to anything other than [the] abstract idea.”). “Instructing one to ‘apply’ an abstract idea and reciting no more than generic computer elements performing generic computer tasks does not make an abstract idea patent-eligible.” <i>Intellectual Ventures I LLC v. Capital One Bank (USA)</i>, 792 F.3d 1363, 1368 (Fed. Cir. 2015) (citing <i>Alice</i>, 134 S. Ct. at 2359-60); see also <i>Alice</i>, 573 U.S. at 224 (“[W]holly generic computer implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.’” (quoting <i>Mayo</i>, 132 S. Ct. at 1297)). The generic and/or nonce “structures” recited in Claim 3 perform routine and generic processing capabilities typical of sensors and computer-driven software programs. <i>See, e.g., Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). <i>See also Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,” and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 3 (and/or in the specification) is functional. <i>See id.</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to how to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea ...’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 3 of the ’232 Patent, at least based on KAIFI’s apparent interpretation, require nothing other than “off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information,” the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed by these generic structures.
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	The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants’ Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants’ Invalidity Contentions. Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
4. The system as recited in claim 3, wherein the sensor network intelligence unit comprises: a sensed data analyzer for performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit; an event processor for generating the conditional events including notification and alarm according to a rule set by the application program and managing the generated events; and a context information manager for sensing and generating the context aware information, based on the sensed data analyzed by the sensed data analyzer.	See above analysis for Claim 3, which is incorporated by reference herein. Like Claims 1, 6, and 10, this claim is directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user. Put another way, this claim is directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment. Claim 4 is substantially similar and linked to the same abstract idea as representative claims 1, 6 and 10. Claim 4 depends from Claim 3 and recites the additional limitations of “<i>wherein the sensor network intelligence unit comprises:</i> <i>[a] a sensed data analyzer for performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit;</i> <i>[b] an event processor for generating the conditional events including notification and alarm according to a rule set by the application program and managing the generated events; and</i> <i>[c] a context information manager for sensing and generating the context aware information, based on the sensed data analyzed by the sensed data analyzer.”</i> These additional claim limitations, individually or as an ordered combination, do not change the abstract idea, function(s) or process recited in Claims 1, 2 and/or 3 and recite only broad, generic functional language without specifying how the recited functions are achieved.

	Claim 4 of the '232 Patent does not contain an inventive concept such that it does more than claim an abstract idea (or a combination of abstract ideas). Instead, it recites broad and result-based functional language. For example, it recites “performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit,” “generating the conditional events including notification and alarm according to a rule set by the application program and managing the generated events,” ; and “sensing and generating the context aware information, based on the sensed data analyzed by the sensed data analyzer.” But the '232 Patent does not provide any meaningful explanation of how those functional steps are to be achieved. <i>See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC</i>, 874 F.3d 1329, 1337 (Fed. Cir. 2017) (finding the use of results-based functional language failed to “sufficiently describe how to achieve these results in a non-abstract way”). Instead, Claim 4 of the '232 Patent seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that perform broad and result-based functional language. The generic and/or nonce “structures” that perform the results-based functions recited in the additional limitations of Claim 4 include a “sensed data analyzer,” an “event processor,” and a “context information manager.” According to Claim 4, the “sensed data analyzer,” performs the function(s) of “performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit”; the “event processor” performs the function(s) of “generating the conditional events including notification and alarm according to a rule set by the application program and managing the generated events,” and the “context information manager,” performs the function(s) of “sensing and generating the context aware information, based on the sensed data analyzed by the sensed data analyzer.” But Claim 4’s recitation of these generic and/or nonce structures does not transform Claim 4’s broad, functional claiming into patent-eligible subject matter. <i>See Ericsson Inc. v. TCL Commc'n Tech. Holdings Ltd.</i>, 955 F.3d 1317, 1326 (Fed. Cir. 2020) (finding that recitation of “functional computer components” did not specify how functions are performed or “direct the claim to anything other than [the] abstract idea.”). “Instructing one to ‘apply’ an abstract idea and reciting no more than generic computer elements performing generic computer tasks does not make an abstract idea patent-eligible.” <i>Intellectual Ventures I LLC v. Capital One Bank (USA)</i>, 792 F.3d 1363, 1368 (Fed. Cir. 2015) (citing <i>Alice</i>, 134 S. Ct. at 2359-60); see also <i>Alice</i>, 573 U.S. at 224 (“[W]holly generic computer
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	implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.’” (quoting <i>Mayo</i>, 132 S. Ct. at 1297))). The generic and/or nonce “structures” recited in Claim 4 perform routine and generic processing capabilities typical of sensors and computer-driven software programs. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). <i>See also Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,” and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 4 (and/or in the specification) is functional. <i>See id.</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to how to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 4 of the ’232 Patent, at least based on KAIFI’s apparent interpretation, require nothing other than “off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information,” the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed by these generic structures. The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants’ Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants’ Invalidity Contentions.
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	Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “‘transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
5. The system as recited in claim 4, wherein the service platform management unit comprises: a directory service manager for identifying and searching resources of the sensor network; a service process manager for scheduling and managing an operation sequence of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program; and an application program interface for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program.	See above analysis for Claim 4, which is incorporated by reference herein. Like Claims 1, 6 and 10, this claim is directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user. Put another way, this claim is directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment. Claim 5 is substantially similar and linked to the same abstract idea as representative claims 1, 6 and 10. Claim 5 depends from Claim 4 and recites the additional limitations of “<i>wherein the service platform management unit comprises:</i> <i>[a] a directory service manager for identifying and searching resources of the sensor network;</i> <i>[b] a service process manager for scheduling and managing an operation sequence of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program; and</i> <i>[c] an application program interface for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program.”</i> These additional claim limitations, individually or as an ordered combination, do not change the abstract idea, function(s) or process recited in Claim 1, 2, 3 and/or 4 and recite only broad, generic functional language without specifying how the recited functions are achieved. To the extent KAIFI argues that Claim 5 adds an additional concept, such as “identifying and searching resources of the sensor network,” such an addition would not render claim 5 any less

	abstract. Under such an interpretation, the claim would be directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user while searching for and identifying resources of the sensor network, which is itself an abstract idea. The additional limitations of Claim 5 do not render Claim 5 any less abstract. Claim 5 of the '232 Patent does not contain an inventive concept such that it does more than claim an abstract idea (or a combination of abstract ideas). Instead, Claim 5 of the '232 Patent seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that perform broad and result-based functional language. The generic and/or nonce “structures” recited in the additional limitations of Claim 5 include a “directory service manager,” a “service process manager,” and an “application program interface.” According to Claim 5, the generic and/or nonce “directory service manager,” performs the function(s) of “identifying and searching resources of the sensor network”; the “service process manage” performs the function(s) of “scheduling and managing an operation sequence of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program”; and the “application program interface,” performs the function(s) of “providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program.” But Claim 5’s recitation of these generic and/or nonce structures does not transform Claim 5’s broad, functional claiming into patent-eligible subject matter. See <i>Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.</i>, 955 F.3d 1317, 1326 (Fed. Cir. 2020) (finding that recitation of “functional computer components” did not specify how functions are performed or “direct the claim to anything other than [the] abstract idea.”). “Instructing one to ‘apply’ an abstract idea and reciting no more than generic computer elements performing generic computer tasks does not make an abstract idea patent-eligible.” <i>Intellectual Ventures I LLC v. Capital One Bank (USA)</i>, 792 F.3d 1363, 1368 (Fed. Cir. 2015) (citing <i>Alice</i>, 134 S. Ct. at 2359-60); see also <i>Alice</i>, 573 U.S. at 224 (“[W]holly generic computer implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.’” (quoting <i>Mayo</i>, 132 S. Ct. at 1297)).
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	The generic and/or nonce “structures” recited in Claim 5 perform routine and generic processing capabilities typical of sensors and computer-driven software programs. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). <i>See also Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,” and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 5 (and/or in the specification) is functional. <i>See id.</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to how to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea ...’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 5 of the ’232 Patent, at least based on KAIFI’s apparent interpretation, require nothing other than “off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information,” the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed by these generic structures. The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants’ Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants’ Invalidity Contentions. Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “‘transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
6. A Ubiquitous Sensor Network (USN) middleware	Like Claims 1 and 10, this claim is directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user.

apparatus for generating an information service based on heterogeneous sensor networks, comprising: a sensor network abstraction unit for extracting sensed data from a message received from a sensor network; a sensor network intelligence unit for extracting object and environment information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and generating an event, including notification and alarm, and context aware information from the extracted object and environment information; and a service platform management unit for providing the event and the context aware information to the application program in a form suitable for the application program.	Put another way, this claim is directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment. See analysis for Claim 1, above, and Claim 10, below, which are incorporated by reference herein. Claim 6 is substantially similar and linked to the same abstract idea as representative claims 1 and 10. The limitations of Claim 6, individually or as an ordered combination, recite only broad, generic functional language without specifying how the recited functions are achieved. Observing an environment and then providing information related to that environment based on the observation constitutes a method of organizing human activity and an abstract idea. <i>See, e.g., IpLearn, LLC v. K12 Inc.</i>, 76 F. Supp. 3d 525, 533 (D. Del. 2014) (finding abstract claims “addressed to fundamental human behavior related to instruction” performed by computer structures); <i>FullView, Inc. v. Polycom, Inc.</i>, 485 F. Supp. 3d 1156, 1167 (N.D. Cal. 2020) (agreeing with the district court that “once the abstract idea is removed from the claim, all that is left here is the ‘conventional technology’ of a digital camera, such as image sensors, lenses, circuitry, memory and a processor being used in conventional ways.”). To the extent this abstract idea is considered to be two or more ideas—<i>e.g.</i>, (1) collecting sensed data, and (2) providing information to an application program based on that data—the combination of these abstract ideas does not render Claim 1 any less abstract, <i>see Sensormatic Elecs., LLC v. Wyze Labs, Inc.</i>, 484 F. Supp. 3d 161, 165 (D. Del. 2020), <i>aff’d</i>, No. 2020-2320, 2021 WL 2944838 (Fed. Cir. July 14, 2021) (“Courts often invalidate patents that are directed to a combination of abstract ideas.”) (citing cases); <i>Broadband iTV, Inc. v. Amazon.com, Inc.</i>, No. 6:20-CV-00921-ADA, 2022 WL 4703425, at *14 (“Combining two abstract ideas . . . is not inventive.”); <i>RecogniCorp. LLC v. Nintendo Co.</i>, 855 F.3d 1322, 1327 (Fed. Cir. 2017) (“Adding one abstract idea . . . to another abstract idea . . . does not render the claim non-abstract.”); <i>Consumer 2.0, Inc. v. Tenant Turner, Inc.</i>, 343 F. Supp. 3d 581, 590-91 (E.D. Va. 2018), <i>aff’d</i> 796
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	F. App'x 752 (Fed. Cir. 2020) (“[T]he mere combination of these abstract processes is insufficient to bring the patent-at-issue out of the realm of the abstract.”) (citing cases). Claim 6 of the '232 Patent does not contain an inventive concept such that it does more than claim an abstract idea (or a combination of abstract ideas). Instead, it recites broad and result-based functional language without providing any meaningful explanation of how those functional steps are to be achieved. <i>See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC</i>, 874 F.3d 1329, 1337 (Fed. Cir. 2017) (finding the use of results-based functional language failed to “sufficiently describe how to achieve these results in a non-abstract way”). In particular, Claim 6 of the '232 Patent seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that perform broad and result-based functional language. The generic and/or nonce “structures” that perform the results-based functions recited in Claim 6 include a “Ubiquitous Sensor Network (USN) middleware apparatus,” a “sensor network abstraction unit,” a “sensor network intelligence unit,” a “service platform management unit,” and an “application program.” According to Claim 6, the “Ubiquitous Sensor Network (USN) middleware apparatus,” performs the function(s) of “generating an information service based on heterogeneous sensor networks”; the “sensor network abstraction unit,” performs the function(s) of “extracting sensed data from a message received from a sensor network”; the “sensor network intelligence unit,” performs the function(s) of “extracting object and environment information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and generating an event, including notification and alarm, and context aware information from the extracted object and environment information”; and the “service platform management unit,” performs the function(s) of “providing the event and the context aware information to the application program in a form suitable for the application program.” But Claim 6’s recitation of these generic and/or nonce structures does not transform Claim 6’s broad, functional claiming into patent-eligible subject matter. <i>See Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.</i>, 955 F.3d 1317, 1326 (Fed. Cir. 2020) (finding that recitation of “functional computer components” did not specify how functions are performed or “direct the claim to anything other than [the] abstract idea.”). “Instructing one to ‘apply’ an abstract idea and
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	reciting no more than generic computer elements performing generic computer tasks does not make an abstract idea patent-eligible.” <i>Intellectual Ventures I LLC v. Capital One Bank (USA)</i>, 792 F.3d 1363, 1368 (Fed. Cir. 2015) (citing <i>Alice</i>, 134 S. Ct. at 2359-60); see also <i>Alice</i>, 573 U.S. at 224 (“[W]holly generic computer implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.’” (quoting <i>Mayo</i>, 132 S. Ct. at 1297)). The generic and/or nonce “structures” recited in Claim 6 perform routine and generic processing capabilities typical of sensors and computer-driven software programs. See <i>Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). See also <i>Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,” and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 6 (and/or in the specification) is functional. See <i>id.</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to how to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 6 of the ’232 Patent, at least based on KAIFI’s apparent interpretation, require nothing other than “off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information,” the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed by these generic structures. Further, as described in Defendants’ Invalidity Contentions, which are incorporated by reference herein, the Challenged Claims, including Claim 6, recite numerous generic and/or nonce terms that perform various functions recited in the claims, but the claims and specification of the ’232 fail to describe sufficient corresponding structures (or relevant algorithms) capable of actually performing the claimed functions. The only disclosure of relevant structures in the patent
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	suggests that all of the claimed functions can be performed by a general purpose “computer” running “programs [] stored in a computer-readable recording medium that can execute the programs.” ’232 Patent at 8:12-17. As a result, Claim 6 simply applies the abstract idea(s) using generic electronic devices and does not contain an inventive concept such that it does more than claim the ineligible idea itself. Korean patent application No. 2006-0084353, which is incorporated by reference in the ’232 Patent, provides no additional structural information or disclosure that would take the subject matter recited in Claim 6 beyond the generic or nonce structures that are recited in the claims. <i>See</i> ’232 Patent at 8:17-21; <i>See also</i> Korean patent application No. 2006-0084353. The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants’ Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants’ Invalidity Contentions. Moreover, the Challenged Claims (including Claim 6) would preempt the broad subject matter of collecting and analyzing information from a network of sensors and providing related information to a user, at least according to KAIFI’s apparent interpretation of the claims. This further suggests that the Challenged Claims are directed to an abstract idea and patent-ineligible subject matter. <i>See, e.g., Bancorp Servs., LLC v. Sun Life Assur. Co. of Canada (U.S.)</i>, 687 F.3d 1266, 1280 (Fed. Cir. 2012) (finding that claimed abstract idea would improperly preempt broad subject matter). Further, the subject matter of each of the Challenged Claims (including Claim 6) is tantamount to subject-matter that can be performed by a human actor. <i>See</i> discussion re same as to Claim 1, above. Patents that involve “the use of computers to conserve human resources by automating work otherwise performed through human labor” may be directed at abstract ideas. <i>Enco Sys., Inc. v. DaVincia, LLC</i>, 845 F. App’x 953, 957 (Fed. Cir. 2021) (quotation omitted); <i>see also, e.g., Ubisoft Entertainment, S.A. v. Yousician Oy</i>, 401 F.Supp.3d 644, 649 (finding claims to be directed toward abstract idea of teaching guitar by evaluating a user’s performance and generating appropriate exercises to improve that performance and noting that “[a] typical music
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	teacher performs these steps when teaching a musical instrument.”), <i>aff’d</i>, 814 Fed. App’x 558, 591-592 (“The mini-game generation step is thus no different from the ordinary mental processes of a guitar instructor teaching a student how to play the guitar.”). Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “‘transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
7. The ubiquitous sensor network middleware apparatus as recited in claim 6, wherein the sensor network abstraction unit comprises: a sensor network interface for extracting the sensed data by referring to a message transfer protocol; a sensor network interface protocol storage for managing a rule for the message transfer protocol; and a sensor network monitor for monitoring a state of the sensor network, based on the data received from the sensor network interface.	See above analysis for Claims 1 and 6, which is incorporated by reference herein. Like Claims 1, 6 and 10, this claim is directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user. Put another way, this claim is directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment. Claim 7 is substantially similar and linked to the same abstract idea as representative claims 1, 6 and 10. Claim 7 depends from Claim 6 and recites the additional limitations of “<i>wherein the sensor network abstraction unit comprises:</i> <i>[a] a sensor network interface for extracting the sensed data by referring to a message transfer protocol;</i> <i>[b] a sensor network interface protocol storage for managing a rule for the message transfer protocol; and</i> <i>[c] a sensor network monitor for monitoring a state of the sensor network, based on the data received from the sensor network interface.”</i> These additional claim limitations, individually or as an ordered combination, do not change the abstract idea, function(s) or process recited in Claim 6 and recite only broad, generic functional language without specifying how the recited functions are achieved. Claim 7 of the ’232 Patent does not contain an inventive concept such that it does more than claim an abstract idea (or a combination of abstract ideas). Instead, it recites broad and result-based functional language without providing any meaningful explanation of how those functional

	steps are to be achieved. <i>See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC</i>, 874 F.3d 1329, 1337 (Fed. Cir. 2017) (finding the use of results-based functional language failed to “sufficiently describe how to achieve these results in a non-abstract way”). Claim 7 of the '232 Patent seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that perform broad and result-based functional language. The generic and/or nonce “structures” that perform the results-based functions recited in the additional limitations of Claim 7 include a “sensor network interface,” a “a sensor network interface protocol storage,” and a “sensor network monitor.” According to Claim 7, the “sensor network interface,” performs the function(s) of “extracting the sensed data by referring to a message transfer protocol”; the “sensor network interface protocol storage,” performs the function(s) of “managing a rule for the message transfer protocol”; and the “sensor network monitor,” performs the function(s) of “monitoring a state of the sensor network, based on the data received from the sensor network interface.” But Claim 7’s recitation of these generic and/or nonce structures does not transform Claim 7’s broad, functional claiming into patent-eligible subject matter. <i>See Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.</i>, 955 F.3d 1317, 1326 (Fed. Cir. 2020) (finding that recitation of “functional computer components” did not specify how functions are performed or “direct the claim to anything other than [the] abstract idea.”). “Instructing one to ‘apply’ an abstract idea and reciting no more than generic computer elements performing generic computer tasks does not make an abstract idea patent-eligible.” <i>Intellectual Ventures I LLC v. Capital One Bank (USA)</i>, 792 F.3d 1363, 1368 (Fed. Cir. 2015) (citing <i>Alice</i>, 134 S. Ct. at 2359-60); see also <i>Alice</i>, 573 U.S. at 224 (“[W]holly generic computer implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.’” (quoting <i>Mayo</i>, 132 S. Ct. at 1297)). The generic and/or nonce “structures” recited in Claim 7 perform routine and generic processing capabilities typical of sensors and computer-driven software programs. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). <i>See also Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,”
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	and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 7 (and/or in the specification) is functional. <i>See id.</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to how to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea ...’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 7 of the ’232 Patent, at least based on KAIFI’s apparent interpretation, require nothing other than “off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information,” the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed by these generic structures. The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants’ Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants’ Invalidity Contentions. Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “‘transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
8. The ubiquitous sensor network middleware apparatus as recited in claim 7, wherein the sensor network intelligence unit comprises: a sensed data analyzer for performing an analysis	See above analysis for Claim 7, which is incorporated by reference herein. Like Claims 1, 6 and 10, this claim is directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user. Put another way, this claim is directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment.

operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit; an event processor for generating the event including the knowledge contents according to a rule set by the application program and managing the generated event; and a context information manager for sensing and generating the environment condition information, based on the sensed data analyzed by the sensed data analyzer.	Claim 8 is substantially similar and linked to the same abstract idea as representative claims 1, 6 and 10. Claim 8 depends from Claim 7 and recites the additional limitations of “<i>wherein the sensor network intelligence unit comprises:</i> <i>[a] a sensed data analyzer for performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit;</i> <i>[b] an event processor for generating the event including the knowledge contents according to a rule set by the application program and managing the generated event; and</i> <i>[c] a context information manager for sensing and generating the environment condition information, based on the sensed data analyzed by the sensed data analyzer”</i> These additional claim limitations, individually or as an ordered combination, do not change the abstract idea, function(s) or process recited in Claims 6 and/or 7 and recite only broad, generic functional language without specifying how the recited functions are achieved. Claim 8 of the ’232 Patent does not contain an inventive concept such that it does more than claim an abstract idea (or a combination of abstract ideas). Instead, it recites broad and result-based functional language without providing any meaningful explanation of how those functional steps are to be achieved. <i>See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC</i>, 874 F.3d 1329, 1337 (Fed. Cir. 2017) (finding the use of results-based functional language failed to “sufficiently describe how to achieve these results in a non-abstract way”). Claim 8 of the ’232 Patent seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that perform broad and result-based functional language. The generic and/or nonce “structures” that perform the results-based functions recited in the additional limitations of Claim 8 include a “sensed data analyzer,” an “event processor,” and a “context information manager.” According to Claim 8, the “sensed data analyzer,” performs the function(s) of “performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit”; the “event processor,” performs the function(s)
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	of “generating the event including the knowledge contents according to a rule set by the application program and managing the generated event,” and the “context information manager” performs the function(s) of “sensing and generating the environment condition information, based on the sensed data analyzed by the sensed data analyzer.” But Claim 8’s recitation of these generic and/or nonce structures does not transform Claim 8’s broad, functional claiming into patent-eligible subject matter. <i>See Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.</i>, 955 F.3d 1317, 1326 (Fed. Cir. 2020) (finding that recitation of “functional computer components” did not specify how functions are performed or “direct the claim to anything other than [the] abstract idea.”). “Instructing one to ‘apply’ an abstract idea and reciting no more than generic computer elements performing generic computer tasks does not make an abstract idea patent-eligible.” <i>Intellectual Ventures I LLC v. Capital One Bank (USA)</i>, 792 F.3d 1363, 1368 (Fed. Cir. 2015) (citing <i>Alice</i>, 134 S. Ct. at 2359-60); see also <i>Alice</i>, 573 U.S. at 224 (“[W]holly generic computer implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.’” (quoting <i>Mayo</i>, 132 S. Ct. at 1297)). The generic and/or nonce “structures” recited in Claim 8 perform routine and generic processing capabilities typical of sensors and computer-driven software programs. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). <i>See also Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,” and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 8 (and/or in the specification) is functional. <i>See id.</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to how to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 8 of the ’232 Patent, at least based on KAIFI’s apparent interpretation, require nothing other than “off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting
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	the desired information,” the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed by these generic structures. The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants’ Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants’ Invalidity Contentions. Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
9. The ubiquitous sensor network middleware apparatus as recited in claim 8, wherein the service platform management unit comprises: a directory service manager for identifying and searching resources of the sensor network; a service process manager for scheduling and managing an operation order of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program; and	See above analysis for Claim 8, which is incorporated by reference herein. Like Claims 1, 6 and 10, this claim is directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user. Put another way, this claim is directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment. Claim 9 is substantially similar and linked to the same abstract idea as representative claims 1, 6 and 10. Claim 9 depends from Claim 8 and recites the additional limitations of “<i>wherein the service platform management unit comprises:</i> <i>[a] a directory service manager for identifying and searching resources of the sensor network;</i> <i>[b] a service process manager for scheduling and managing an operation order of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program; and</i>

an application program interface for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program.	<i>[c] an application program interface for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program.”</i> These additional claim limitations, individually or as an ordered combination, do not change the abstract idea, function(s) or process recited in Claims 6, 7 and/or 8 and recite only broad, generic functional language without specifying how the recited functions are achieved. To the extent KAIFI argues that Claim 5 adds an additional concept, such as “identifying and searching resources of the sensor network,” such an addition would not render claim 9 any less abstract. Under such an interpretation, the claim would be directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user while searching for and identifying resources of the sensor network, which is itself an abstract idea. The additional limitations of Claim 9 do not render Claim 9 any less abstract. Claim 9 of the ’232 Patent does not contain an inventive concept such that it does more than claim an abstract idea (or a combination of abstract ideas). Instead, it recites broad and result-based functional language without providing any meaningful explanation of how those functional steps are to be achieved. <i>See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC</i>, 874 F.3d 1329, 1337 (Fed. Cir. 2017) (finding the use of results-based functional language failed to “sufficiently describe how to achieve these results in a non-abstract way”). Claim 9 of the ’232 Patent seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that perform broad and result-based functional language. The generic and/or nonce “structures” that perform the results-based functions recited in the additional limitations of Claim 9 include a “directory service manager,” a “service process manager,” and an “application program interface.” According to Claim 9, the “directory service manager,” performs the function(s) of “identifying and searching resources of the sensor network”; the “service process manager,” performs the function(s) of “scheduling and managing
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	an operation order of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program”; and the “application program interface,” performs the function(s) of “providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program.” But Claim 9’s recitation of these generic and/or nonce structures does not transform Claim 9’s broad, functional claiming into patent-eligible subject matter. <i>See Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.</i>, 955 F.3d 1317, 1326 (Fed. Cir. 2020) (finding that recitation of “functional computer components” did not specify how functions are performed or “direct the claim to anything other than [the] abstract idea.”). “Instructing one to ‘apply’ an abstract idea and reciting no more than generic computer elements performing generic computer tasks does not make an abstract idea patent-eligible.” <i>Intellectual Ventures I LLC v. Capital One Bank (USA)</i>, 792 F.3d 1363, 1368 (Fed. Cir. 2015) (citing <i>Alice</i>, 134 S. Ct. at 2359-60); see also <i>Alice</i>, 573 U.S. at 224 (“[W]holly generic computer implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.’” (quoting <i>Mayo</i>, 132 S. Ct. at 1297)). The generic and/or nonce “structures” recited in Claim 9 perform routine and generic processing capabilities typical of sensors and computer-driven software programs. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). <i>See also Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,” and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 9 (and/or in the specification) is functional. <i>See id.</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to how to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea ...’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 9 of the ’232 Patent, at
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	least based on KAIFI’s apparent interpretation, require nothing other than “off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information,” the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed by these generic structures. The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants’ Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants’ Invalidity Contentions. Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
10. A method for generating an information service based on heterogeneous sensor networks in a ubiquitous sensor network middleware apparatus, comprising: extracting sensed data and monitoring a state management of a sensor network, based on the extracted sensed data; performing an analysis operation to clean, classify and integrate the extracted sensed data; extracting object and environment information from the analyzed sensed data, and	Like Claims 1 and 10, this claim is directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user. Put another way, this claim is directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment. See analysis for Claim 1 and 6, above, which are incorporated by reference herein. Claim 10 is substantially similar and linked to the same abstract idea as representative claims 1 and 6. The limitations of Claim 10, individually or as an ordered combination, recite only broad, generic functional language without specifying how the recited functions are achieved. Observing an environment and then providing information related to that environment based on the observation constitutes a method of organizing human activity and an abstract idea. <i>See, e.g., IpLearn, LLC v. K12 Inc.</i>, 76 F. Supp. 3d 525, 533 (D. Del. 2014) (finding abstract claims

generating context aware information based on the extracted object and environment information; generating an event including notification event, alarm, and knowledge contents according to a rule set by an application program; scheduling an operation sequence for providing an information service to the application program; and providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events and context aware information.	“addressed to fundamental human behavior related to instruction” performed by computer structures); <i>FullView, Inc. v. Polycom, Inc.</i>, 485 F. Supp. 3d 1156, 1167 (N.D. Cal. 2020) (agreeing with the district court that “once the abstract idea is removed from the claim, all that is left here is the ‘conventional technology’ of a digital camera, such as image sensors, lenses, circuitry, memory and a processor being used in conventional ways.”). To the extent this abstract idea is considered to be two or more ideas—<i>e.g.</i>, (1) collecting sensed data, and (2) providing information to an application program based on that data—the combination of these abstract ideas does not render Claim 10 any less abstract, <i>see Sensormatic Elecs., LLC v. Wyze Labs, Inc.</i>, 484 F. Supp. 3d 161, 165 (D. Del. 2020), <i>aff’d</i>, No. 2020-2320, 2021 WL 2944838 (Fed. Cir. July 14, 2021) (“Courts often invalidate patents that are directed to a combination of abstract ideas.”) (citing cases); <i>Broadband iTV, Inc. v. Amazon.com, Inc.</i>, No. 6:20-CV-00921-ADA, 2022 WL 4703425, at *14 (“Combing two abstract ideas . . . is not inventive.”); <i>RecogniCorp. LLC v. Nintendo Co.</i>, 855 F.3d 1322, 1327 (Fed. Cir. 2017) (“Adding one abstract idea . . . to another abstract idea . . . does not render the claim non-abstract.”); <i>Consumer 2.0, Inc. v. Tenant Turner, Inc.</i>, 343 F. Supp. 3d 581, 590-91 (E.D. Va. 2018), <i>aff’d</i> 796 F. App’x 752 (Fed. Cir. 2020) (“[T]he mere combination of these abstract processes is insufficient to bring the patent-at-issue out of the realm of the abstract.”) (citing cases). Claim 10 of the ’232 Patent does not contain an inventive concept such that it does more than claim an abstract idea (or a combination of abstract ideas). Instead, it recites broad and result-based functional language. For example, Claim 10 recites “extracting sensed data,” “monitoring a state management of a sensor network, based on the extracted sensed data,” “performing an analysis operation to clean, classify and integrate the extracted sensed data,” “extracting object and environment information from the analyzed sensed data,” “generating context aware information based on the extracted object and environment information,” “generating an event including notification event, alarm, and knowledge contents according to a rule set by an application program,” “scheduling an operation sequence for providing an information service to the application program,” and “providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events
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	and context aware information.” But the ’232 Patent does not provide any meaningful explanation of <i>how</i> those functional steps are to be achieved. <i>See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC</i>, 874 F.3d 1329, 1337 (Fed. Cir. 2017) (finding the use of results-based functional language failed to “sufficiently describe how to achieve these results in a non-abstract way”). Claim 10 of the ’232 Patent seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that are used to perform this broad and result-based functional language. To the extent the preamble is limiting, the generic and/or nonce “structures” that perform the results-based functions recited in Claim 10 include a “ubiquitous sensor network middleware apparatus,” “heterogenous sensor networks,” a “sensor network,” and an “application program.” To the extent the preamble is non-limiting, Claim 10 simply seeks to apply the abstract idea by reciting a method that is not tied to any “structure” at all beyond a generic and/or nonce “sensor network” and “application program.” According to the preamble of Claim 10, the claimed method “generat[es] an information service based on heterogeneous sensor networks in a ubiquitous sensor network middleware apparatus.” Claim 10 then makes passing reference to a “sensor network,” stating that the claimed method comprises “extracting sensed data and monitoring a statement management of a sensor network, based on the extracted sensed data.” The claimed method likewise refers to an “application program,” stating that the claimed method comprises “generating an event including notification event, alarm and knowledge contents according to a rule set by an application program” and stating that the method further comprises “providing the application program with the information service obtained according to the scheduled operation sequence.” But Claim 10’s minimal recitations of these generic and/or nonce structures does not transform Claim 10’s abstract, broad, functional claiming into patent-eligible subject matter. <i>See Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.</i>, 955 F.3d 1317, 1326 (Fed. Cir. 2020) (finding that recitation of “functional computer components” did not specify how functions are performed or “direct the claim to anything other than [the] abstract idea.”). “Instructing one to ‘apply’ an abstract idea and reciting no more than generic computer elements performing generic computer tasks does not make an abstract idea patent-eligible.” <i>Intellectual Ventures I LLC v. Capital One Bank (USA)</i>, 792 F.3d 1363, 1368 (Fed. Cir. 2015) (citing <i>Alice</i>, 134 S. Ct. at 2359-60); see also <i>Alice</i>, 573
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	U.S. at 224 (“[W]holly generic computer implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.’” (quoting <i>Mayo</i>, 132 S. Ct. at 1297)). The generic and/or nonce “structures” recited in Claim 10 perform routine and generic processing capabilities typical of sensors and computer-driven software programs. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). <i>See also Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,” and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 10 (and/or in the specification) is functional. <i>See id.</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to how to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 10 of the ’232 Patent, at least based on KAIFI’s apparent interpretation, require nothing other than “off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information,” the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed by these generic structures. Further, as described in Defendants’ Invalidity Contentions, which are incorporated by reference herein, the Challenged Claims, including Claim 10, recite numerous generic and/or nonce terms that perform various functions recited in the claims, but the claims and specification of the ’232 fail to describe sufficient corresponding structures (or relevant algorithms) capable of actually performing the claimed functions. The only disclosure of relevant structures in the patent suggests that all of the claimed functions can be performed by a general purpose “computer” running “programs [] stored in a computer-readable recording medium that can execute the programs.” ’232 Patent at 8:12-17. As a result, Claim 10 simply applies the abstract idea(s)
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	using generic electronic devices and does not contain an inventive concept such that it does more than claim the ineligible idea itself. Korean patent application No. 2006-0084353, which is incorporated by reference in the '232 Patent, provides no additional structural information or disclosure that would take the subject matter recited in Claim 10 beyond the generic or nonce structures that are recited in the claims. <i>See</i> '232 Patent at 8:17-21; <i>See also</i> Korean patent application No. 2006-0084353. The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants' Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants' Invalidity Contentions. Moreover, the Challenged Claims (including Claim 10) would preempt the broad subject matter of collecting and analyzing information from a network of sensors and providing related information to a user, at least according to KAIFI's apparent interpretation of the claims. This further suggests that the Challenged Claims are directed to an abstract idea and patent-ineligible subject matter. <i>See, e.g., Bancorp Servs., LLC v. Sun Life Assur. Co. of Canada (U.S.)</i>, 687 F.3d 1266, 1280 (Fed. Cir. 2012) (finding that claimed abstract idea would improperly preempt broad subject matter). Further, the subject matter of each of the Challenged Claims (including Claim 10) is tantamount to subject-matter that can be performed by a human actor. <i>See</i> discussion re same as to Claim 1, above. Patents that involve "the use of computers to conserve human resources by automating work otherwise performed through human labor" may be directed at abstract ideas. <i>Enco Sys., Inc. v. DaVincia, LLC</i>, 845 F. App'x 953, 957 (Fed. Cir. 2021) (quotation omitted); <i>see also, e.g., Ubisoft Entertainment, S.A. v. Yousician Oy</i>, 401 F.Supp.3d 644, 649 (finding claims to be directed toward abstract idea of teaching guitar by evaluating a user's performance and generating appropriate exercises to improve that performance and noting that "[a] typical music teacher performs these steps when teaching a musical instrument."), <i>aff'd</i>, 814 Fed. App'x 558,
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	591-592 (“The mini-game generation step is thus no different from the ordinary mental processes of a guitar instructor teaching a student how to play the guitar.”). Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
11. The method as recited in claim 10, wherein the performing an analysis operation to clean, classify and integrate the extracted sensed data analyzes sensed data from a specific single sensor network, or analyzes sensed data from a plurality of sensor networks, or analyzes sensed data from the sensor network in association with predefined legacy data.	See above analysis for Claim 10, which is incorporated by reference herein. Like Claims 1, 6 and 10, this claim is directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user. Put another way, this claim is directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment. Claim 11 is substantially similar and linked to the same abstract idea as representative claims 1, 6 and 10. Claim 11 depends from Claim 10 and recites the additional limitation of “<i>wherein the performing an analysis operation to clean, classify and integrate the extracted sensed data analyzes sensed data from a specific single sensor network, or analyzes sensed data from a plurality of sensor networks, or analyzes sensed data from the sensor network in association with predefined legacy data.</i>” In fact, given this additional limitation’s repeated use of the disjunctive “or,” and its reference to “wherein the performing an analysis operation to clean, classify and integrate the extracted sensed data analyzes sensed data from a specific sensor network,” dependent Claim 11 does not appear to be any more limited in scope than Claim 10, in violation of 35 U.S.C. 112 ¶ 4. In any event, the additional limitation of Claim 11 does not change the abstract idea, function(s) or process recited in Claim 10, and Claim 11 recites only broad, generic functional language without specifying how the recited functions are achieved. For example, it recites that the “performing an analysis operation to clean, classify and integrate the extracted sensed data” (recited in claim 10) may be done by analyzing sensed data from “a specific single sensor network,” “a plurality of sensor networks,” or “in association with predefined legacy data.” But the ’232 Patent does not provide any meaningful explanation of how any such functional analysis

	steps are to be achieved. <i>See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC</i>, 874 F.3d 1329, 1337 (Fed. Cir. 2017) (finding the use of results-based functional language failed to “sufficiently describe how to achieve these results in a non-abstract way”). The additional limitation of Claim 11 also does not specify any structure(s), whether generic or otherwise that are to be utilized when “performing an analysis operation to clean, classify, and integrate the extracted sensed data.” In so doing, Claim 11 simply applies the abstract idea(s) using broad and result-based functional language. Indeed, Claim 11 of the '232 Patent seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that perform broad and result-based functional language. The generic and/or nonce “structures” recited in Claim 11 (via claim 10) perform routine and generic processing capabilities typical of sensors and computer-driven software programs. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). <i>See also Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,” and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 10 (and/or in the specification) is functional. <i>See</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to how to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea ...’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 11 of the '232 Patent, at least based on KAIFI’s apparent interpretation, require nothing other than “off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information,” the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed by these generic structures.
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	The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants’ Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants’ Invalidity Contentions. Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
12. The method as recited in claim 10, wherein the providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events and context aware information provides the information service to the application program only one time, or periodically provides the information service during a request period of the application program, or provides the information service at a specific time point when a requirement from the application program is satisfied.	See above analysis for Claim 10, which is incorporated by reference herein. Like Claims 1, 6 and 10, this claim is directed to the abstract idea of collecting and analyzing information from a sensor network and providing information to a user. Put another way, this claim is directed to the abstract idea of observing an environment and, based on that observation, providing information related to the environment. Claim 12 is substantially similar and linked to the same abstract idea as representative claims 1, 6 and 10. Claim 12 depends from Claim 10 and recites the additional limitation of “<i>wherein the providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events and context aware information provides the information service to the application program only one time, or periodically provides the information service during a request period of the application program, or provides the information service at a specific time point when a requirement from the application program is satisfied.</i>” This additional claim limitation, individually or as an ordered combination, do not change the abstract idea, function(s) or process recited in Claim 10 and recites only broad, generic functional language. Claim 12 of the ’232 Patent does not contain an inventive concept such that it does more than claim an abstract idea (or a combination of abstract ideas). Instead, it recites broad and result-

	based functional language, without specifying how the recited functions are achieved. For example, it recites that the “providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events and context aware information” (recited in claim 10) may be done “only one time,” or “periodically . . . during a request period of the application program,” or “at a specific time point when a requirement from the application program is satisfied.” But the ’232 Patent does not provide any meaningful explanation of how any such method step is to be achieved. <i>See, e.g., Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC</i>, 874 F.3d 1329, 1337 (Fed. Cir. 2017) (finding the use of results-based functional language failed to “sufficiently describe how to achieve these results in a non-abstract way”). The additional limitation of Claim 12 also does not specify any structure(s), whether generic or otherwise that are to be utilized when “providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events and context aware information.” In so doing, Claim 12 simply applies the abstract idea(s) using broad and result-based functional language. Indeed, Claim 12 of the ’232 Patent seeks to apply the abstract idea(s) through the use of generic or nonce electronic devices or purported “structures” that perform broad and result-based functional language. The generic and/or nonce “structures” recited in Claim 12 (via claim 10) perform routine and generic processing capabilities typical of sensors and computer-driven software programs. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). <i>See also Electric Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1353-56 (Fed. Cir. 2016) (noting that “collecting information,” “analyzing information by steps people go through in their minds,” and “merely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation)” are abstract and patent-ineligible subject matter). The description of each of these components in Claim 10 (and/or in the specification) is functional. <i>See</i> at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to how to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms.</i>
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	<i>LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Because the limitations of Claim 12 of the '232 Patent, at least based on KAIFI's apparent interpretation, require nothing other than "off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting the desired information," the claims are directed to abstract ideas. <i>Elec. Power Grp., LLC v. Alstom S.A.</i>, 830 F.3d 1350, 1355 (Fed. Cir. 2016). The claims recite broad and result-based functional language that is performed in the context of these generic structures. The functions and generic structures recited in this claim were all well-known, routine, and conventional in the art, as shown in greater detail in the chart below and as further shown in each of the references listed in Defendants' Invalidity Contentions, provided concurrently herewith, and as charted in the corresponding claim charts submitted with Defendants' Invalidity Contentions. Thus, either "individually" or "as an ordered combination," the elements of this claim do not add enough to "'transform the nature of the claim' into a patent-eligible application." <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
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Pursuant to the Court’s Standing Order Regarding Subject Matter Eligibility Contentions, Amazon provides the following chart identifying a description of the industry at the relevant time in which the Challenged Claims are alleged to be well understood, routine, and conventional, and the factual and legal basis therefore; and a description of how each element of each Challenged Claim, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time, and the legal and factual basis therefor.

Description of Industry, at Relevant Time, in Which the Claim is Well-Understood, Routine, and Conventional, and Basis Therefor
The Challenged Claims of the ’322 Patent cover the system and/or method equivalent of a building inspector monitoring and reporting on the status of a building, or a police officer monitoring the area in and around a suspects house and reporting to headquarters about his observations. The cover “a broad and familiar concept [in the realm of organizing human activity] that is untethered to any specific or concrete way of implementing it.” <i>Affinity Labs of Texas, LLC v. DIRECTV, LLC</i>, 838 F.3d 1253, 1258 (Fed. Cir. 2016). Humans have been observing and analyzing environments and providing information relating to such environments for thousands of years. For example, ancient Egyptians built “nilometers,” structures calibrated to measure the Nile River’s clarity and water level during the annual flood season. Professional nileometer readers would observe and report their data and use it to predict annual harvests, determine tax levels, and set food prices. Nilometers were heterogeneous in their nature and design. For example, some were designed as vertical columns, others as stairways of steps leading down into the Nile, and others were designed as deep wells having a culvert. <i>See, e.g.</i>, HELAINE SELINE, <i>ENCYCLOPAEDIA OF THE HISTORY OF SCIENCE, TECHNOLOGY, AND MEDICINE IN NON-WESTERN CULTURES</i> 1753; <i>see also</i> https://www.ancient-origins.net/artifacts-ancient-technology/nilometer-0013452; https://en.wikipedia.org/wiki/Nilometer#cite_ref-H_1-3; https://archaeology.org/issues/march-april-2023/collection/egypt-thmuis-nilometer/the-ancient-promise-of-water/ Similarly, ancient Rome employed water managers to oversee their complex networks of aqueducts, reservoirs, and other hydraulic systems. These individuals would use their senses and various tools observe water levels, water flow, and other data relating to the water supply, and would calculate water discharge rates and distribution patters to ensure proper functioning of the empire’s water supply. These individuals would report their information to the <i>Curator Aquarum</i>, the head Roman official responsible for managing Rome’s water supply. <i>See, e.g.</i>, https://www.ox.ac.uk/news/2023-08-04-what-did-romans-do-us-aqueducts-and-art-roman-water-management-0 ; https://en.wikipedia.org/wiki/Curator_Aquarum

Humans have continued monitoring and analyzing specific environments in order to provide or report useful information relating to those environments.

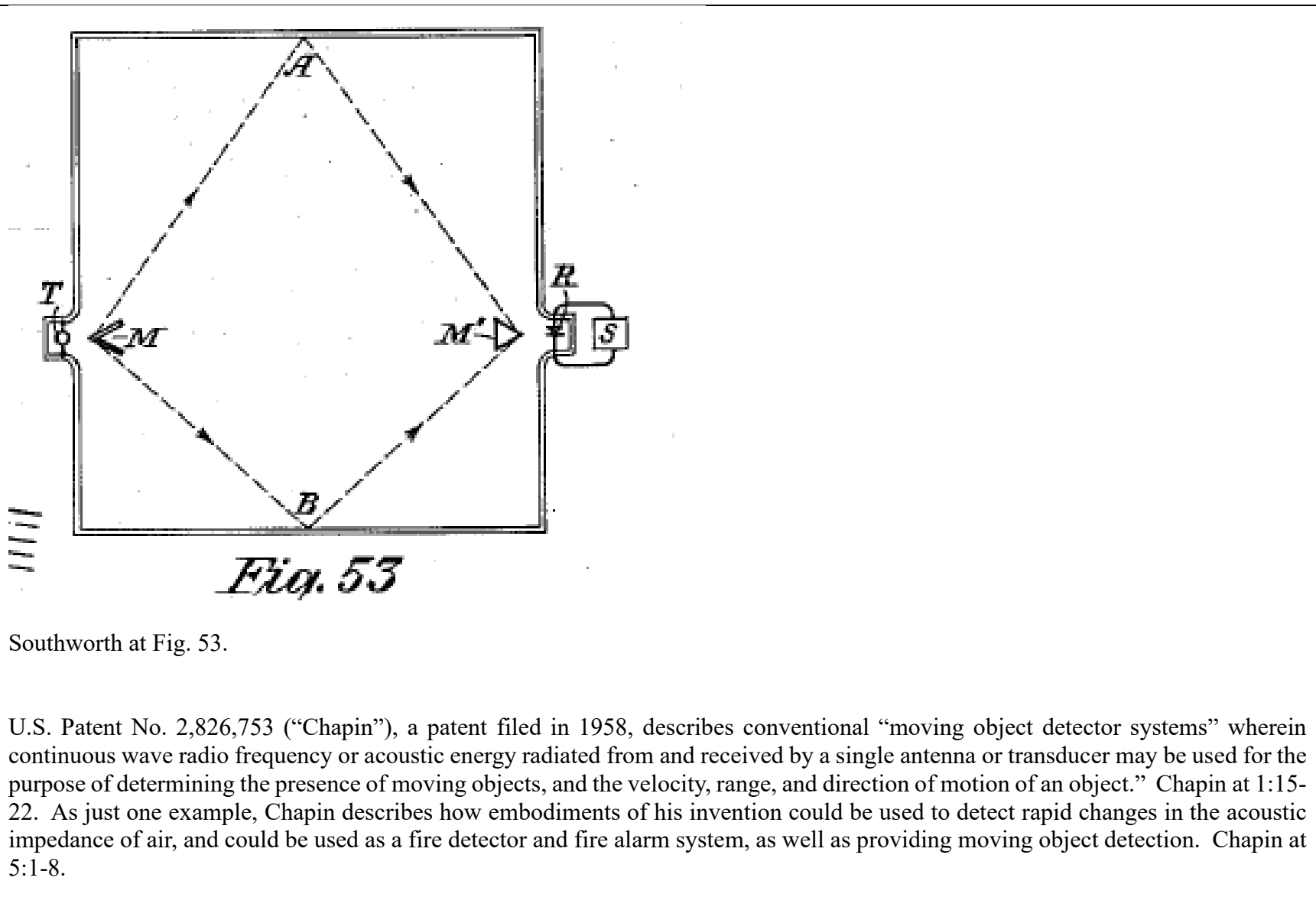
Using sensors, including heterogeneous networks of sensors, to collect information about environments was a logical progression of this basic human activity. And doing so was well-known long before KAIFI's claimed priority date for the '232 Patent of December 26, 2006.¹ Using sensor networks to monitor and provide information relating to an environment has been known for decades.

As one example, beginning in the 19th century, people began using canaries in coal mines as living sensors to detect toxic gases. Miners would observe the birds' behavior to receive early warning of potentially dangerous air conditions, and they would sound alarms if potentially dangerous situations arose. *See, e.g.,* <https://www.smithsonianmag.com/smart-news/what-happened-canary-coal-mine-story-how-real-life-animal-helper-became-just-metaphor-180961570/>; <https://history.alberta.ca/energyheritage/coal/the-early-development-of-the-coal-industry-1874-1914/early-methods-and-technology/canaries-in-the-coal-mine.aspx>

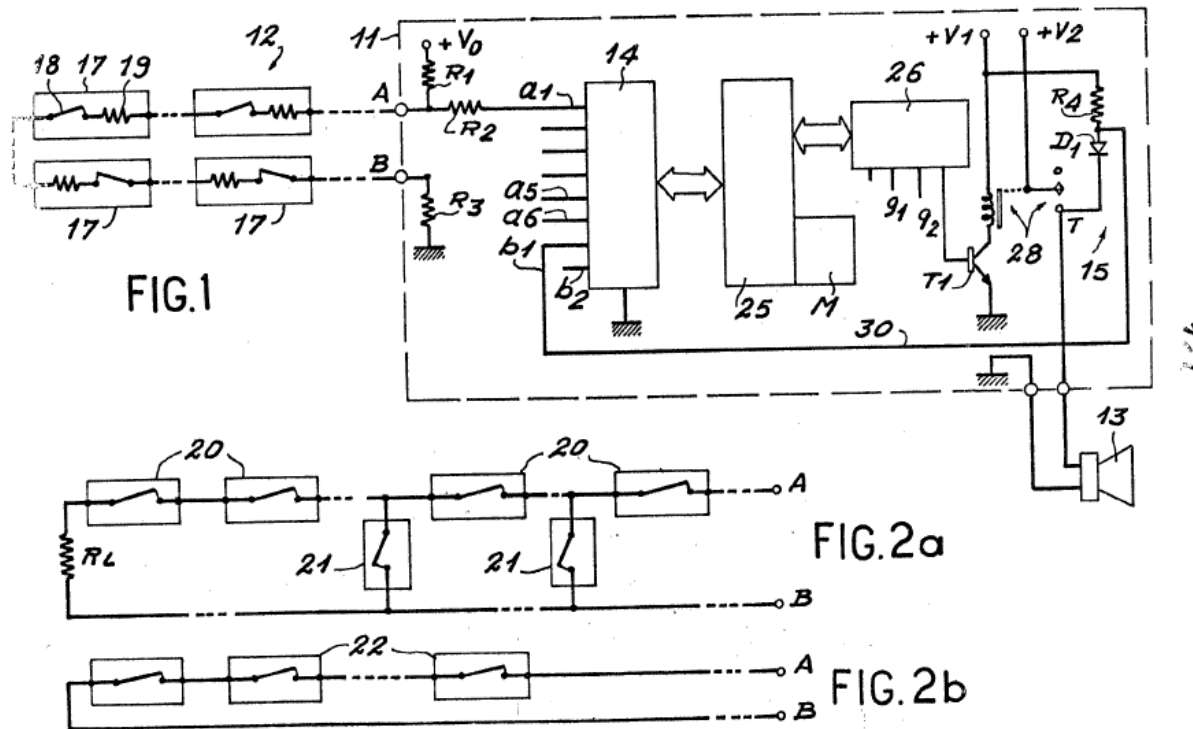
As sensor technology continued to develop, humans continued to use them to observe and collect useful information.

For example, a patent filed in 1934, U.S. Patent No. 2,206,923 ("Southworth") describes an alarm system that could be used to detect a burglar entry by using short wave radio signals. This system utilized a transmitter T, along with mirrors to direct the path of the radio signals. If one of the paths of the radio signals was interrupted by an intruder, the receiver "R" would detect the disturbance to the signal and an alarm signal would be given the device labeled "S," which was operably connected to the receiver. *See*

¹ *See* KAIFI Initial Infringement Contentions, § V (identifying a priority date of December 26, 2006 for the '232 Patent pursuant to P.R. 3-1(e)). In a recent supplemental interrogatory response dated January 8, 2025, KAIFI indicated, without any supporting facts or evidence, that "KAIFI believes that . . . the '232 Patent *may have* an earlier invention date of at least May 2005, for which it is currently investigating and may require further third-party discovery." This KAIFI supplemental interrogatory response provides no statement or factual support for purported diligence on the part of the patentee during any of the intervening period between May 2005 and December 26, 2006. KAIFI has since also sought to amend its P.R. 3-1(e) statement. To the extent KAIFI is permitted to amend its invalidity contentions, or is permitted to advance a claimed priority date earlier than December 26, 2006, the Defendants expressly reserve the right to serve amended invalidity and ineligibility contentions to address any such priority claim made by KAIFI.



As another example, a French patent publication from 1982 – FR 2528601 to Roger Amar (“Amar”) – describes methods and systems for creating anti-theft alarm systems. This publication describes conventional anti-theft sensor networks at the time, which comprised various sensor types and numbers of sensors, depending on the requirements of the site to be monitored. For example, Amar described how, for some sites, it may be necessary to combine volumetric monitoring sensors (radar) and electromechanical sensors, such as contact sensors, placed in desired locations, such as doors and windows. *See id.* at 1:16-26. As Amar describes, such systems would have a “central unit” that was intended to be connected to one or more of the different types of sensors. *Id.* at 1:27-28. Amar described the desire to make these different device inputs compatible with each other. *Id.* at 1: 28-2:2. Amar described his invention in 1982 as developing “a method of monitoring a site to be protected such as, for example, a building, in which at least one sensor and, preferably, several are arranged. Sensors connected together so as to constitute at least one network forming an electric dipole connected by its two terminals to a central monitoring unit, characterized in that it consists in measuring the original state of said dipole seen from its two terminals, in memorizing said original state and in subsequently comparing the current state of said dipole to said stored original state and to trigger a signaling procedure if the difference between these two states exceeds a predetermined value. *Id.* at 2:27-37. Amar also stated in 1982 that his invention covered any installation for monitoring a site to be protected, such as a building, that comprised a central monitoring unit to which at least one dipole formed by a sensor or a network of sensors connected to each other and at least one signaling or alarm means capable of being actuated in response to a significant change in the state of said dipole, characterized in that said central unit comprises a means for measuring the state of said dipole, a memory capable of storing a particular state or original state of said dipole and a comparator means arranged between said memory and said measuring means to determine the difference, and said signaling means would trigger when the difference exceeded a predetermined value. *See id.* at 3:1-14. Amar Figs. 1 and 2 show representations of such installations in a monitoring site to be protected:



Amar at Figs. 1-2.

As wired sensors continued to develop, so too did wired sensor network technologies and middleware used to support them and provide information to downstream software applications.

As one example, in the 1950s, the United States military developed the Sound Surveillance System (SOSUS), which used submerged acoustic hydrophone sensors distributed in the Atlantic and Pacific oceans to detect and track Soviet submarines. SOSUS is still used by the National Oceanographic and Atmospheric Administration for monitoring seismic and animal activity in the ocean. See Chong et al., "Sensor Networks: Evolution, Opportunities, and Challenges," Proceedings of the IEEE, Vol. 91, No. 8 (Aug. 2003).

As wireless sensor became available and thereby allowed for wireless networks of sensors, this development unlocked additional opportunities for remote monitoring of new environments and activities, even in inhospitable environments without access to wired power and communications. An early wireless project was developed by the United States Defense Advanced Research Projects Agency (DARPA), which initiated a Distributed Sensor Network (DSN) program in the 1980s. As described in the literature:

Technology components for a DSN were identified in a Distributed Sensor Nets workshop in 1978 [4]. These included sensors (acoustic), communication (high-level protocols that link processes working on a common application in a resource-sharing network [5]), processing techniques and algorithms (including self-location algorithms for sensors), and distributed software (dynamically modifiable distributed systems and language design).

Id. at 1248.

As sensor networks grew more complex, middleware became more important for managing these systems. In particular, (1) middleware emerged as a software layer between the application layer and lower layers, providing abstraction from network details, and (2) middleware aimed to hide the complexities of underlying heterogeneous hardware, technologies, and networks from applications and developers.

Various academic and industrial initiatives in the 1990s and early 2000s focused on developing middleware for sensor networks, including:

- UCLA Wireless Integrated Network Sensors (1993)
- University of California at Berkeley PicoRadio program (1999)
- μ Adaptive Multi-domain Power Aware Sensors program at MIT (2000)
- NASA Sensor Webs (2001)
- ZigBee Alliance (2002)
- Center for Embedded Network Sensing (2002).

WSNs and supporting middleware continued to develop in the early 2000s. As Hadim et al. stated in their Jan. 2006 article:

Wireless Sensor Networks are emerging as a suitable new tool for a spectrum of new applications in recent years [12]. They are easily deployable at a large scale, low power, inexpensive and self-organizing. These unique characteristics make them advantageous over traditional networks. Sensor networks applications were originally motivated by military applications such as target detection, surveillance of enemy activities in a battlefield environment and

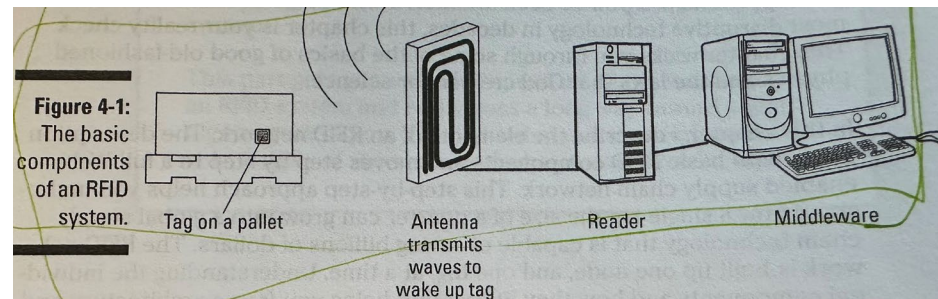
counterterrorism; however, their many advantages over traditional networks resulted in the development of many other potential applications [10] that range from infrastructure security to industrial sensing. Some examples are: environment and habitat monitoring, health applications, home automation, traffic control, etc.

Hadim et al., *Middleware for Wireless Sensor Networks: A Survey*. Proc. Of the First Int'l Conference on Communication Software and Middleware (COMSWARE 2006), IEEE, New Delhi, India, Jan. 2006.

As of January 2006, various middleware solutions for use with WSN had already been developed, including: Mate, Magnet, Impala, EnviroTrack, Milan, Cougar, SINA, and DSWare. *See id.* at 2-5.

Overlapping with the development of both wired and wireless sensor networks, radio frequency identification (RFID) networks and related middleware technologies were likewise being developed. The subject matter of the Challenged Claims would have been well understood, routine, and conventional, at least to those working in the radio frequency identification (RFID) industry.

The book titled *RFID for Dummies*, written in 2004 and published in early 2005, provides a good overview of the RFID industry by the early 2000s. Sweeney, *RFID for Dummies*, (2005) (“Dummies”); *see Dummies* at 28 (“This book was written in 2004 and released in early 2005.”). RFID refers to the set of technologies that use radio waves for identifying objects or people. As of 2005, as shown below, a basic RFID system included: (1) a transponder (more commonly called a tag), programmed with information that uniquely identified itself; (2) a transceiver (more commonly called a reader) to “read” tag information via an exchange of radio signals and pass tag information onward; and (3) a reader interface layer, or middleware, that acted as a conduit between the RFID hardware elements and the client’s application software systems. *Dummies* at 77-78.



Dummies at Fig. 4-1.

The first RFID system was developed by the British during World War II. Dummies at 82. They used it to rapidly discriminate between their own returning aircraft and enemy aircraft. *Id.* British fighters were equipped with tags that replied to an interrogation signal with a special “I am a friend” code. *Id.* In the late 1960s, the need for security and safety of nuclear materials drove further development of RFID tagging, such as electronic article surveillance (EAS). *Id.* In 1977, Los Alamos Scientific Laboratories (LASL) transferred the RFID technology that had been developed in government labs to the public sector. Commercial RFID applications beyond EAS began to appear in the early 1980s: railroad freight car tagging, the tagging of cattle and rare dog breeds, automobile immobilizers, keyless entry systems, and automatic highway toll collection. *Id.*

In the early 1990s, the DoD began using active RFID to tag shipping containers moving throughout the DoD supply chain. Dummies at 44. The private sector soon realized that they could follow this model. *Id.* In 1999, a consortium of large retailers and consumer packaged good (CPG) manufacturers, along with the DoD, funded MIT’s Auto-ID center. *Id.* The goal of this center was to make RFID a viable technology in the supply chain and enable an “internet of things.” *Id.*

By June 2003, Wal-Mart had announced to the world that it was requiring all suppliers to put RFID tags on every case and pallet that entered a Wal-Mart distribution center or store. Dummies at 16. The Department of Defense announced a similar mandate in October 2003, releasing a policy paper spelling out a passive RFID program for all 40,000 DoD suppliers. *Id.* at 16-17.

As of 2004, Dummies explained that the vision behind radio frequency identification was the “creation of an ‘Internet of Objects.’” Dummies at 10. “In such a highly connected network, devices dispersed through an enterprise can talk to each other – providing real-time information about the location, contents, destination, and ambient conditions of assets.” *Id.* Dummies predicted that “RFID and a global protocol [would] enable a world we couldn’t even have imagined at the turn of this century.” Dummies at 29. It noted that RFID readers would “come in two flavors: (1) cheap, dumb readers that only read tags and send the data up to a central collection point, which filters and smooths the data for analysis; and (2) more expensive, higher-processing, smart RFID readers that can perform intelligent operations beyond simple communication.” *Id.* It explained that the cheap and small readers would enable a “convergence of parallel technologies you may have already heard of,” including “**Dust nodes:** Tiny sensor networks that can do everything from predict disasters like tsunamis to recognize chemical warfare, and can be deployed by dropping them from a plane by the thousands, like crop dusters,” and “**Sensors:** To monitor everything from temperature to vibration to nuclear levels attach to this networked world.”

While focused on RFID, Dummies made clear that sensors that communicated by radio—including sensors that sensed environmental information such as temperature—were well known and likely to be integrated with RFID technology for more intelligent systems and business decision-making. *See, e.g.* Dummies at 39 (“Some active tags can also be made to monitor sensor inputs, such as the temperature or movement”). Dummies included a section on “MEMS, the kissing cousin of RFID,” which explained:

A MEMS device connects the physical world with the electronic world. MEMS not only identify a component or product (like an RFID tag), but also take measurements from or make changes in the physical world. MEMS devices come in several functional types:

- **Sensors:** *Sensors* detect a condition in the physical world and convert it to an electrical signal or data element (for example, a tire with a MEMS device embedded can report its pressure back to the car).
- **Actuators:** *Actuators* convert an electrical signal into an action in the physical environment, such as a garage door opener.
- **Combination:** Sensors and actuators can be combined in devices such as thermostats.

MEMS devices typically use RF transmissions to communicate information to other systems or devices.

Dummies at 41.

Dummies explained that “many people’s vision of an internet of smart objects will be realized as all of these technologies unite in a manner that is pure machine-to-machine communication. ... Information about everything from temperature and movement to cost and ownership will be distributed in these complex systems.” *Id.* at 29. Dummies explained the vision:

George Jetson never had it as good as we will a decade from now: When you wake up in the morning, your armoire will notify you of your perfect wardrobe, based not only on fashion coordination, but also on what’s on your calendar for the day. Then you’ll get in your car and head back to sleep because it will use sensors and GPS to drive you to the office. If a tire gets low on air, it will route the car to the service station for a quick fix and get you back on your way. If the interstate is backed up, your car will route you to a different path and get you there on time. Then, when you stop at the store on the way home, you’ll simply fill your cart up with items and walk out the front door, and a sign will let you know that you’ve just purchased \$38.76 worth of Pop-Tarts, toothpaste, SPAM, and Cheez Whiz. When you get home, your refrigerator will display a warning light that your arteries are going to be blocked quicker than brushing your Newfoundland in the tub will block your drain if you don’t change your diet. If it does get that far, we may want Jane Jetson to stop this crazy thing called technology. But, needless to say, the future could be a very cool place that is wildly efficient, thanks to RFID.

Id. at 29-30.

As of the early 2000s, it was abundantly clear that effective middleware was a part of this vision. As Dummies reported, “[a]n RFID network will produce much more data in real time than your current system Fortunately, the major enterprise resource planning (ERP), warehouse management (WMS), and inventory software vendors are designing and building new additions to their

existing applications specifically for RFID. ... Already, companies like SAP, Manugistics, Oracle, and others have built RFID middleware and modules that their existing clients will be able to benefit from.” Dummies at 27. Elsewhere, Dummies explained:

One of the keys to handling the billions of reads that happen in a typical warehouse is to have specialty *middleware* (filtering software) for the readers. The data created by an RFID needs to be filtered and smoothed before it is useful for any application. The special filtering and smoothing software is called a *reader interface*, *EPC information server*, or a *Savant*. The reader interface is the key to making the data volume manageable and the information useful. (I go over the various middleware options in detail in Chapter 11.)

The middleware enables you to use RFID with existing applications, such as warehouse management systems (WMS), enterprise resource planning (ERP) suites, or inventory management packages. The good news is that the leading software companies are all developing middleware modules specifically designed for RFID.

Dummies at 61. The goal of an RFID system, as explained by Dummies, was to be able to process a *lot* of information, from a *lot* of tags:

Imagine this: The use of a single tag, no larger than a book of matches, is multiplied millions of times over within a global supply chain, which creates a peer-to-peer network that shares data in real time across a limitless number of boundaries. The image of the single millimeter-sized chip quickly expands to comprise a warehouse; a company; and industry; and a world of rapidly changing, automatically updated, real-time information. From that tiny chip blossoms the power to know where every object is at all times in a global network. Pretty cool, huh?

Dummies at 81.

For that reason, Dummies reported that “vendors [we]re flocking to the RFID middleware market, which [was] riddled with mandate-driven user companies whose RFID budgets [were] increasing.” Dummies at 208. “RFID middleware vendors [were] crawling out of the woodwork.” *Id.*

Finally, as of the early 2000s, it was well-understood that the purpose of such a middleware was to provide some form of the information collected by the distributed RFID system to an application later, which would in turn be provided to a user. *See* claim limitation 1[e], below; *see also* Dummies at 211 (“One of the key reasons for the hubbub around RFID is that it gives you visibility into what’s going on across all points in your supply chain....” *Id.* at 211.

Dummies made clear that a goal of sensor networks at the time was that they be heterogenous, not just in the types of frequencies they communicated via, but also in the type of information they collected. Dummies emphasized that “the power of RFID is unleashed when a multiplicity of single nodes are bonded together sharing real-time, specific data.” Dummies at 28. It noted that a goal for cheap and small RFID readers was to create “[t]iny sensor networks that can do everything from predict disasters like tsunamis to recognize chemical warfare, and can be deployed by dropping them from a plane by the thousands, like crop dusters.” Dummies at 29. It further explained that “Sensors,” with cheap and small RFID readers, can be used “to monitor everything from temperature to vibration to nuclear levels attached to this networked world.” *Id.* As Dummies explained, “an Internet of things was the vision.” Dummies at 45. In other words, the vision was to make a standardized identification system that would allow all different types of things, including sensors, to communicate. It is thus clear that it was well-understood, routine, and conventional to think of sensor networks being made up of different types of environmental sensing, including temperature, vibration, humidity, chemical presence, and anything else that might be used to monitor for tsunamis and chemical warfare. As a result, a POSITA would have understood the vision and teachings of the RFID field and middleware relating to the same would apply equally to the fields of wireless and/or wired sensor networks as well. Dummies is far from the only reference from around the time of KAIFI’s claimed priority date to show the close relationship and common structural vision and paradigms in the fields of RFID and wired and/or wireless sensor networks.

Additional examples, include SeWon Oh et al, “RFID-based Middleware System for Providing Ubiquitous Information Service” (2005), which states, *inter alia*:

“RFID has been expected to overcome the limits of either barcode or smart cards, then to be one of the essential components for Ubiquitous Sensor Network (USN) infrastructure in the future. And USN infrastructure is hoped to lead the synchronization of the physical objects and on-line information.”

Id. at 461.

Similarly, Smith et al., “RFID-Based Techniques for Human-Activity Detection” (2005) discloses a system for ubiquitous computing in which human activities could be tracked with Wireless Identification and Sensing Platform (WISP) devices, blurring the lines between RFID and wireless sensors. As Smith et al. describe:

“While both approaches modify and extend conventional RFID, neither requires batteries in the objects being tracked. WISPs deliver the motion-detection capabilities of active sensor beacons in the same battery-free form factor as RFID tags, using line-powered readers.”

Id. at 40.

Elham Mousavidin, “RFID Technology: An Update, ISRC Technology Briefing Series (2004), provides similar descriptions of the state of the art of RFID systems as of 2004, including how RFID systems at that time would utilize middleware to extract meaningful object and environment data from voluminous data streams and provide important information to downstream applications. For example, Dr. Mousavidin states:

The paper first provides an overview of RFID technology and summarizes some of its recent applications. It then discusses the issues of standardization, middleware, and privacy.

1. What is RFID?

RFID refers to the set of technologies that use radio waves for identifying objects or people. A basic RFID system includes a radio frequency tag, a combination of a microchip and an antenna, which is also called a transponder, and a reader. The reader sends out electromagnetic waves, which are received by the tag’s antenna. The tag sends the data, which is usually a serial number stored on the tag, by transmitting radio waves back to the reader. Figure 1 depicts a schematic view of the components of an RFID system.

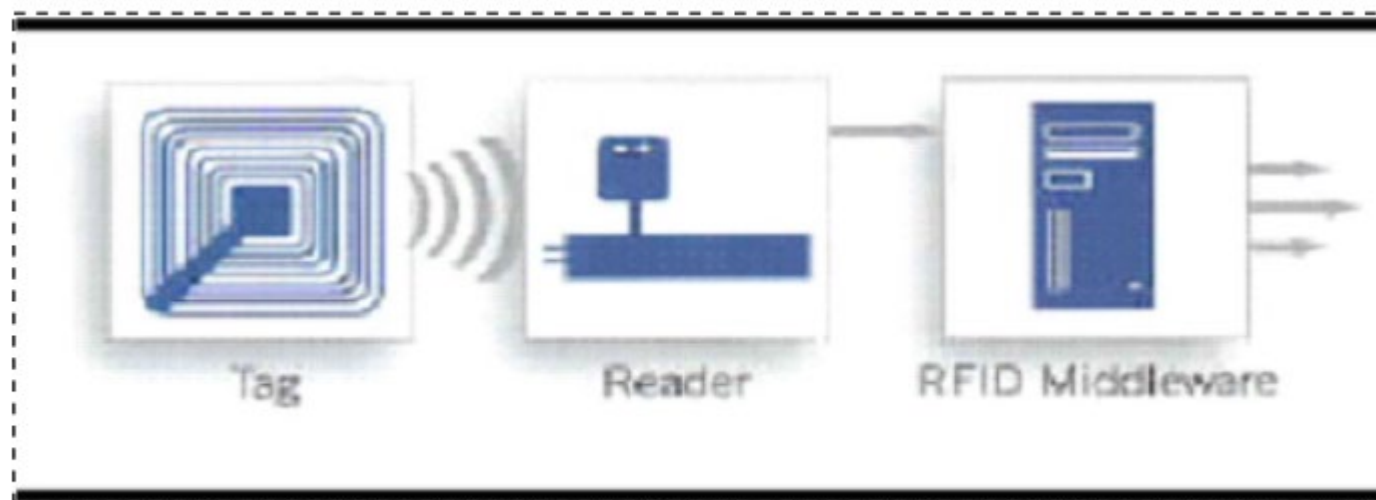


Figure 1. Components of an RFID system (Source: Manhattan Associates)

In specifically discussing existing middleware for RFID systems, Dr. Mousavidin stated:

3.2 Middleware

Mandates from firms such as Wal-Mart, Target, and the US Department of Defense have created urgency for companies to adopt RFID technology. However, the real benefit of using RFID technology for tracking items stems from the intelligent use of data, retrieved from RFID-tagged products and supplied to business applications. As Nicholas Evans Global Lead, Emerging Technology, for BearingPoint's public services sector, states:

"Many companies are struggling to understand how RFID data can be turned into information that they can use to cut costs and drive efficiencies. The key is likely to be found not in the RFID readers or in the enterprise systems, but in the middle—more precisely, in the middleware" [Evans, 2004]

Therefore, having efficient middleware for incorporating the data to business processes is vital to these companies. The set of applications between RFID tags and business information systems is called middleware. Middleware links the information, retrieved from the tag, to the product information that is saved in the databases. For example, in a supply chain, the middleware processes the

information received from the tag and transfers it to company's supply chain execution (SCE) software. SCE then updates inventory data. [Chokshi et al. 2003; Wolfe 2003].

Efficient middleware is able to handle the following tasks [Walker 2004]:

- Reader coordination: Users can configure and monitor the readers by issuing commands to the readers through middleware.
- Data smoothing and filtration: Middleware is responsible for ensuring data accuracy and
- preventing data redundancy. Middleware handles large volume of data by providing a buffer for filtering and aggregation of data.
- Data routing and integration: Middleware controls the distribution of information to different business applications.
- Process management: Middleware monitors data based on business rules. Middleware can alert systems in the case of, for example, unauthorized product movement or unexpected inventory level. Middleware sends notifications (about low or out-of-stock level of inventory) to inventory management system.

Id. at 12-13.

As of 2004, significant efforts were underway toward developing global standards for RFID technology. At the forefront of this movement was the EPCglobal Network, which was developed by the Auto-ID Center at MIT. As Dr. Mousavidin stated:

The Auto-ID Center focused on developing global standards for RFID technology. The EPCglobal NetworkTM

(please refer to section 3.1.3.1.1) was initially developed by the Auto-ID Center at the Massachusetts Institute of Technology (MIT) with the cooperation of five leading research universities. The Auto-ID Center encouraged companies to sponsor development of EPCglobal NetworkTM. Table 2 includes a list of Auto-ID Center sponsors. By participating in the center's meetings and activities, these companies have been able to influence the evolution of RFID standards. The Auto-ID Center officially closed its research activities on October 31, 2003. EPCglobal along with Auto-ID Labs took over the Center's responsibilities and have continued to work towards the development of RFID standards. [EPCglobal, 2004b; Wolfe et al., 2003]

Board of Oversees		Technology Board	
<u>Abbott Laboratories</u>	<u>Ahold, IS</u>	<u>Accenture</u>	<u>ACNielsen</u>
<u>Best Buy Corporation</u>	<u>Canon Inc</u>	<u>Alien Technology</u>	<u>Avery Dennison</u>
<u>Carrefour</u>	<u>Chep International</u>	<u>AWID</u>	<u>British Telecommunications (BT)</u>
<u>Coca-Cola</u>	<u>CVS</u>	<u>Cash's</u>	<u>Catalina Marketing Corp</u>
<u>Dai Nippon Printing Co., Ltd</u>	<u>Department of Defense</u>	<u>Checkpoint Systems, Inc.</u>	<u>ConnecTerra, Inc.</u>
<u>Ean International</u>	<u>Eastman Kodak</u>	<u>Ember Corporation</u>	<u>Embrace Networks</u>
<u>The Gillette Company</u>	<u>Home Depot</u>	<u>Flexchip AG</u>	<u>Flint Ink</u>
<u>International Paper</u>	<u>Johnson & Johnson</u>	<u>GEA Consulting</u>	<u>GlobeRanger</u>
<u>Kellogg's Corporation</u>	<u>Kimberely Clark Corporation</u>	<u>IBM Business Consulting Services</u>	<u>IDTechEx</u>
<u>Kraft</u>	<u>Lowes Companies, Inc.</u>	<u>Impinj, Inc.</u>	<u>Information Resources, Inc.</u>
<u>Metro</u>	<u>Mitsui & Co. Ltd.</u>	<u>Intel</u>	<u>Intermec</u>
<u>Nestle</u>	<u>Pepsi</u>	<u>InvensysPLC</u>	<u>Ishida Co. Ltd</u>
<u>PepsiCo</u>	<u>Pfizer</u>	<u>KSW Microtec AG</u>	<u>Manhattan Associates</u>
<u>Philip Morris USA</u>	<u>Proctor and Gamble Company</u>	<u>Markem Corp.</u>	<u>Matrics</u>
<u>Sara Lee</u>	<u>Smurfit-Stone Container Corp</u>	<u>Morningside Technologies</u>	<u>NCR Corporation</u>
<u>Target Corp.</u>	<u>Tesco Stores Ltd.</u>	<u>Nihon Unisys Ltd.</u>	<u>Nippon Telegraph and Telephone Corporation</u>
<u>Uniform Code Council</u>	<u>Toppan Printing</u>	<u>NTT Comware</u>	<u>OATSystems</u>
<u>United States Postal Service</u>	<u>Unilever</u>	<u>Omron Corporation</u>	<u>Philips Semiconductors</u>
<u>Visy Industries</u>	<u>UPS</u>	<u>Rafsec</u>	<u>RF Saw Components</u>
<u>Wegmans Food Markets, Inc.</u>	<u>Wal-Mart Stores, Inc.</u>	<u>SAMSYS</u>	<u>SAP</u>
<u>Yuen Foong Yu Paper Mfg. Co., LTD.</u>	<u>Westvaco</u>	<u>Savi Technology</u>	<u>Sensitech</u>
		<u>Sensormatic Electronics Corp</u>	<u>Siemens Dematic Corp.</u>
		<u>STMicroelectronics</u>	<u>Sun Microsystems</u>
		<u>Symbol Technologies</u>	<u>TAGSYS</u>
		<u>ThingMagic</u>	<u>Toppan Forms</u>
		<u>Toray International, Inc.</u>	<u>Vizional Technologies</u>
		<u>Zebra Technologies Corporation</u>	

Table 2. Auto-ID center Sponsors (Source: The Auto-ID center)

The Auto-ID center developed Savant, a software technology for providing middleware between RFID readers and downstream applications and databases. As described by Dr. Mousavidin:

Savant, is an enterprise software technology developed to provide middleware (refer to section 3.2) between RFID reader and databases. Savant sits between tag readers and enterprise applications in order to manage the vast amount of information retrieved from the tags. Savant manages and moves information in a way that does not overload existing networks. Savant has a hierarchical architecture that directs the flow of data by gathering, storing, and acting on information and communicating with other Savants. In a Savant system, lower level Savants process, filter and direct information to the higher level ones and, consequently, massive flow of information and network traffic is reduced. Figure 7 shows a schematic view of Savant system

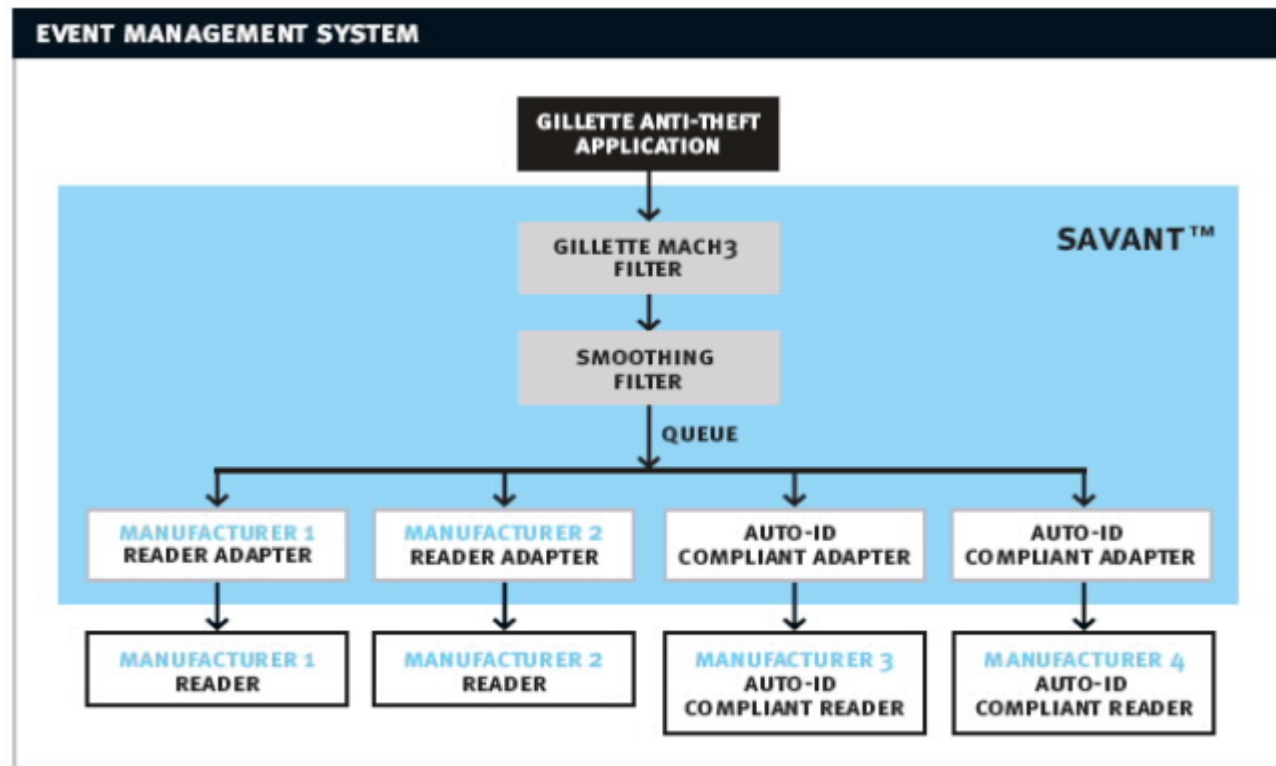


Figure 7. Savant System (Source: The Auto-ID Center)

As of KAIFI's claimed priority date, Savant middleware would clean, classify, and integrate data (to the extent the meaning of those terms can be understood from the patent, and KAIFI's apparent interpretation thereof in its infringement contentions. Given the often noisy and error-prone nature of raw RFID data, cleaning RFID data was an important aspect of any RFID middleware. Further, Savant middleware would organize and filter RFID data, allowing applications to receive specific subsets of data based on readers, tags, or other criteria.

As described by Floerkemeier in 2005, RFID middleware such as Savant played the role of acquiring raw RFID data, filtering that data, and distributing the filtered data for use by applications.

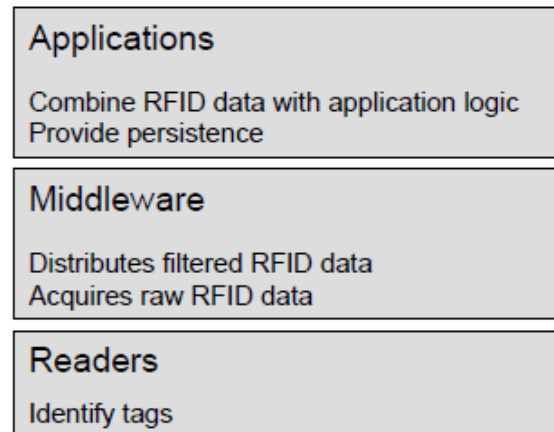


Figure 1: Overview of functional components in an RFID system. The reader identifies tags using radio-frequency. The middleware acquires these raw tag reads, filters and delivers them to applications, where the RFID data are combined with application logic.

Floerkemeier et al., RFID Middleware Design – Addressing Application Requirements and RFID Constraints at 1.

Data filtering and aggregation. Common to all applications that make use of the captured data is the desire to receive filtered and aggregated RFID events rather than raw streams of RFID data. Different applications are however interested in a different subset of the total data captured based on the reader and the tag involved. Since RFID permits the identification at the instance-level rather than at the class-level, the fine-grained RFID data need to be aggregated into summaries for applications that cannot deal with the increased granularity.

Id. at 2. Savant further acted as an intermediary between RFID readers and applications, integrating data from multiple readers and providing a unified interface for applications to access RFID information observed by readers and sensors. *See, e.g., id.*

An article published January 2006 by Feng Bo et al., titled “Study of RFID Middleware for Distributed Large-Scale Systems,” (“Feng 2006”) further shows that the claimed concepts and limitations of the ’232 Patent were well-known, routine, and conventional in the RFID field as of KAIFI’s claimed priority date for the ’232 Patent.

Feng describes a middleware framework that filters, correlates, and aggregates operations based on predefined rules and turn raw RFID data into high-level information suitable to the needs of applications. *See, e.g.:* Feng at 2754-55:

Using

filter, correlate, and aggregate operations based on predefined rule and case, the data management engine turns the raw RFID data into high-level information suitable to the needs of the applications. Furthermore, the middleware

Feng at 2754-55.

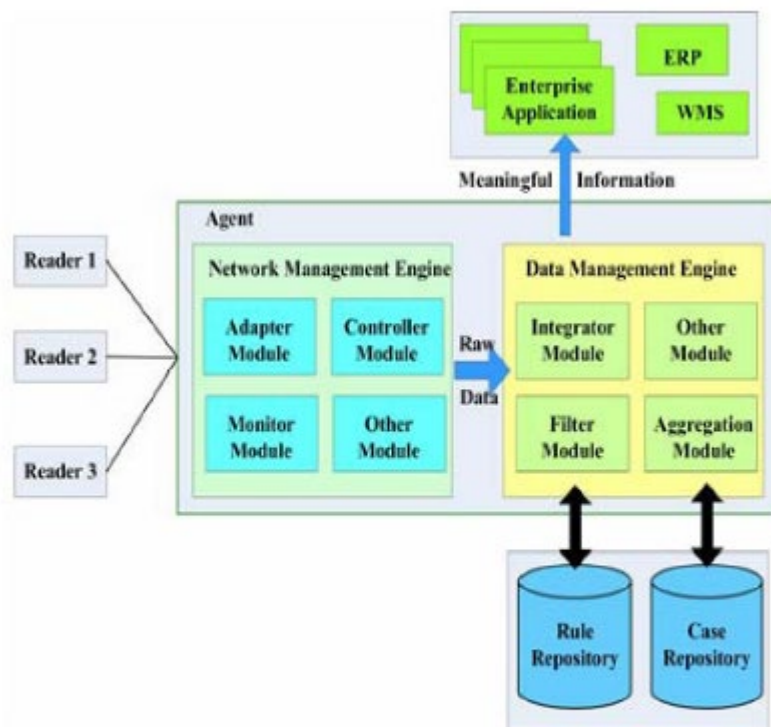


Figure 2. The RFID middleware framework.

Feng describes the existing state of the RFID industry, stating, inter alia:

Radio frequency identification (RFID) is a contact-less, without line-of-sight, low-power and low-cost wireless communication technology that can be used for automatic identification and data collection. Some people

Id. at 2754. As Feng describes, it was typical for large, internet-scale RFID networks to employ heterogeneous sensor and sensor nodes, *see, e.g.*:

Heterogeneity: The Internet-scale RFID network may span multiply groups or organizations. It is no longer legitimate to assume a common environment. The situation is further complicated by differing standards of RFID around the world. This requires the middleware to provide a transparent access to RFID network for high-level applications that no need to care about the details of the low-level readers.

Id. at 2755.

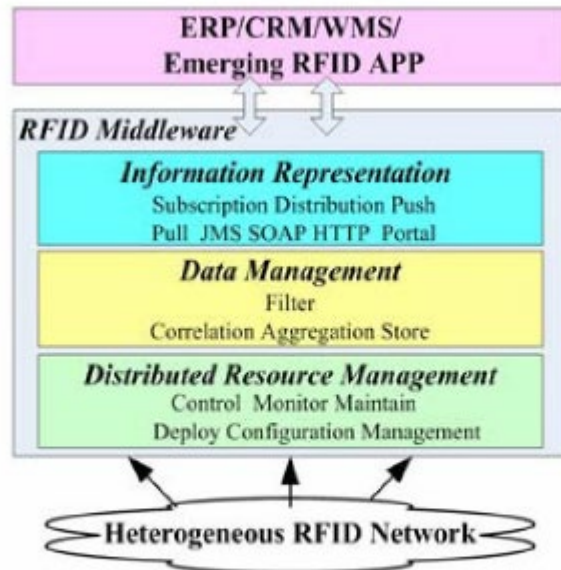


Figure 1. Three layered middleware architecture.

Feng at Fig. 1.

Feng describes an advantage of RFID systems being that it can capture “massive volumes of data” in real-time, and that meaningful knowledge can be abstracted from the huge volumes of RFID data. *See id.* at 2755:

2.2. RFID Data Management

The adoption of RFID is not just for automatic capturing massive volumes of data. The big advantage of RFID is its real-time and meaningful knowledge abstracted from the huge volumes of raw RFID data. For achieving this

As described by Feng, it was well-known, routine, and conventional that RFID data would be sent in “message form” and middleware would be used to analyze and process the raw data and extract important information that would be useful to a downstream application program:

Turn Raw RFID Data to Meaningful Information: The data collected by the RFID reader is a common triplet like < TagID, ReaderId, Timestamp >, which is not suitable for the requirements of applications. Thus, a middleware is needed to drill down into raw data and to extract implicit information which can satisfy the application level needs, so accurate appropriate business decision can be made.

Feng at 2756.

As described by Feng, it was also well-known, routine and conventional to use middleware to monitor the resources and/or state of the sensor network(s):

Distributed Resource Management Layer:

This layer provides enhanced services for the other layers to improve the performance and efficiency of the Internet-scale RFID network. Within this layer, specialized protocol for reader communication and mechanisms specific to monitor, manage, and maintain the RFID network resources are implemented and made available through a unified set of APIs to the other layers. According to this layer, when a new specific reader or function is added to this layer, it will be available to the other layers without requiring changes in the other layers.

Feng 2006 at 2756.

In the late 1990s and early 2000s, the basic paradigm of sensor network → middleware → application program was heartily adopted in a number of fields. As one example, the literature of the time is replete with examples relating to structural “health monitoring” for structures such as buildings and bridges. In so doing, sensor networks and middleware took over the role previously performed by inspectors and other actors of monitoring and measuring characteristics of such a structure, analyzing the available data, and then reporting relevant findings and information.

For example, the 2003 article by Elgamal et al. titled “Health Monitoring for Civil Infrastructure” shows that, by 2003 it was well-known, routine and conventional to use sensor networks to obtain data relating to structural soundness of buildings or bridges, along with middleware used to help process and analyze the sensor data and provide useful information to downstream application programs and users.

ABSTRACT: Internet technologies are increasingly facilitating real-time monitoring of Bridges and Highways. The advances in wireless communications for instance, are allowing practical deployment for large extended systems. Sensor data, including video signals, can be used for long-term condition assessment, traffic-load regulation, emergency response, and seismic safety applications. Computer-based automated signal-analysis algorithms routinely process the incoming data and determine anomalies based on pre-defined response thresholds. Upon authentication, appropriate action may be authorized for maintenance, early warning, and/or emergency response. In such a strategy, data from thousands of sensors can be analyzed with real-time and long-term assessment and decision-making implications. Addressing the above, a flexible

Elgamal et al. at Abstract.

As another example, Tsetsos describes the use heterogeneous sensors to monitor and acquire data in a healthcare environment, with middleware being used to process and analyze sensor data and provide useful information, including alerts, warnings, or instructions healthcare monitoring. For example, Tsetsos describes:

Scenario A - *Agy, a 3G mobile user, wants to monitor the healthcare (physical and biological state) of her grandmother, Sophie. For that purpose she orders her Mobile Network Operator (MNO) to install a full health-sensing system in Sophie's environment (house and body). Such system monitors her heart-pulse rate, body temperature, periodically takes photographs from the rooms and detects falls. Thus, Agy can periodically check Sophie's state and ensure that she faces no problem. In case of an emergency situation she will be notified through the Multimedia Messaging Service (MMS) push functionality provided by the MNO.*

Tsetsos at 3.

Another article, Yoneki et al. "A Survey of Wireless Sensor Network Technologies: Research Trends and Middleware's Role" (2005), describes the many known and conventional use-cases for such technology:

1. INTRODUCTION

The need to monitor and measure various physical phenomena (e.g. temperature, fluid levels, vibration, strain, humidity, acidity, pumps, generators to manufacturing lines, aviation, building maintenance and so forth) is common to many areas including structural engineering, agriculture and forestry, healthcare, logistics and transportation, and military applications. Wired sensor networks have long been used to support such environments and, until recently, wireless sensors have been used only when a wired infrastructure is infeasible, such as in remote and hostile locations. But the cost of installing, terminating, testing, maintaining, trouble-shooting, and upgrading a wired network makes wireless systems potentially attractive alternatives for general scenarios.

Recent advances in technology have made possible the production of intelligent, autonomous, and energy efficient sensors that can be deployed in large numbers to form self organizing and self healing WSNs in a geographical area.

Id. at 3.

The 2004 article by Li et al. titled “Event Detection Services Using Data Service Middleware in Distributed Sensor Networks” (“Li 2004”) further show that it was known and conventional in the art to use middleware to analyze sensor data and feed useful information relating to the same to applications.

Li et al. discusses the Real-Time Event Detection Service using Data Service Middleware (DSWare) for sensor networks, focusing on data-centric and group-based services. As stated in the article, DSWare addresses the unreliability of individual sensor reports, the correlation among sensor observations, and the real-time nature of events. Li et al. describe the use of confidence functions based on data semantics, which help in partial detection of critical events and differentiation between actual events and false alarms.

Li et al. describe the conventional software architecture for sensor networks, comprising in this case the sensor MAC layer, network layer, DSWare middleware, and an application that receives relevant information from the middleware:

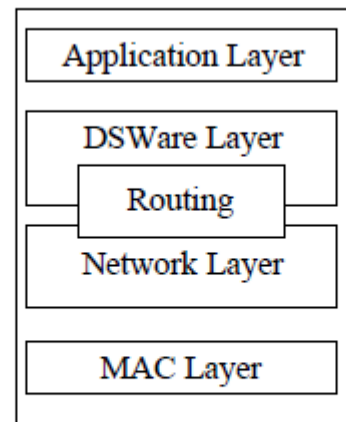


Fig. 1. Software Architecture in Sensor Networks

Li et al. at Fig. 2 show that it was known, routine and conventional to use middleware such as DSWare to take in raw sensor data, use the middleware to detect events and other useful information, and then convey relevant information to the application as required by the application. The application would commonly be configured to subscribe to relevant types of information provided by the middleware:

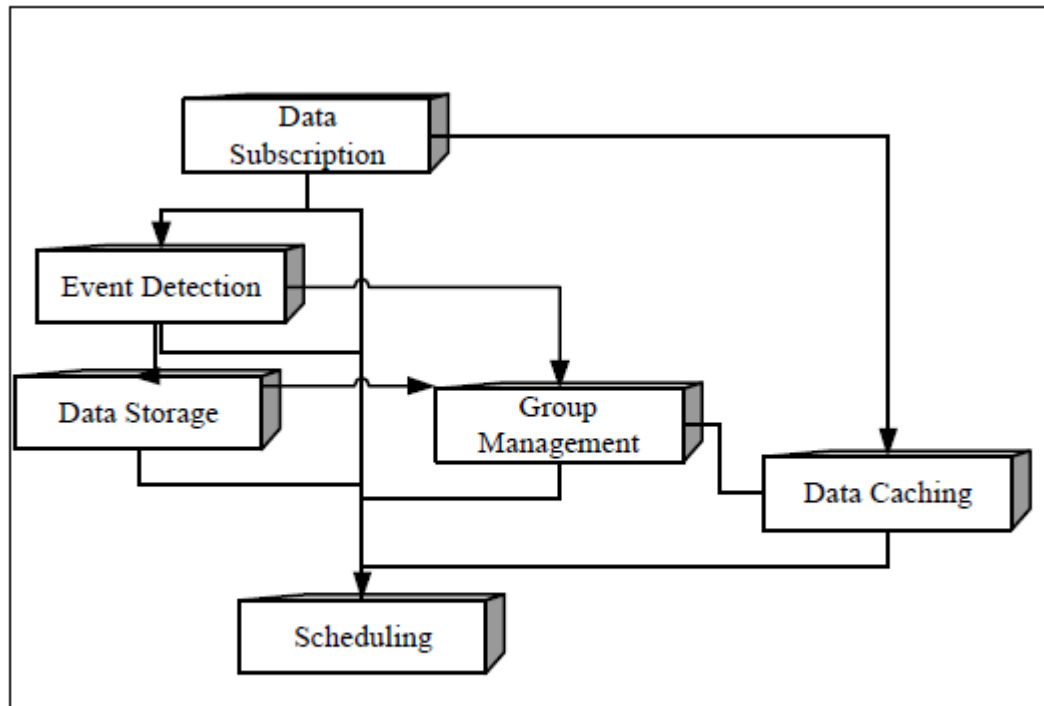


Fig. 2. Framework of DSWare

In Li et al 2004, DSWare is a middleware layer, which like all conventional middleware at the time provides data service abstraction, enhancing power-awareness and real-time-awareness of routing protocols. The architecture of DSWare includes components like data subscription, event detection, data storage, group management, data caching, and scheduling. *See id.* at 2.

Li et al. 2004 shows that heterogenous sensor networks were well-known, routine, and conventional. For example, Li et al. 2004 describes using different sensors for measuring temperature, light, and acoustic data. *See id.* at 8. As described by Li et al. 2004, sensor can be formed based on task requirements and can be dynamic or stable, depending on the task, such as temperature measurement or vehicle tracking.

Li et al. 2004 describes Event Detection, which involves pre-registering events according to application needs, with a detailed protocol discussed in a later section. *See, e.g., id.* at 6.

Event Detection Services in DSWare include concepts like event hierarchy, confidence, and time semantics, with events categorized as atomic or compound. Atomic events refer to events that can be determined merely based on an observation of a sensor, such as high temperature events. Compound events, by contrast are inferred from detections of other atomic or compound events. For example, explosion events are given as an example of an event that can be inferred from high-temperature, light and acoustic events. *See id* at 8.

Li et al 2004 also discloses the idea of using DSWare middleware to calculate confidence functions assess the likelihood of event occurrence based on sub-event detection, using factors like importance, reliability, and historical data.

Li et al. 2004 makes clear that it was routine and conventional for sensor networks to collect data in real time. It describes using Real-Time Semantics to ensure timely event reporting, with sub-events having specific validity intervals and a time window for aggregating node reports. *See, e.g., id.* at 7, 9-11.

Li et al. 2004 make clear that it was routine and conventional for sensor networks to send data in message form. For example, it notes that “Wireless media and unpredictable environment in which a sensor network exists make both the loss of messages and failures of nodes common.” *Id.* at 9; *see also, e.g. id.* at Fig. 4:

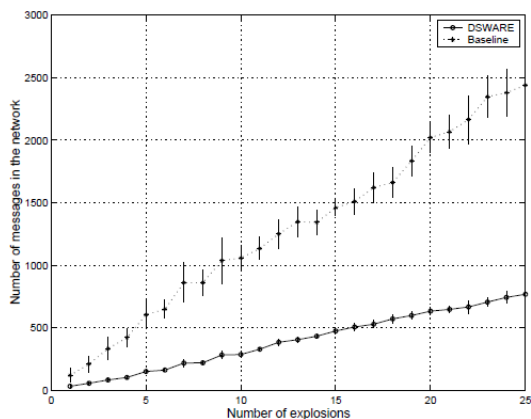


Fig. 4. Comparison of Communication Cost

Fig 4 is the comparison between real-time event services (denoted by the DSWARE curve in the figure) and the Baseline on the number of messages transmitted in the network. From the figure, we can see that the number of

As described by Li et al. 2004, the event detection process involves several steps: determining the current phase, checking sub-events, calculating confidence, and reporting based on a confidence threshold. The implementation uses SQL-like language for event registration and cancellation, providing a simple interface but with potential parsing overhead. *See, e.g., id.* at 8-12.

Further, DSWare was capable of performing spatial and temporal resolutions on events, which was important for distinguishing between repeated reports of the same event and different occurrences, as required by some applications. *Id.* at 12.

U.S. Patent application Publication No. 2005/0222811 (“Jakobson”) was filed in April 2005 and published in October 2005. JAKOBSON (2005). Jakobson demonstrates that by April 2005, it was well-known, routine and conventional to user sensor networks to collect environmental data and to use middleware to process that data to provide events and other useful information relating to the observed environment to an application program.

As Jakobson describes, it was known that “A domain may be instrumented with sensors, probes, surveillance equipment, monitoring apparatus, management apparatus, and other means by which to monitor and report the characteristics of a domain. Hereafter, the term “sensors” is used to refer to one or more of these means of monitoring a domain.” Jakobson at [0009].

Jakobson describes using middleware to process sensed information and pass the results along to the application. For example:

Jakobson’s FIG. 6 illustrates “a system for managing a domain.” Jakobson, [0143].

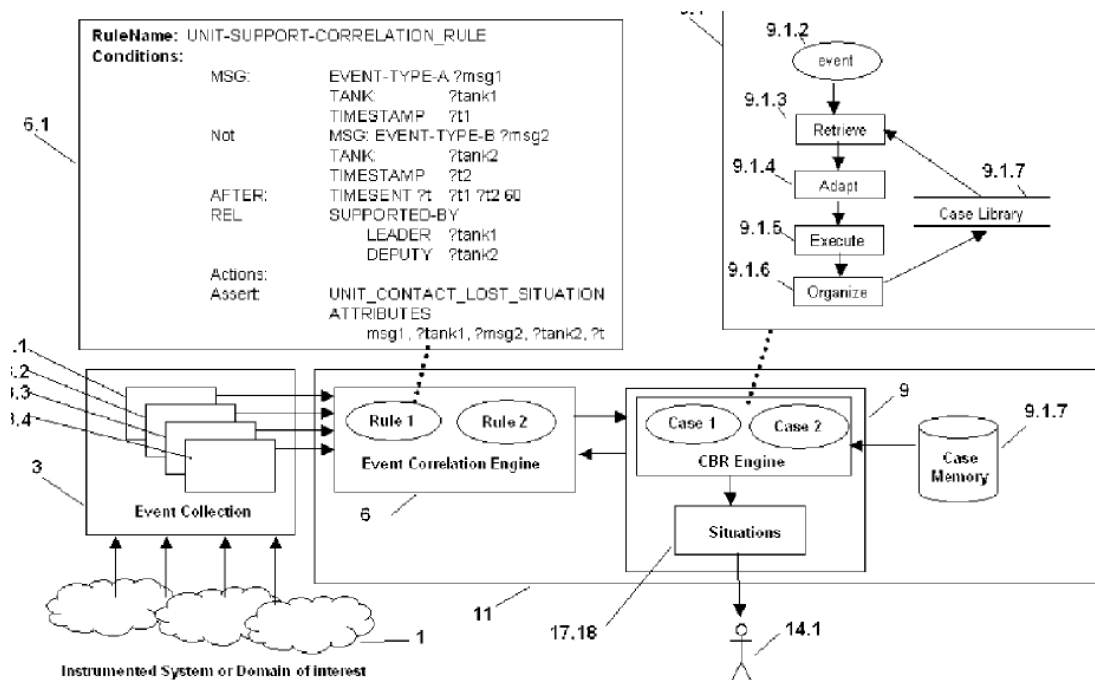


Fig. 6

And Jakobson Fig. 7 similarly illustrates a system “For realizing SBM [situation-based management] using middleware services”:

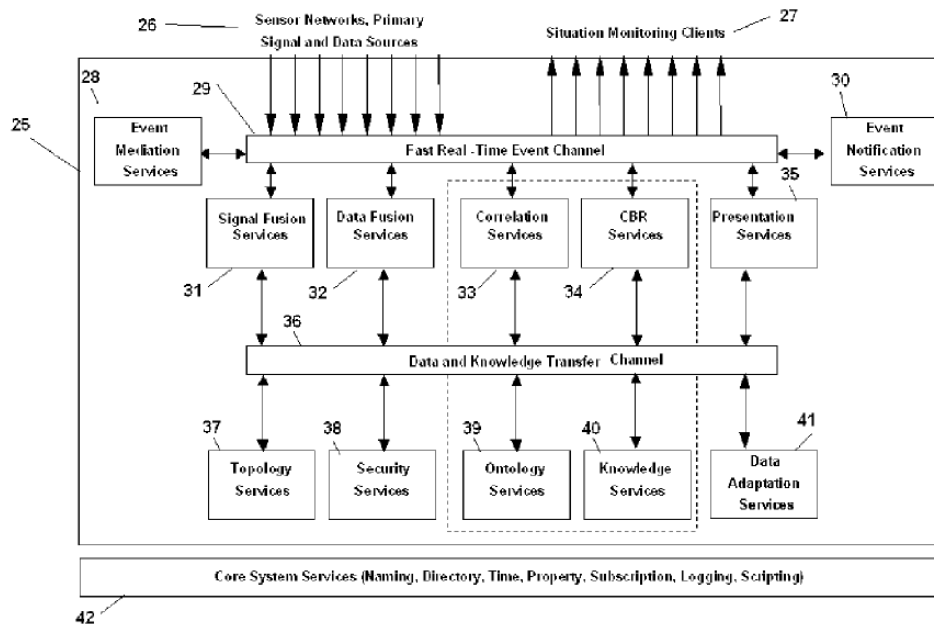


Fig. 7

As was commonplace, Jakobson explained that heterogeneous sensors were supported by such middleware. *See, e.g.,* Jakobson [0014],. *See also, e.g.,* Jakobson [0010]:

Some sensors may produce signals characterizing one or more properties of the domain, such as waveforms representing audio, pressure, or temperature.

Jakobson, [0010].

As was well-understood, routine, and conventional, the output of such middleware was provided to an application program and ultimately a user, with the middleware extracting relevant data regarding objects or the environment. For example, this is clear from Fig. 4 and the related description:

FIG. 4. shows that the situation viewer 14 may be a human observer 14.1, an information system 14.2, or a user interface 14.3. A human observer 14.1 **may be provided situations, situation reports, extracts of situations,**

abstracts or summaries of situations, or descriptions of situations through communications channel 12 such as a user interface, an instant message, an email, and a voice, image, or video input system. An information system 14.2 may interface to situation-based management 11 through various means for distributed information systems to exchange information such as messages, remote procedure calls, and shared databases. An information system 14.2 may be provided a situation, situation report, an extract of a situation, an abstract or summary of a situation or a description of a situation from situation-based management 11 by methods such as polling, subscription, retrieval, or function call. The situation, situation report, extract of a situation, abstract or summary of a situation, or description of a situation may be converted to a different format prior to or during the step of providing it to the information system 14.2.

Jakobson, [0178].

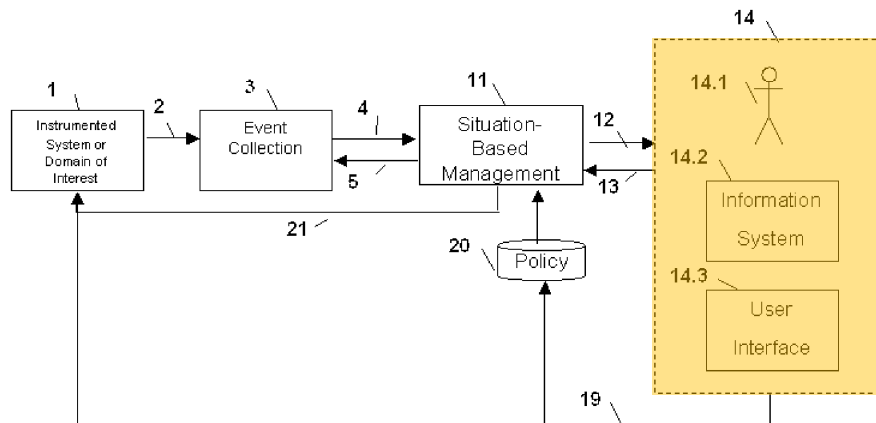


Fig. 4

Jakobson, FIG. 4

Jakobson also described various “fusion services” performed by the middleware, as it fulfilled its routine, conventional, and well-known role of analyzing and processing the data obtained by the sensor networks. For example, *see* Jakobson at Fig. 7 and related text:

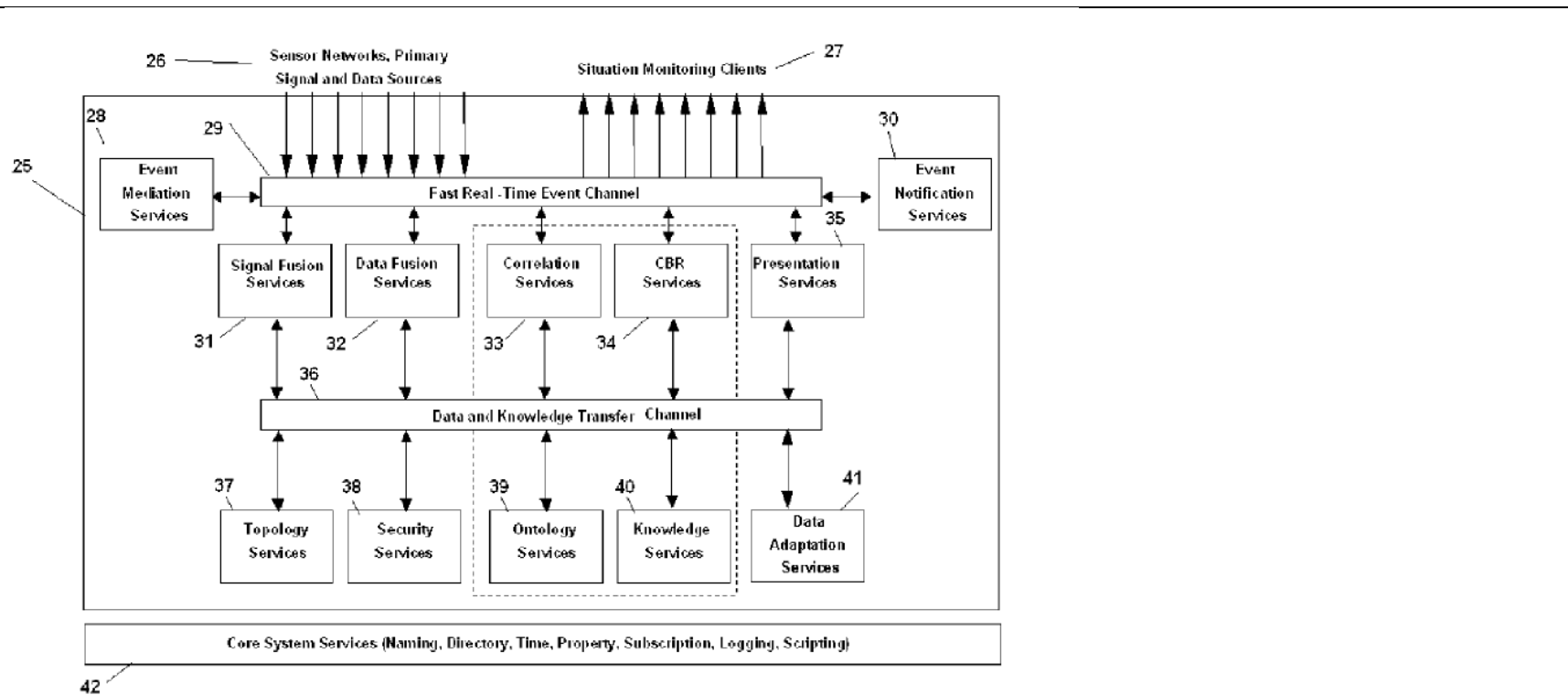


Fig. 7

As Jakobson makes clear, such “fusion services,” including “signal fusion” and “data fusion” services were well-known, routine, and conventional. For example, Jakobson states:

The methods of Signal fusion and data fusion are described in many Sources, and are known to those familiar with the art.

Jakobson [0184].

As another example, Jakobson describes that that data fusion operations include “filtering, translating, cleansing, aliasing,

aggregating, and converting to a uniform representation.” Jakobson, [0013]. Jakobson’s event correlation service “**extracts the essential properties of the events** collected by event collection 3.” Jakobson, [0175].

Jakobson explains that the event filtering rule involves discarding events that do not fall within a set of “predefined legitimate values”:

Event filtering (2) is the most widely used operation to reduce the number of events. If some parameter $p(a)$ of event a , e.g., priority, type, location, time stamp, etc., does not fall into the set of predefined legitimate values H , **then event a is simply discarded** or provided to a log file. The decision to **filter event a out or not is based solely on the specific characteristics of event a** . In more sophisticated cases, set H could be dynamic and depend on user-specified criteria or criteria calculated by the system.

Jakobson, [0187].

Similarly, Jakobson explains that the event correlation operations includes assigning values to events based on severity:

Event escalation (5) **assigns a higher value to some parameter $p(a)$ of event a , usually the severity, depending on the operational context**, e.g., the number of occurrences of the event.

Jakobson, [0188].

And Jakobson also describes how event correlation combines the events (integrates the message) to infer new events:

In yet a third embodiment, Event Correlation 6 may perform a “pre-processor, decision maker, and event correlation” function in which the **total collection of events known by Event Correlation 6 are combined to infer a new event** or a new quality of an event.

Jakobson, [0307].

After performing these (and various other) data processing steps, Jakobson describes that the middleware would perform its well-known, routine, and conventional task of generating useful information for the application program, such as generating events. For example, Jakobson describes an event correlation service that creates higher-level events based on lower-level events (e.g., sensor measurements) received from the sensor and data fusion modules:

Event correlation is the process of inferring a new event or a new quality of an event from one or more existing events. A new event may alternatively be referred to as an inferred event, a fused event, a correlated event, or

a synthetic event. For example, one object of the event correlation engine in situation-based management is to **reduce a collection of events to a root-cause or a high-level inferred synthetic event**. “Event correlation” will be used interchangeably with “event correlator” where the context is understood.

Jakobson, [0019]. As another example, Jakobson discloses creating events based on an incoming event (sensed data) exceeding a threshold:

The events 15.1-15.7 contain observations from the domain. These observations may be measurements such as event 15.2. These observations may be sensory oriented such as event 15.5. Events may contain modality such as **“it is suspect that sensor 123 exceeded threshold.”**

Jakobson, [0176].

In addition, Jakobson describes middleware that provides relevant information to an application program, as was well-known, routine and conventional at the time. For example, Jakobson discloses providing a “situation viewer” (highlighted) which could be a “user interface 14.3” (*application program*) which provides a user information about the situation reported by the sensors in the form of a situation report:

FIG. 4. shows that the **situation viewer 14** may be a human observer 14.1, an information system 14.2, **or a user interface 14.3**. **A human observer 14.1 may be provided situations, situation reports, extracts of situations, abstracts or summaries of situations, or descriptions of situations through communications channel 12 such as a user interface, an instant message, an email, and a voice, image, or video input system.** An information system 14.2 may interface to situation-based management 11 through various means for distributed information systems to exchange information such as messages, remote procedure calls, and shared databases. An information system 14.2 may be provided a situation, situation report, an extract of a situation, an abstract or summary of a situation or a description of a situation from situation-based management 11 by methods such as polling, subscription, retrieval, or function call.

Jakobson, [0178].

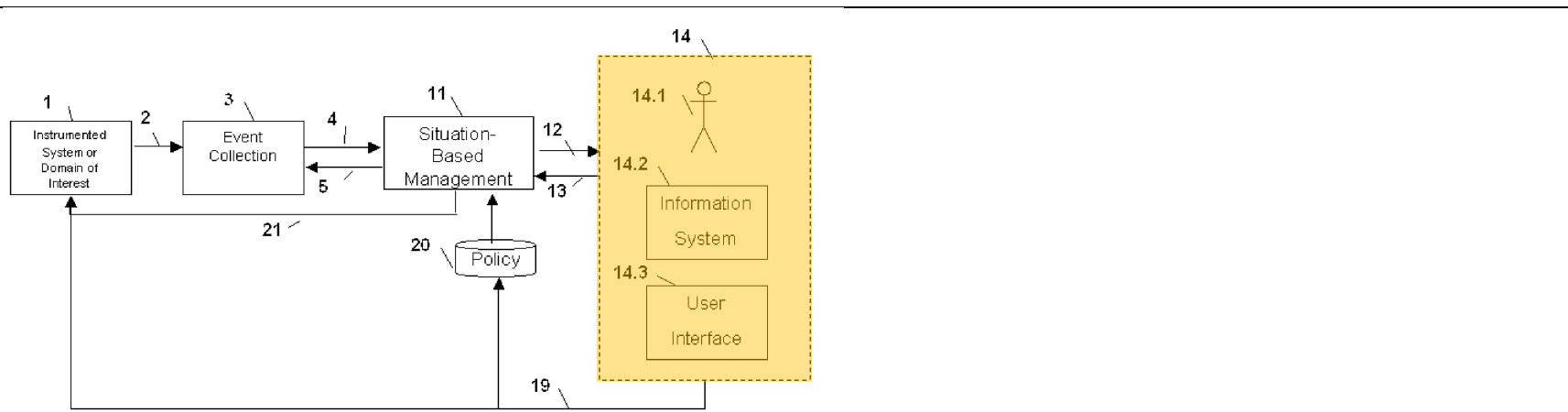


Fig. 4

Jakobson, FIG. 4

Jakobson explains that this information (e.g., situation reports) is viewable via a user interface (14.3), and that the user can interact and respond to this information:

In FIG. 4, the user interface 14.3 provides at least one modality by which **situations, situation reports, extracts of situations, descriptions of situations, and events are presented**. User interface modalities include visual, textual, tactile, and auditory. There may be various means to **control the presentation such as a keyboard, a pointing device, or voice input**.

Jakobson, [0179].

The February 2005 article by Katsiri et al, titled “Toward Commercial Wireless Sensor Networks: Business and Technology Architecture” (“Katsiri 2005”) demonstrates that by February 2005, it was well-known, routine and conventional to use sensor networks to collect environmental data and to process it with middleware to provide events and other useful information to applications.

Katsiri 2005 describes a framework called SCAFOS, which provides powerful tools for inferring abstract knowledge from low-level, concrete knowledge, verifying its correctness, and then estimating likelihood of other knowledge.

Katsiri shows that it was well-known to use heterogeneous networks of sensors to observe an environment. For example, Katsiri states:

“Another issue of sensor-driven systems is that these typically consist of several heterogeneous components that differ significantly in terms of the properties of the instrumenting technology, e.g., the accuracy of the location system, the number of users that are known in the domain and the specific topology of the domain. This has a huge impact on application development.” Katsiri at 21.

Katsiri makes clear that it was commonplace to use such sensors to collect data, but that middleware was needed to help parse this data and provide meaningful information to downstream application programs. For example, Katsiri states:

“However, primitive events, especially those arising from sensors, e.g., that a user is at position (x, y, z), are too low-level to be meaningful to applications. Existing models for creating higher-level, more meaningful events, from low-level events, are insufficient to capture the user’s intuition about abstract system state. Furthermore, there is a strong need for user-centered application development, without undue programming overhead. Applications need to be created dynamically and remain functional independently of the distributed nature and heterogeneity of sensor-driven systems, even while the user is mobile. Both issues combined necessitate an alternative model for developing applications in a real-time, distributed sensor-driven environment such as Sentient Computing.” Katsiri at Abstract.

Katsiri describes the SCAFOS middleware framework, which is focused on providing context-awareness in distributed sensor-driven systems, such that the system can detect, interpret, and respond to the user’s local environment. *See, e.g.*, Katsiri 2005 at 22. The same framework also provides knowledge contents and events, an activity which was well-understood, routine and conventional at the time. *See, e.g.*:

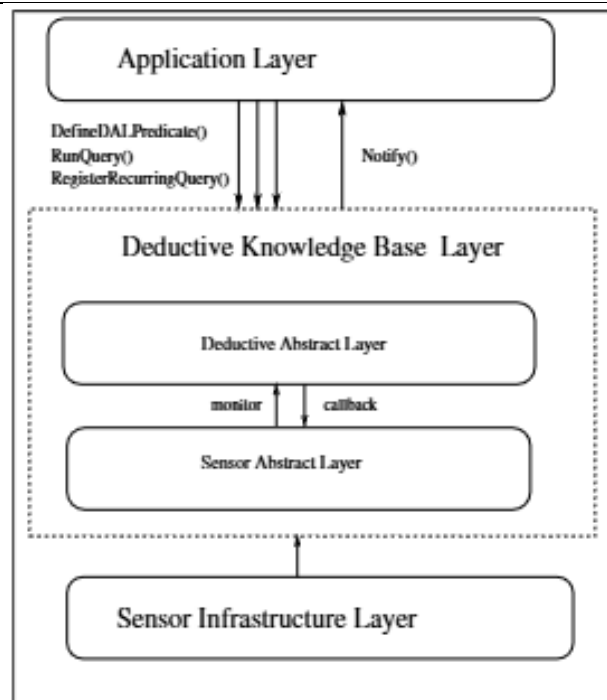


Figure 6.1. The Sentient applications layered architecture and its API.

Katsiri at Figure 6.1.

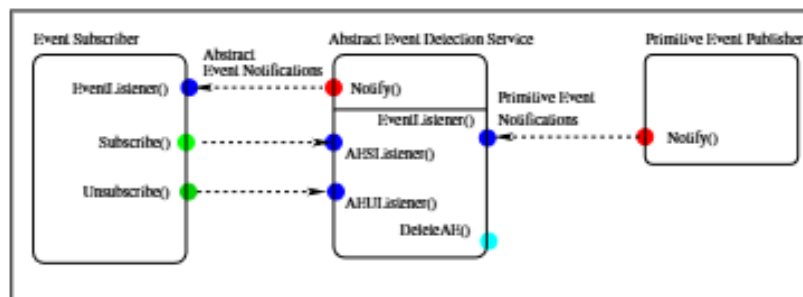


Figure 8.4. Abstract Event Detection (AED) Service.

Katsiri at Figure 8.4. *See also, e.g.:*

- An implementation of SCAFOS, based on CORBA [21], consisting of the following services:
 - A Context-Aware Application Service, which enables the simple development of context aware applications with little programming overhead.
 - A Statistical Inference Service, which detects human movement from location data and estimates the likelihood that an instance of either concrete or abstract knowledge will hold in the future.
 - An Abstract Event Deduction Service, which publishes state changes into abstract events.
 - A set of Deductive Knowledge Base (KB) components that detect abstract events that are published by the Abstract Event Detection Service. Deductive KB components are capable of scalable abstract reasoning.
 - A Satisfiability Service that proves the correctness of user requirements and their semantic compatibility with the sensor-driven system components of the distributed infrastructure.” Katsiri at 30.

Katsiri at 88. As an example, Katsiri 2005 describes a system in which the movements of 20 users were monitored in an environment over a period of time. Heterogeneous sensors located within the environment tracked the locations and movements of the participants, and the SCAFOS middleware parsed the data to provide notifications via email when certain events of interest were detected. *See, e.g., id.* at 167-169 (describing email notifications being sent when participants moved from one room to another, when participants were co-located in the same room, etc.). The use of heterogeneous sensors and middleware for analyzing and providing such information was well-understood, routine, and conventional in the art as of KAIFI’s claimed priority date for the ’232 Patent.

Similarly, an article by Ahn et al., titled “A Case Study on Message-Oriented Middleware for Heterogeneous Sensor Networks,” (“Ahn 2006”) published in early August, 2006 reflects the state of the art in the wireless sensor networks at that time and shows that the claimed concepts and limitations of the ’232 Patent were well-known, routine, and conventional in the WSN field as of the priority date for the ’232 Patent.

Again, Ahn 2006 shows that it was well-understood, routine and conventional that WSNs would utilize heterogeneous sensor networks. For example:

Abstract. Needs of interoperability are getting increased since there have been some issues in heterogeneous wireless sensor networks such as information exchange, network protocol conversion, and integrity among multi-vendor products. We propose message-oriented middleware to make use of an intelligent bridge for information exchange in heterogeneous constraints. It

Ahn 2006 at Abstract. Unsurprisingly, Ahn 2006 describes the use of middleware to interface between heterogeneous wireless sensors and downstream applications, as was known and conventional at the time. For example:

We propose message-oriented middleware to make use of an intelligent bridge for information exchange in heterogeneous constraints. It includes middleware architecture, a message format and message types, and rule handling. The architecture makes an intelligent bridge through a home server in home networks, and the home server can help to exchange information among wireless sensor networks. The intelligent bridge carries out roles of a mediator between middlewares in heterogeneous wireless sensor networks. The rule handling is the most important function of the intelligent bridge which takes charge of possessing information, analyzing input data, searching rules, interpreting selected rule, and controlling statuses of all wireless sensor networks. A message format is composed of message type, destination identification, source identification, the sequence number of message, and contents. The message types are classified by six categories such as request,

Id. at 1-2. As Ahn, and this passage, make clear, the middleware utilized rules to handle and analyze sensor data received in message form, as was known and conventional at the time. The middleware was then used to provide useful information to a downstream application program, which could then be passed on to a user, as was also conventional. For example,

2.1 Middleware Architecture

Middleware provides a mechanism through which application specific code can be injected and triggered inside the network, allowing energy efficiency in data dissemination and increasing the wireless sensor network performance and time life.

Id. at 2; see also, e.g.:

Requirements on Wireless Sensor Network Middleware Middleware in wireless sensor network should support all sorts of services that need in various application system development based on heterogeneous sensor nodes, maintenance, installation, and accomplishment. In order to support these purposes, middleware should provide a lot of functions which make suitable information for high level application by mixing sensing data, conduct data fusion, transfer them, and finally report data to user.

Id. at 9. Indeed, the above passage makes clear analyzing sensor data and providing useful information based on that data for an application program (and ultimately an end user) was a requirement for WSN middleware. Such an architecture is also shown and described in Fig. 1:

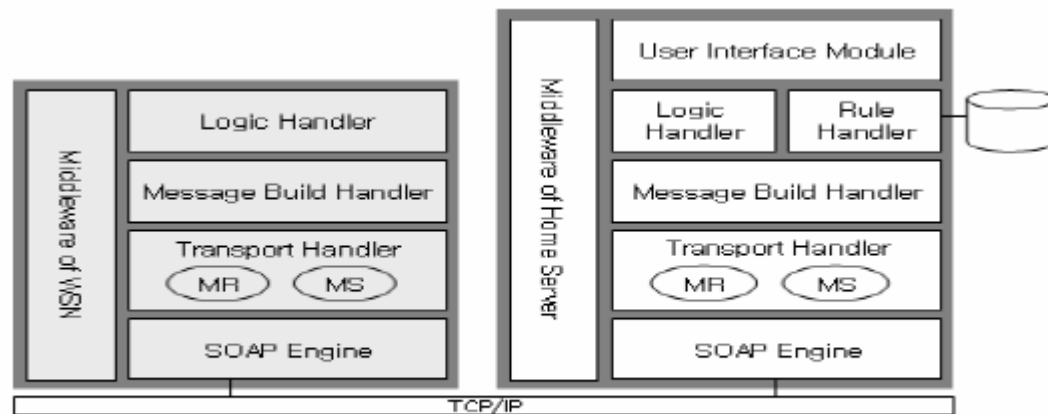


Figure 1. Middleware Architecture

Id. at Fig. 1.

It was also well-understood, routine and conventional for such middleware to search for and monitor WSN resources and to monitor the state of the sensor networks. For example, Ahn states:

“The rule handling is the most important function of the intelligent bridge which takes charge of possessing information, analyzing input data, searching rules, interpreting selected rule, *and controlling statuses of all wireless sensor networks.*” Ahn 2006 at 2.

As yet another example, an article by Byungrak Son et al., titled “A Design and Implementation of Forest-Fire Surveillance System Based on Wireless Sensor Networks for South Korea Mountains, published September 2006 (“Son 2006), also shows and reflects the state of the art of the WSN industry as of the KAIFI’s claimed priority date for the ’232 Patent.

Son 2006 shows that it was well-known, routine and conventional to use networks of wireless sensors to monitor and generate data relating to environment. In the case of Son 2006, wireless sensor networks were utilized to monitor forested areas in the South Korean mountains.

As Son 2006 describes:

“Wireless Sensor Networks (WSNs) become an important issue such as environmental monitoring, home or factory automation, logistics and so on.

Son 2006 at Abstract.

As was conventional at the time, Son 2006 describes a wireless sensor network system comprising heterogeneous sensors that can detect different types of data, including temperature, humidity and smoke, for monitoring this environment. For example:

In this paper, we develop a forest-fires surveillance system in South Korea Mountains. We call this system FFSS (Forest-Fires Surveillance System). The developed FFSS consists of WSNs, middleware and web application. The WSNs measure temperature and humidity, and detect smoke. The middleware program and the web application analyze the collected data and information. The FFSS is possible to detect the heat. It let to know early alarm in real time when the forest-fire occurs.

Id. at Abstract. Son 2006 goes on to describe the popularity of WSNs and various common use cases for the same. In particular, Son 2006 describes the rapid development and popularity of MEMS-based sensor technology, which helped drive the popularity and growth of WSNs in the early 2000s in particular. For example, Son 2006 states:

WSNs will be popular over the next ten years. The WSNs based on sensing technologies are a kind of sensors with micro electro mechanical systems (MEMS) technology. It has been growing for various applications. Many research used the WSN. It has been conduct a structural health monitoring for buildings and civil engineering structures in recent years [4]. Some of these researches have focused on wireless sensing technology. The WSNs evaluate and analyze on the environmental information, such as temperature, humidity, sound, vibration, smoke as well as pictures of a building and forest. The WSNs based on the FFSS will give an early fire alarm of fire in forest or a mountain area using to analyzed on environment information.

Id. at 124.

As was typical and conventional of WSN systems at the time, the system developed and described by Son et al. was developed to have various heterogeneous sensors monitor the relevant environment, with middleware used to review and analyze the sensor data and provide useful information, such as alarms and warnings to a downstream application so that users would be alerted to fire dangers. For example:

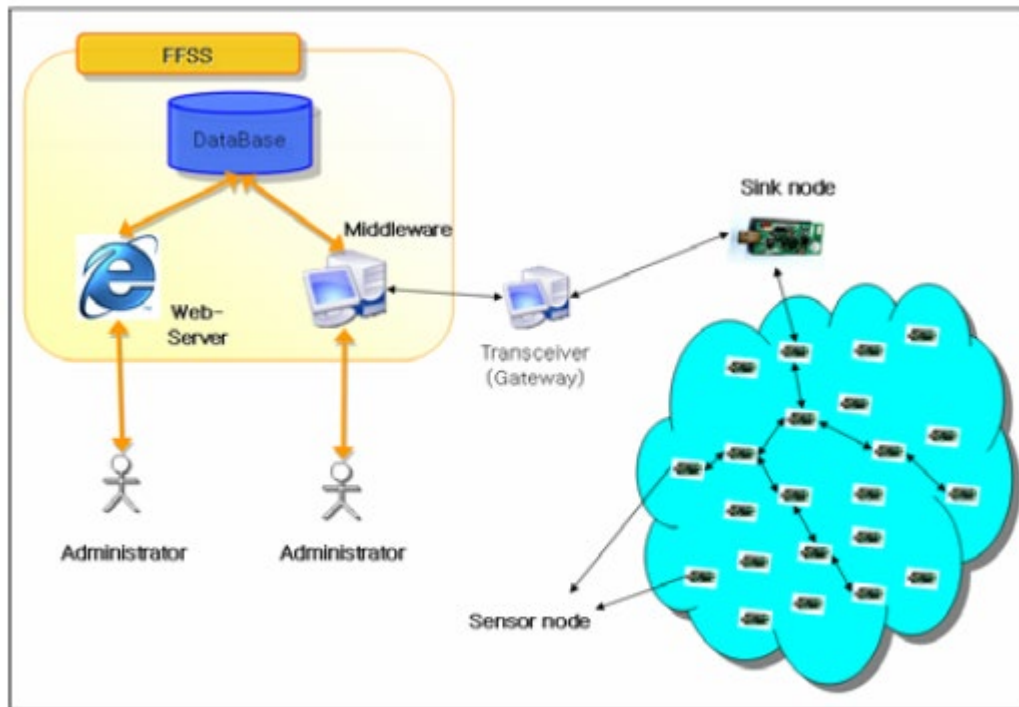
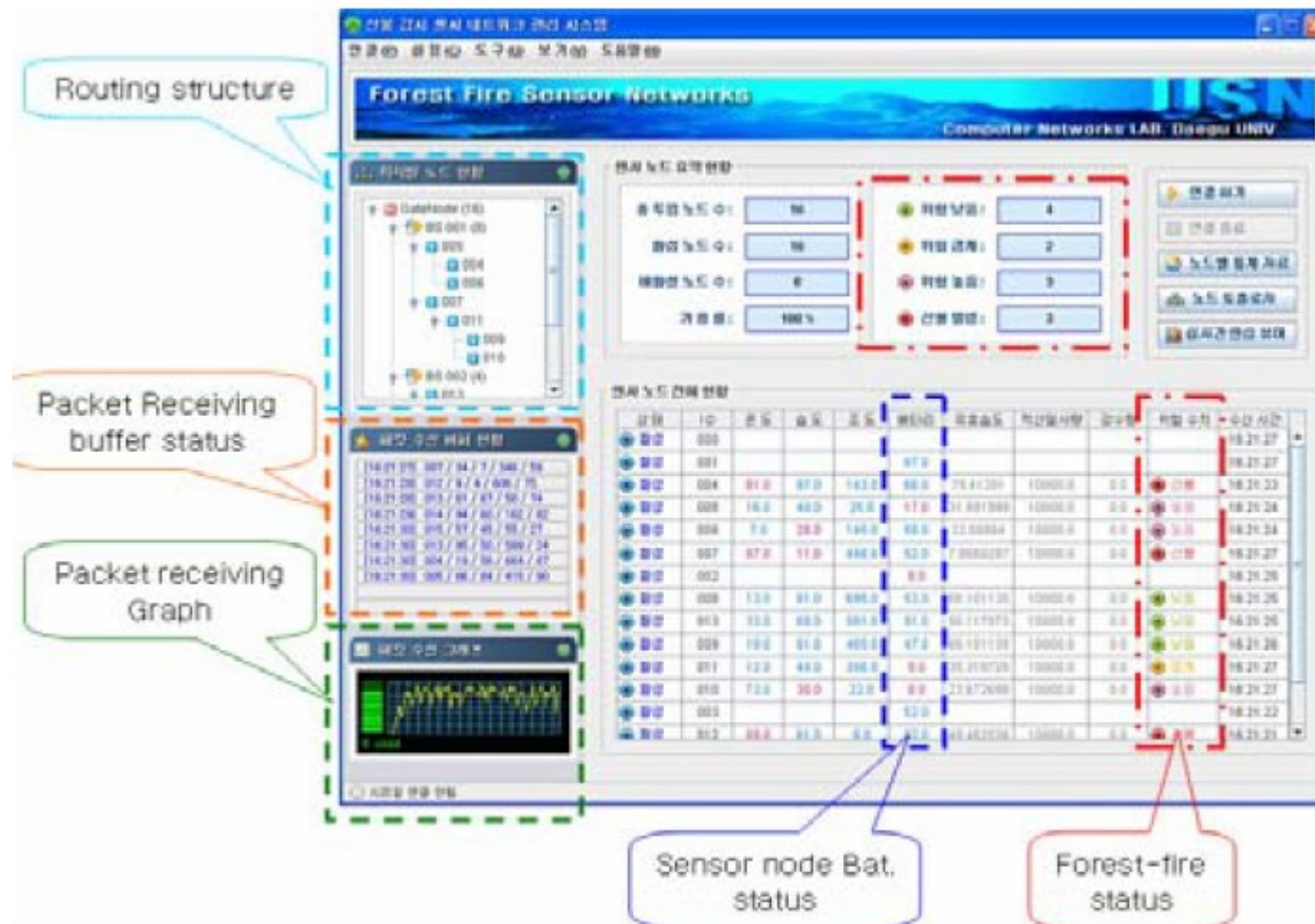


Figure 7. Structure of FFSS components

Further, it was well-known, routine and conventional for the middleware system to search for and monitor resources of the sensor network. For example, this is shown at Fig. 10, which shows the middleware monitoring, among other things, the battery status of various sensor nodes:



Son 2006 at Fig. 10.

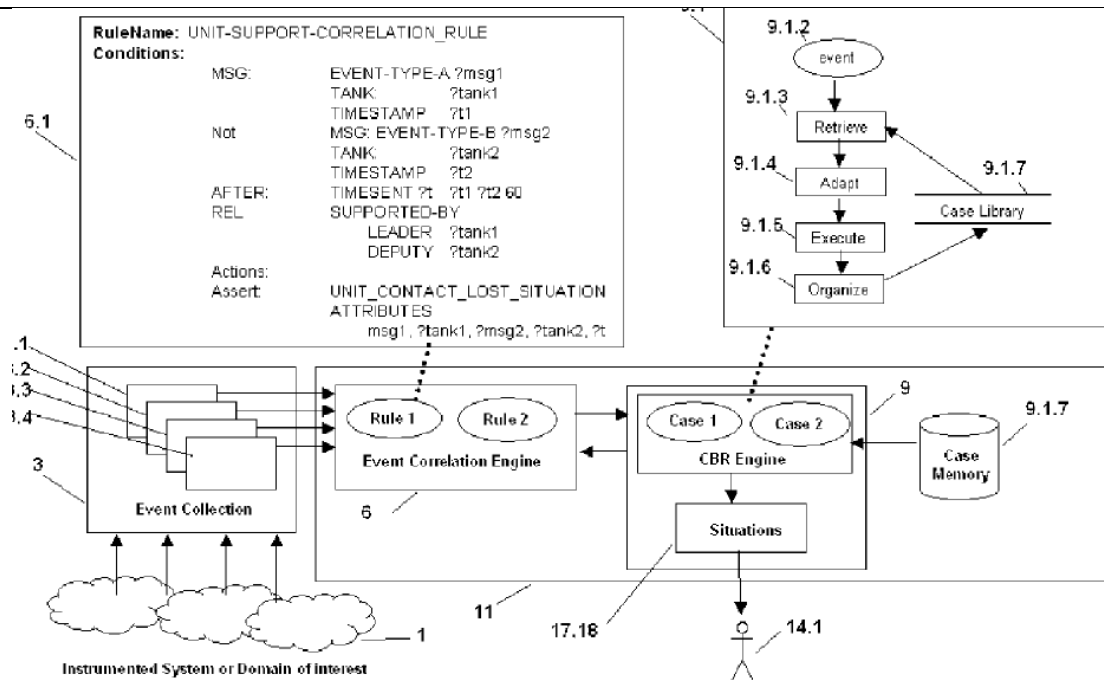
These references, and others from the wired sensor network, wireless sensor network, and RFID industry demonstrate that the subject matter of the Challenged Claims of the '232 Patent was well-understood, routine, and conventional in the industry at the relevant time.

The Defendants' 102/103 invalidity contentions and claim charts, which are incorporated herein by reference, provide further description of these and other prior-art references, providing an even more complete description of the history and state of the industry as of KAIFI's claimed priority date for the '232 Patent. Accordingly, on or around December 26, 2006, it was well-understood, routine, and conventional in the wired sensor network, wireless sensor network, and RFID industry to gather environmental information, process that information for practical use, and provide environment-related information to a user. It was further well-understood, routine and conventional in the wired sensor network, RFID, and wireless sensor network industries to collect and analyze information from a sensor network and provide information to a user.

Patent Claim	Exception to Eligibility, and Basis Therefor
1[pre]. A system for providing an information service based on heterogeneous sensor networks, comprising:	As described above, Claim 1, like all the Challenged Claims of the '232 Patent, is directed to the abstract idea(s) of gathering environmental information, processing that information for practical use, and providing environment-related information to a user. Put another way, it is directed to collecting and analyzing information from a sensor network and providing environmental information to a user. An alternative way of articulating the abstract idea of this claim is that it is directed to the abstract idea of observing an environment and then providing information relating to that environment to another person. Claim 1 of the '036 Patent is directed to: “A system for providing an information service based on heterogeneous sensor networks, comprising: a sensor node constructing a sensor network to sense environment information; a sensor network data transmitter for collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form; and a Ubiquitous Sensor Network (USN) middleware for extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program, the

	application program providing a user with information related to environment where the sensor network is installed.” This claim does not contain an inventive concept such that it does more than claim the ineligible idea itself. Instead, the claim applies the abstract idea to generic electronic devices or software: a sensor, a sensor network data transmitters, a “middleware,” and an application program. The sensor in the claim does nothing more than sense “environment information” and convey it to the “sensor network data transmitter.” The “sensor network data transmitter,” in turn, collects that data and passes it along. The “middleware” then processes the information and passes along “conditional events, context aware information, and knowledge contents” to an application. Finally, the application provides the user with information. Every single device or piece of software in this claim is simply receiving, processing, and passing along signals. These are routine and generic processing capabilities of computers generally. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). Similarly, each device or software component is recited as generically as possible, and their descriptions are functional. <i>See id.</i>, 838 F.3d at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in claim 1 that is directed to <i>how</i> to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). KAIFI may argue that the use of sensors and a system to sense and convey “environmental information” is a more targeted application than the general use of sensors or conveyance of information. “That restriction, however, does not alter the result. All that limitation does is to confine the abstract idea to a particular technological environment” <i>Affinity Labs</i>, 838 F.3d at 1258-59. But “merely limiting the field of use of the abstract idea to a particular existing technological environment does not render the claims any less abstract.” <i>Id.</i> at 1259 (collecting cases). Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “‘transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98).
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	To the extent the preamble is limiting: A system for providing an information service based on heterogeneous sensor networks was well-understood, routine and conventional in the relevant industry at the relevant time period, including for the reasons described above.. Henricksen described this as “the main purpose of middleware for sensor networks”: The goal of middleware for (wireless) sensor networks (WSN) is summarised as follows by Römer et al. [18]: The main purpose of middleware for sensor networks is to support the development, maintenance, deployment, and execution of sensing-based applications. This includes mechanisms for formulating complex high-level sensing tasks, communicating this task to the WSN, coordination of sensor nodes to split the task and distribute it to the individual sensor nodes, data fusion for merging the sensor readings of the individual sensor nodes into a high-level result, and reporting the result back to the task issuer. Moreover, appropriate abstractions and mechanisms for dealing with the heterogeneity of sensor nodes should be provided. Henricksen et al., “A Survey of Middleware for Sensor Networks: State of the Art and Future Directions,” (2006) (quoting Römer). As just one practical example, Jakobson describes using middleware to process sensed information and pass the results along to the application. For example: Jakobson’s FIG. 6 illustrates “a system for managing a domain.” Jakobson, [0143].
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And Jakobson Fig. 7 similarly illustrates a system “For realizing SBM [situation-based management] using middleware services”:

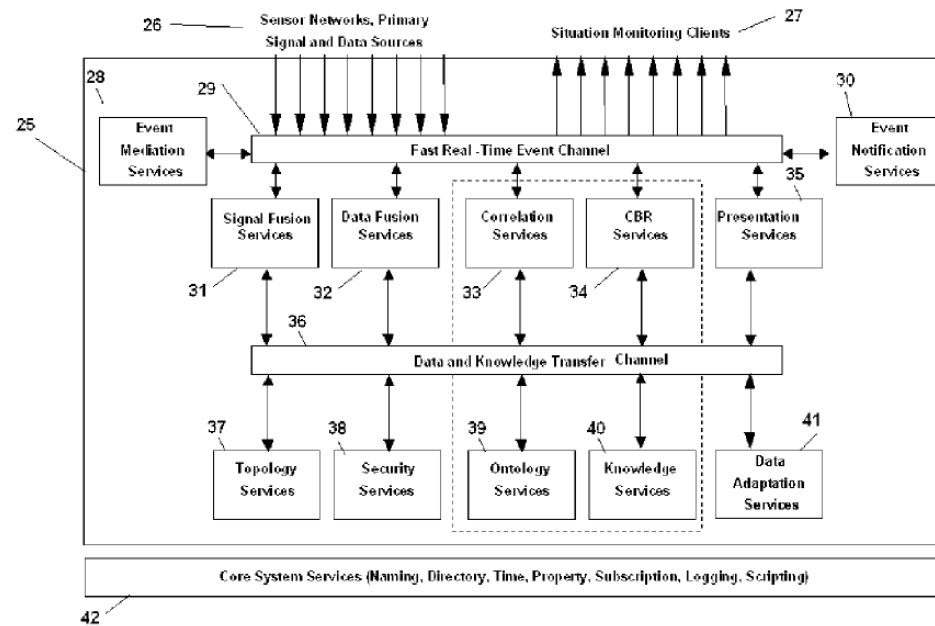


Fig. 7

As another example, Floerkemeier 2005 describes how RFID systems include various functional components, including readers/sensors, middleware that acquires raw data and filters and distributes filtered data, and applications that make use of the information provided by the middleware:

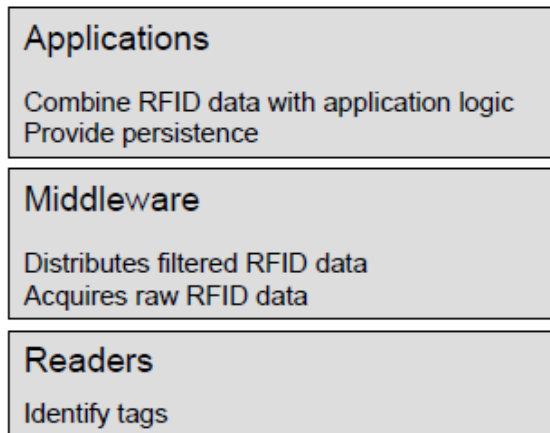


Figure 1: Overview of functional components in an RFID system. The reader identifies tags using radio-frequency. The middleware acquires these raw tag reads, filters and delivers them to applications, where the RFID data are combined with application logic.

Floerkemeier et al., RFID Middleware Design – Addressing Application Requirements and RFID Constraints at 1.

Data filtering and aggregation. Common to all applications that make use of the captured data is the desire to receive filtered and aggregated RFID events rather than raw streams of RFID data. Different applications are however interested in a different subset of the total data captured based on the reader and the tag involved. Since RFID permits the identification at the instance-level rather than at the class-level, the fine-grained RFID data need to be aggregated into summaries for applications that cannot deal with the increased granularity.

Id. at 2.

As another example, in the RFID industry the idea of processing “heterogenous” signals from RFID tags was well-known. As of 2005, tags and readers communicated on a “heterogenous mix of global frequencies.” Dummies at 67-68. For that reason, there existed on the market “both readers and tags that [could] read multiple frequencies and have various power levels.” *Id.* at 68; ; *see also id.* at 342 (ThingMagic offers a reader that “claims to be capable of reading all classes of tags and readers”).

Similarly, Dummies made clear that a goal of sensor networks at the time was that they be heterogenous, not just in the types of frequencies they communicated via, but also in the type of information they collected. Dummies emphasized that “the power of RFID is unleashed when a multiplicity of single nodes are bonded together sharing real-time, specific data.” Dummies at 28. It noted that a goal for cheap and small RFID readers was to create “[t]iny sensor networks that can do everything from predict disasters like tsunamis to recognize chemical warfare, and can be deployed by dropping them from a plane by the thousands, like crop dusters.” Dummies at 29. It further explained that “Sensors,” with cheap and small RFID readers, can be used “to monitor everything from temperature to vibration to nuclear levels attached to this networked world.” *Id.* As Dummies explained, “an Internet of things was the vision.” Dummies at 45. In other words, the vision was to make a standardized identification system that would allow all different types of things, including sensors, to communicate. It is thus clear that it was well-understood, routine, and conventional to think of sensor networks being made up of different types of environmental sensing,

	including temperature, vibration, humidity, chemical presence, and anything else that might be used to monitor for tsunamis and chemical warfare. The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. To the extent the preamble is limiting: A system for providing an information service based on heterogeneous sensor networks was well known, routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art reference as of the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, the preamble, and claim 1 in its entirety, do not claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[1a] a sensor node constructing a sensor network to sense environment information;	A sensor node constructing a sensor network to sense environment information was well understood, routine and conventional in the relevant industry at the relevant time period. Reciting a “sensor node” that that constructs a “sensor network” to sense environment information recites generic structures performing a routine and generic function. In this claim, the “sensor node” and “sensor network” perform routine and generic functionality that was well-understood, routine and conventional of sensors and nodes of sensors generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). At the relevant time, sensor networks operable to sense environment information and forming a sensor node was well-known, routine and conventional in the art. For example, Son 2006 showed the basic structure of conventional WSN systems. For example:

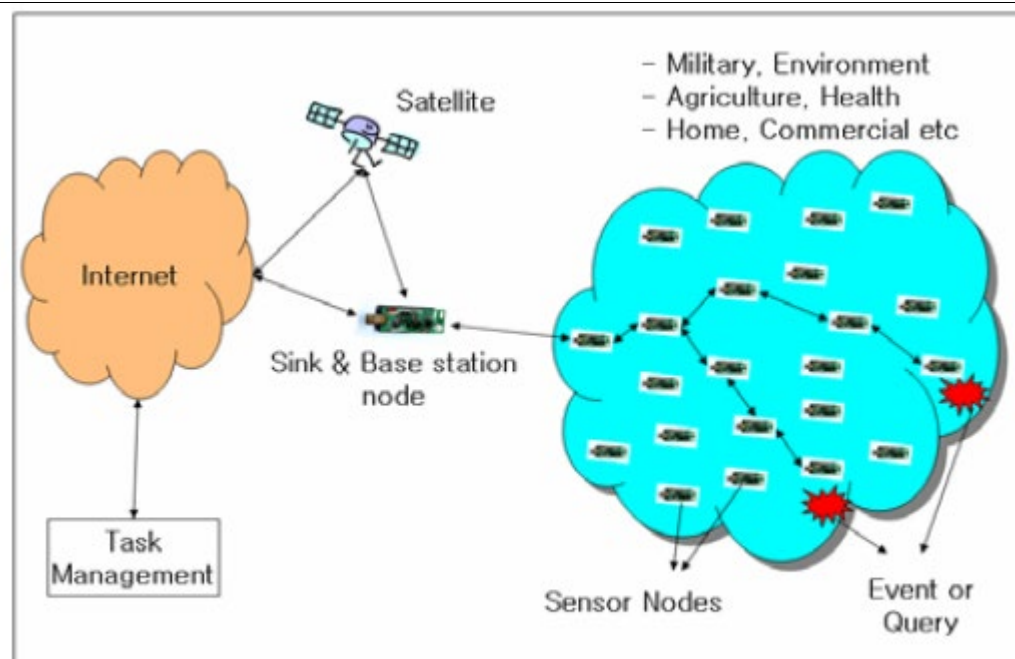


Figure 3. Structure of WSNs

And Son 2006 further described how middleware could be used to collect data about the environment, process and analyze that data, and provide relevant information to an application, in this case a web server, which could be viewed by users, all of which was well-known, routine, and conventional as of KAIFI's claimed priority date for the '232 Patent. For example:

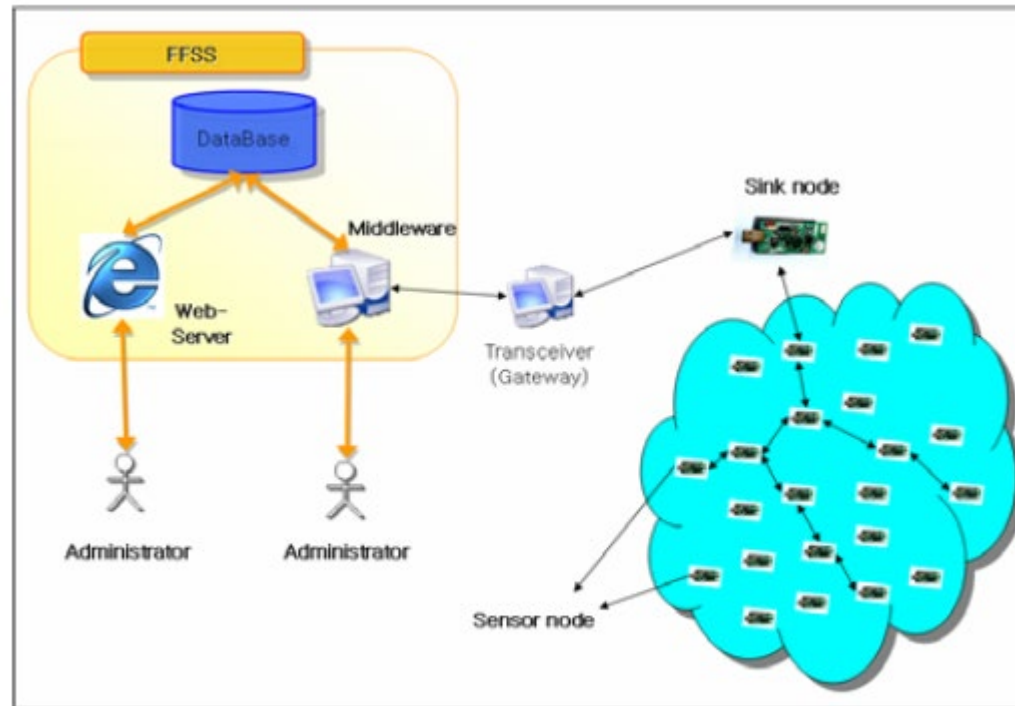


Figure 7. Structure of FFSS components

As another example, As Hadim et al. stated in their Jan. 2006 article discussed the popularity of deploying sensor networks:

Wireless Sensor Networks are emerging as a suitable new tool for a spectrum of new applications in recent years [12]. They are easily deployable at a large scale, low power, inexpensive and self-organizing. These unique characteristics make them advantageous over traditional networks. Sensor networks applications were originally motivated by military applications such as target detection, surveillance of enemy activities in a battlefield environment and counterterrorism; however, their many advantages over traditional networks

resulted in the development of many other potential applications [10] that range from infrastructure security to industrial sensing. Some examples are: environment and habitat monitoring, health applications, home automation, traffic control, etc.

Hadim et al., Middleware for Wireless Sensor Networks: A Survey. Proc. Of the First Int'l Conference on Communication Software and Middleware (COMSWARE 2006), IEEE, New Delhi, India, Jan. 2006.

As yet another example, Feng 2006 shows an example of a conventional system utilizing a heterogeneous RFID network:

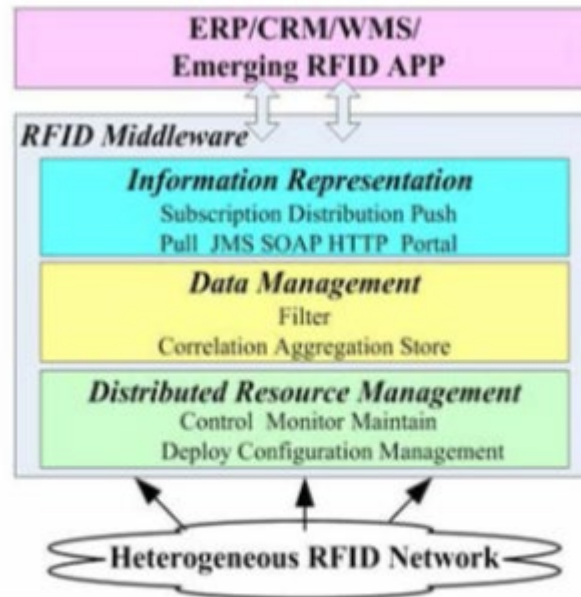


Figure 1. Three layered middleware architecture.

Feng 2006 at Fig. 1.

	A sensor node constructing a sensor network to sense environment information was well-understood, routine and conventional in the RFID industry at the relevant time period. Dummies explicitly discusses this idea as something “you may have already heard of.” <i>See</i> Dummies at 29. Specifically, it discusses: Dust notes: Tiny sensor networks that can do everything from predict disasters like tsunamis to recognize chemical warfare, and can be deployed by dropping them from a plane by the thousands, like crop dusters. Sensors: To monitor everything from temperature to vibration to nuclear levels attached to this networked world. Dummies at 29. This quote alone shows that sensor nodes making up sensor networks to sense environmental information was well-known as of 2004. <i>See also:</i> “The vision underlying automatic identification (or Auto-ID) is the creation of an “Internet of Objects.” In such a highly connected network, devices dispersed through an enterprise can talk to each other—providing real-time information about the location, contents, destination, and ambient conditions of assets.” Dummies at 10 (emphasis added). “[T]he power of RFID is unleashed when a multiplicity of single nodes are bonded together sharing real-time, specific data.” Dummies at 28 (emphasis added). Dummies also explains how these sensors fit into the RFID structure. Specifically, “[s]ome active [RFID] tags can ... be made to monitor sensor inputs, such as the temperature or movement” Dummies at 39. The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts.
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	Accordingly, limitation [1a], and claim 1 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[1b] a sensor network data transmitter for collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form; and	A sensor network data transmitter for collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form was well understood, routine and conventional in the relevant industry at the relevant time period. Reciting a “sensor network data transmitter” that collects sensed data sensed by a sensor in real-time and transmits the collected sensed data in a message form recites a generic structure performing a routine and generic function. In this claim, the “sensor network data transmitter” performs routine and generic functionality of a transmitter that was well-understood, routine and conventional of transmitters generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. For example, each of Ahn 2006, Feng 2006, Jakobson, Tsetsos, Katsiri 2005, Li 2004, and Son 2006 disclose this ubiquitous design principle, as discussed above and in their respective invalidity charts. As just one example, Ahn 2006 describes the use of middleware to interface between heterogeneous wireless sensors and downstream applications, and sensor data would be sent and received in message form. For example:

We propose message-oriented middleware to make use of an intelligent bridge for information exchange in heterogeneous constraints. It includes middleware architecture, a message format and message types, and rule handling. The architecture makes an intelligent bridge through a home server in home networks, and the home server can help to exchange information among wireless sensor networks. The intelligent bridge carries out roles of a mediator between middlewares in heterogeneous wireless sensor networks. The rule handling is the most important function of the intelligent bridge which takes charge of possessing information, analyzing input data, searching rules, interpreting selected rule, and controlling statuses of all wireless sensor networks. A message format is composed of message type, destination identification, source identification, the sequence number of message, and contents. The message types are classified by six categories such as request,

Id. at 1-2.

A sensor sensing environment information was well-understood, routine and conventional in the RFID industry at the relevant time period, as well. Dummies explicitly discusses this idea as something “you may have already heard of.” *See* Dummies at 29. Specifically, it discusses:

Dust motes: Tiny sensor networks that can do everything from predict disasters like tsunamis to recognize chemical warfare, and can be deployed by dropping them from a plane by the thousands, like crop dusters.

Sensors: To monitor everything from temperature to vibration to nuclear levels attached to this networked world.

Dummies at 29. This quote alone shows that sensor nodes making up sensor networks to sense environmental information was well-known as of 2004. *See also:*

“The vision underlying automatic identification (or Auto-ID) is the creation of an “Internet of Objects.” In such a highly connected *network*, devices dispersed through an enterprise can talk to

	each other—providing real-time information about the location, contents, destination, and <i>ambient conditions</i> of assets.” Dummies at 10 (emphasis added). “[T]he power or RFID is unleashed when <i>a multiplicity of single nodes are bonded together</i> sharing real-time, specific data.” Dummies at 28 (emphasis added). Dummies also explains how these sensors fit into the RFID structure. Specifically, “[s]ome active [RFID] tags can ... be made to monitor sensor inputs, such as the temperature or movement” Dummies at 39. Further, a sensor network data transmitter for collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form was well-understood, routine and conventional in the relevant industry at the relevant time period. Specifically, as described above, it was well-understood, routine, and conventional in the RFID industry to have a “transceiver” (or “reader”) that performed the jobs of: (1) collecting radio signals from tags in its vicinity; and (2) passing the information from those tags onward. The “reader” was known to “receive[] the tag’s signal through its array of antennas, decode[] the signal, and send[] the information to the host computer system.” Dummies at 80; <i>see also id.</i> at 78 (“The transceiver (or reader) sends the data to the middleware.”). A key property of a reader is its ability to “move data in and out in real time. Dummies at 97. ; <i>see also id.</i> at 28 (“[T]he power or RFID is unleashed when a multiplicity of single nodes are bonded together sharing real-time, specific data.”); <i>id.</i> at 61 (“[T]he benefits of RFID networks are predicated on transporting real-time, serialized data into an application that can make sense of it all”). A reader “has to, or else a gap in the communication occurs because radio waves can’t be stored in a cache anywhere.” <i>Id.</i> “[I]n DSP processing, it does actually happen in real-time as a stream of constant processing of the electronic signals.” Dummies at 97. Implicit in this discussion is the idea that the “reader” receives radio signals and transmits the information carried therein in another form usable by the software down the line, <i>i.e.</i>, “in a message form.” Indeed, in U.S. Patent Publication No. 2006/0082444, a patent filed in October 2004, which has as an inventor the author of the 2005 RFID for Dummies, the inventor clarifies that the RFID reader decodes tag responses “to a standard packet form” to send them to the middleware device. ’444 Publ. at [0004]. Indeed, while the RFID reader described in Dummies performs the functions of “a sensor network data transmitter for collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed
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data in a message form,” an active RFID tag itself can also be read as performing that function. Specifically “active tags can also be made to monitor sensor inputs, such as temperature or movement, even without being within an interrogation zone to power up the tag.” Dummies at 39. In a world where an active tag with memory, *see* Dummies at 52, is linked to a sensor, that active tag collects data sensed by the sensor in real-time and transmits the collected sensed data in a message form to the reader. *See* Dummies at 19 (“In essence, an RFID system is just a reader and a tag communicating over the air at a certain frequency, like any other radio communication.”); *id.* at 20 (“[T]he RFID tag ... exchange[s] data with the reader.”). The reader then *also* collects data sensed by the sensor in real-time, and transmits the collected sensed data in a message form to the middleware. *See above paragraph.* This idea—collecting information sensed in real-time and passing it on—was well-known and conventional at the relevant time.

As Feng 2006 likewise makes clear, it was well-known, routine, and conventional that RFID data would be sent in “message form” and middleware would be used to analyze and process the raw data and extract important information that would be useful to a downstream application program:

Turn Raw RFID Data to Meaningful Information: The data collected by the RFID reader is a common triplet like < TagID, ReaderId, Timestamp >, which is not suitable for the requirements of applications. Thus, a middleware is needed to drill down into raw data and to extract implicit information which can satisfy the application level needs, so accurate appropriate business decision can be made.

Feng at 2756.

This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references

	listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [1b], and claim 1 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[1c] a Ubiquitous Sensor Network (USN) middleware for extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program, the	A Ubiquitous Sensor Network (USN) middleware for extracting object and environment information by cleaning, classifying, and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program was well-understood, routine and conventional in the relevant industry at the relevant time period. As explained above, middleware was known to be a critical element of sensor network systems. For example, Li 2004 describes the conventional software architecture for sensor networks, comprising in this case the sensor MAC layer, network layer, DSWare middleware, and an application that receives relevant information from the middleware:

application program providing a user with information related to environment where the sensor network is installed.

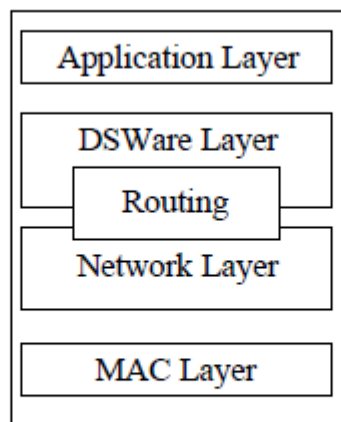


Fig. 1. Software Architecture in Sensor Networks

Li 2004 also shows that it was known, routine and conventional to use middleware to take in raw sensor data, use the middleware to detect events and other useful information, and then convey relevant information to the application as required by the application. The application would commonly be configured to subscribe to relevant types of information provided by the middleware:

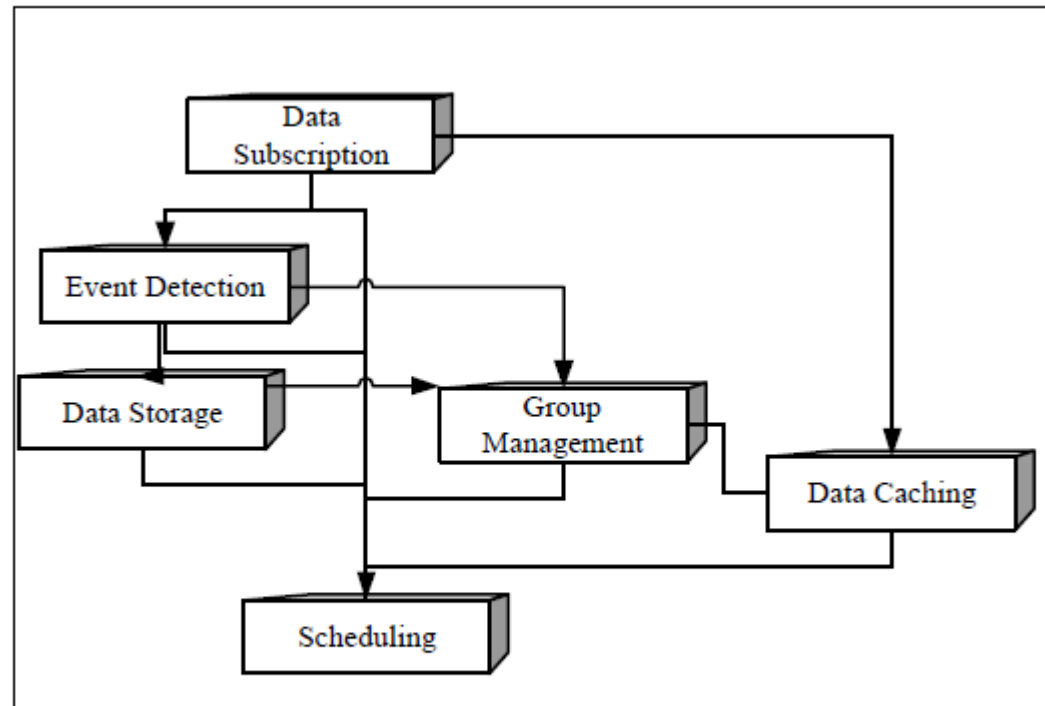


Fig. 2. Framework of DSWare

As explained above, middleware was likewise known to be a critical element of the RFID system. As Dummies explains:

Middleware connects the data coming into a reader to the client's host software systems. The middleware provides a coherent and stable interface between the RFID hardware operations and the flow of data elements, such as EPC (electronic product code) numbers, into inventory, sales, purchasing, marketing, and similar database systems distributed through an enterprise."

	The elements of middleware include the following: - Reader and device management: RFID middleware allows users to configure, monitor, deploy, and issue commands directly to readers through a common interface. - Data management: As RFID middleware captures EPC data or other data from readers, it can intelligently filter and route it to the appropriate destinations. - Application integration: RFID middleware solutions provide messaging, routing, and connectivity features required to integrate RFID data into existing supply-chain management (SCM), enterprise resource planning (ERP), warehouse management (WMS), or customer relationship management (CRM) systems. - Partner integration: Middleware can provide collaborative solutions like business-to-business (B2B integration between trading partners. Dummies at 81. “One of the keys to handling the billions of reads that happen in a typical warehouse is to have specialty <i>middleware</i> (filtering software) for the readers. The data created by an RFID reader needs to be filtered and smoothed before it is useful for any application. The special filtering and smoothing software is called a <i>reader interface</i>, <i>EPC information server</i>, or a <i>Savant</i>. The reader interface is the key to making the data volume manageable and the information useful. ... The middleware enables you to use RFID with existing applications, such as warehouse management systems (WMS), enterprise resource planning (ERP) suites, or inventory management packages. The good news is that the leading software companies are all developing middleware modules specifically designed for RFID. Although many of these will not be commercially viable until 2006, they will still solve many of the problems IT staff are concerned with, such as the form that the data will need to be exported in, how the multiple reads will be filtered, and what the key filters for the data are.” Dummies at 61. Dummies explains that middleware is required to “<i>process</i> the incoming RFID data and intelligently <i>integrate</i> it into your business applications.” Dummies at 205. In so doing “[d]uplicate reads and excess information must be filtered out so as not to bog down the network and end up with confusing information inside your applications.” <i>Id.</i> at 206; <i>see also id.</i> at 211 (One middleware tier should do “[v]ery basic filtering to filter noise and superfluous data from the network, such as duplicate reads. May also aggregate multiple reads into “packages of data that can be passed up to local applications.”). The middleware should also address the fact that “not all readers speak the same language,” and should be able to respond to the fact that “different RFID information needs to be passed off to different applications and data stores. <i>Id.</i> It must
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be able to “[i]ntegrat[e]” RFID tag identification data with “other Auto-ID technologies, like sensors and biometrics.” *Id.* at 207. It should include “both low-level logic (like filtering out duplicate reads) and more complex algorithms (like content-based routing).” *Id.* It can “accurately know when the inventory level becomes critically low and send a machine-generated message to the distribution center to order more product”). It should do the type of “sophisticated filtering and routing” that relies on “contextual information, like data from multiple readers and business logic that may reside in existing business applications.” *Id.* at 208. It should “integrate with RFID readers, filter and aggregate data, and ***even incorporate business rules.***” *Id.* at 209; *see also id.* at 212 (“Raises flags when exceptions occur (like when a pallet tries to leave a distribution center without enough cases on it) using business-event management logic.”); *id.* (“Advanced systems will actually have process-management capabilities and some prepackaged logic for this task.”). Middlewares that incorporated business rules were known at the time, offered by vendors such as ConnecTerra, GlobeRanger, OARSystems, RF Code, and Savi Technologies. *Id.* at 209 .

Dummies thus makes clear that it was well-known and conventional to use a middleware to process a large amount of different types of data coming in from an RFID network (including an RFID network making use of active RFID tags that collect environmental information), and that such a middleware would collect object information (identification information about the tag itself), any other information, such as environmental information, collected by that tag. It also makes clear that the middleware would perform “intelligent” filtering, smoothing, messaging, and routing of information to the appropriate destinations, as well as more complex logic. These functions can be understood as the claimed cleaning, classifying, integrating, and generating conditional events, context aware information, and knowledge contents functions. Further, Dummies emphasizes that the purpose of the middleware would be to “make the data volume manageable and the information useful, Dummies at 61, suggesting that even more intelligent operations be performed at the middleware level. Of course, “generating conditional events, context-aware information, and knowledge contents” were all operations that were well-known and conventional at the relevant time, and have been performed by human brains since there were human brains. The idea of putting those operations into the RFID middleware already described by Dummies would have been well-understood and conventional at that time.

This especially so because Dummies itself describes the purpose of distributed sensor networks that sense environmental data: to “do everything from predict tsunamis to recognize chemical warfare,” and to “monitor everything from temperature to vibration to nuclear levels.” Dummies at 29. Dummies is thus describing a system that generates conditional events, context aware information, and knowledge contents from the sensed environmental information and the identities of the distributed sensors. It would be well-

known and conventional to place that functionality in the middleware that Dummies described as performing such complex functions.

Finally, Dummies discloses, in the above quotes, that the middleware would then provide information to an application. That, too, was well-known at the time, because that was the purpose of middleware, as shown in the above quotes. *See also* Dummies at 78 (“[M]iddleware ... compresses thousands of tag signals into a single identification and also acts s a conduit between the RFID hardware elements to the client’s application software systems ...”); *id.* at 212 (“Connects with common enterprise applications and data stores, like SAP or a centralized product information database.”); *id.* at 216 (“The conventional goal of RFID middleware is to intelligently pass RFID data from readers to enterprise applications, which is a valid goal. But an arguably more exciting application of RFID middleware is to serve as the foundation for building new applications that can take advantage of real-time, item-level data.”).

Other publications in the RFID space at this time make the same points:

“For instance, a reader may send many identical packets when a tag attached to an object moves along a conveyor belt past an interrogator. The middleware (or savant) reduces the chatter of the interrogator to a concise and structured stream of unique packets. These packets are then typically sent to an enterprise data application that actually processes the data.” ’444 Publ. at [0004].

“Many companies, including Manhattan Associates Inc., Provia Software Inc., RedPrairie Corp. and SAP, are adding software modules or upgrading their products to cope with the serial numbers in RFID tags. But these solutions still require suppliers and retailers to deploy middleware that manages the huge amount of data coming from the readers. CIOs will have to devise ways to filter out false or redundant reads and pass on only useful information to enterprise applications.”

See Roberti, M., *Case Study: Wal-Marts Race for RFID*, available at <https://www.eweek.com/enterprise-apps/case-study-wal-marts-race-for-rfid/> (last visited January 11, 2025).

Reciting a “Ubiquitous Sensor Network (USN) middleware” that extracts object and environment information and cleans, classifies and integrates the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application

	program recites generic structures performing a routine and generic function. In this claim, the “Ubiquitous Sensor Network (USN) middleware” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). In addition, reciting an application program providing a user with information related to environment where the sensor network simply describes the ubiquitous functionality of application programs that are used and accessed by users to view relevant information about the environment of interest that is being monitored. According to Dummies, the purpose of distributed sensor networks that sense environmental data is to “do everything from predict tsunamis to recognize chemical warfare,” and to “monitor everything from temperature to vibration to nuclear levels.” Dummies at 29. Dummies also describes that the goal of the middleware is to provide useful information to the application layer. <i>See generally</i> claim limitation [1d], above; <i>see also</i> Dummies at 81 (“Application integration: RFID middleware solutions provide messaging, routing, and connectivity features required to integrate RFID data into existing supply-chain management (SCM), enterprise resource planning (ERP), warehouse management (WMS), or customer relationship management (CRM) systems.”); Dummies at 211 (“One of the key reasons for the hubbub around RFID is that it gives you visibility into what’s going on across all points in your supply chain....”). Given that the purpose of application programs such as SCM, ERP, WMS, and CRM systems is to provide information and control to a user, Dummies reveals that this limitation was also well-known and conventional at the relevant time. The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [1c], and claim 1 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction &</i>
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	<i>Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
2[pre]. The system as recited in claim 1, wherein the ubiquitous sensor network middleware comprises:	See response to Claim 1, which is incorporated in full by reference here. This claim is “substantially similar and linked to the same abstract idea” as each of representative claims 1, 6 and 10. <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass’n</i>, 776 F.3d 1343, 1348 (Fed. Cir. 2014). Claim 2 depends from Claim 1 and recites the additional limitations of: “wherein the ubiquitous sensor network middleware comprises: a sensor network abstraction unit for extracting the sensed data from the message received from the sensor network data transmitter; a sensor network intelligence unit for extracting the object and environment information by analyzing the sensed data extracted by the sensor network abstraction unit, and generating the conditional events including notification and alarm about a certain condition, and the context aware information from the extracted object and environment information; and a service platform management unit for providing the events and the context aware information to the application program in a form suitable for the application program.” These additional limitations do not change the basic abstract idea of Claim 1 and use only generic or nonce structures like “sensor network abstraction unit,” “sensor network intelligence unit,” and “service platform management unit,” along with functional language. These additional limitations were well-known, routine and conventional in the industry at the relevant time. At the time, using middleware to extract the sensed data from the message received from the sensor network data transmitter was well-known, routine and conventional in the art.

	Likewise, using middleware to extract sensed data form the messages received was well-understood, routine, and conventional. Finally, using middleware to extract object and environment information was well-understood, routine and conventional. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Reciting a “ubiquitous sensor network middleware” with generic “units” that perform these functions recites generic structures performing routine and generic functions. In this claim, the generic/nonce “sensor network abstraction unit,” “sensor network intelligence unit,” and “service platform management unit” perform routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. To the extent preamble is limiting, this claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, the preamble, and claim 2 in its entirety, do not claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction &</i>
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	<i>Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[2a] a sensor network abstraction unit for extracting the sensed data from the message received from the sensor network data transmitter;	A sensor network abstraction unit for extracting the sensed data from the message received from the sensor network data transmitter well understood, routine and conventional in the relevant industry at the relevant time period. <i>See, e.g.</i>, response to [1b]. Reciting a “sensor network abstraction unit” for extracting sensed data from a message received from a sensor network data transmitter recites a generic/nonce structure performing a routine and generic function. In this claim, the generic/nonce “sensor network abstraction unit” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [2a], and claim 2 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[2b] a sensor network intelligence unit for extracting	A sensor network intelligence unit for extracting the object and environment information by analyzing the sensed data extracted by the sensor network abstraction unit, and generating the conditional events including notification and alarm about a certain condition, and the context aware information from the extracted object

the object and environment information by analyzing the sensed data extracted by the sensor network abstraction unit, and generating the conditional events including notification and alarm about a certain condition, and the context aware information from the extracted object and environment information; and	and environment information well understood, routine and conventional in the relevant industry at the relevant time period. <i>See, e.g.</i>, response to [1c] Reciting a “sensor network intelligence unit” for extracting object and environment information by analyzing the sensed data extracted by the sensor network abstraction unit, and generating the conditional events including notification and alarm about a certain condition, and the context aware information from the extracted object and environment information, recites a generic/nonce structure performing routine and generic functions. In this claim, the generic/nonce “sensor network intelligence unit” performs routine and generic functionality of extracting information from sensed data and generating events including notification and alarm and context aware information from the information extracted from sensed data. Doing so was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [2b], and claim 2 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[2c] a service platform management unit for providing the events and the context aware information to the application program in a form	Reciting a “service platform management unit” for providing events and context aware information to an application program in a form suitable for the application program recites a generic structure performing a routine and generic function. In this claim, the “service platform management unit” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). This additional limitation was well-known, routine and conventional in the industry.

suitable for the application program.	This additional limitation simply confines the abstract idea to the context of a wherein the middleware is able to communicate with an application program, which is a ubiquitous requirement for sensor network and RFID systems at the time. “That restriction, however, does not alter the result. All that limitation does is to confine the abstract idea to a particular technological environment” <i>Affinity Labs</i>, 838 F.3d at 1258-59. But “merely limiting the field of use of the abstract idea to a particular existing technological environment does not render the claims any less abstract.” <i>Id.</i> at 1259 (collecting cases). Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [2c], and claim 2 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
3[pre]. The system as recited in claim 2, wherein the sensor network abstraction unit comprises:	See response to Claim 2, which is incorporated in full by reference here. This claim is “substantially similar and linked to the same abstract idea” as each of representative claims 1, 6 and 10. <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass’n</i>, 776 F.3d 1343, 1348 (Fed. Cir. 2014). This subject matter of this preamble was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to

	the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, the preamble, and claim 3 in its entirety, do not claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[3a] a sensor network interface for extracting the sensed data by referring to a message transfer protocol;	Claim 3 depends from claim 2 and recites the additional requirement that the “sensor network abstraction unit” comprises “a sensor network interface for extracting the sensed data by referring to a message transfer protocol,” “a sensor network interface protocol storage for managing a rule for the message transfer protocol;” and “a sensor network monitor for monitoring a state of the sensor network, based on the data received from the sensor network interface,” which uses only generic, nonce structures like “sensor network interface,” “sensor network interface protocol storage,” and “sensor network monitor,” along with functional language. These additional limitations were well-known, routine and conventional in the industry. <i>See, e.g.</i>, discussion for limitation 3[pre] and [3a]. Reciting a “sensor network interface” for extracting the sensed data by referring to a message transfer protocol recites a generic/nonce structure performing a routine and generic function. In this claim, the “sensor network interface” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). This additional limitation was well-known, routine and conventional in the industry. As just one example, Dummies discloses a reader sending data, in message form, to the middleware, and the middleware being able to extract, process, and send along that data. Dummies also discloses sending sensed data in a message form, and the ’444 patent publication, which expressly discloses “standard packet form,” does so further. Similarly, Dummies describes a reader that can communicate “over 802.11 back to the main database.” Dummies at 182. Dummies also describes, at length, the various connectivity arrangements that allow readers to communicate messages to the middleware in message form. <i>Id.</i> at 192-194. It discusses the RS-

	232 protocol, which provides “a well-known and reliable system for short-range wired communications,” as well as the “RS-485 protocol.” <i>Id.</i> It also discusses use of the “TCP/IP protocol over Ethernet,” along which the reader sends “TCP/IP packets.” <i>Id.</i> It explains that “[m]any manufacturers recommend the use of protocol translation (PT) devices to convert from RS-232 and RS-485 to TCP/IP.” <i>Id.</i> Further on the topic of the transfer of information to the middleware/application layer, Dummies explains that the International Organization for Standardization (ISO) has partnered with the International Electrotechnical Commission (IEC) to address standards relating to RFID, including standards relating to data transfer. <i>Id.</i> at 360. It discusses ISO/IEC 15961 and ISO/IEC 15962 as directed to data handling protocol. <i>Id.</i> ISO/IEC 15961, specifically, is directed to data protocol for the application interface. ISO/IEC 15961 and 15962, which have been produced and which would have been obvious to combine with Dummies because they are described therein, provide further information about the protocol for data transfer within the RFID system. This additional limitation simply confines the abstract idea to the context a system where middleware receives a message and utilizes or refers to a message transfer protocol, a concept that was ubiquitous and even necessary for a RFID and/or sensor network system to operate. “That restriction, however, does not alter the result. All that limitation does is to confine the abstract idea to a particular technological environment” <i>Affinity Labs</i>, 838 F.3d at 1258-59. But “merely limiting the field of use of the abstract idea to a particular existing technological environment does not render the claims any less abstract.” <i>Id.</i> at 1259 (collecting cases). Thus, either “individually” or “as an ordered combination,” the elements of this claim do not add enough to “transform the nature of the claim’ into a patent-eligible application.” <i>Alice</i>, 134 S. Ct. at 2355 (quoting <i>Mayo</i>, 132 S. Ct. at 1297-98). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts.
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	Accordingly, limitation [3a], and claim 3 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[3b] a sensor network interface protocol storage for managing a rule for the message transfer protocol; and	A sensor network interface protocol storage for managing a rule for the message transfer protocol was well-understood, routine and conventional in the relevant industry at the relevant time period. Reciting a “sensor network interface protocol storage” for managing a rule for the message transfer protocol recites a generic/nonce structure performing a routine and generic function. In this claim, the “sensor network interface protocol storage” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). This additional limitation was well-known, routine and conventional in the industry. The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [3b], and claim 3 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).

[3c] a sensor network monitor for monitoring a state of the sensor network, based on the data received from the sensor network interface.	A sensor network monitor for monitoring a state of the sensor network, based on the data received from the sensor network interface was well-known, routine, and conventional in the relevant industry at the relevant time period. Reciting a “sensor network monitor ” for monitoring a state of the sensor network, based on the data received from the sensor network interface recites a generic/nonce structure performing a routine and generic function. In this claim, the “sensor network monitor” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). This additional limitation was well-known, routine and conventional in the industry. As an example, Feng 2006 shows that it was well-known, routine and conventional to use middleware to monitor the resources and/or state of the sensor network(s): <i>Distributed Resource Management Layer:</i> This layer provides enhanced services for the other layers to improve the performance and efficiency of the Internet-scale RFID network. Within this layer, specialized protocol for reader communication and mechanisms specific to monitor, manage, and maintain the RFID network resources are implemented and made available through a unified set of APIs to the other layers. According to this layer, when a new specific reader or function is added to this layer, it will be available to the other layers without requiring changes in the other layers.
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	Feng 2006 at 2756. Similarly, in the WSN context, Ahn 2006 shows that it was well-understood, routine and conventional for such middleware to search for and monitor WSN resources and to monitor the state of the sensor networks. For example, Ahn states: “The rule handling is the most important function of the intelligent bridge which takes charge of possessing information, analyzing input data, searching rules, interpreting selected rule, <i>and controlling statuses of all wireless sensor networks.</i>” Ahn 2006 at 2. The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [3c], and claim 3 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
4[pre]. The system as recited in claim 3, wherein the sensor network intelligence unit comprises:	See response to Claim 3, which is incorporated in full by reference here. This claim is “substantially similar and linked to the same abstract idea” as each of representative claims 1, 6 and 10. <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass’n</i>, 776 F.3d 1343, 1348 (Fed. Cir. 2014). The subject matter of this preamble was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the

	references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, the preamble, and claim 4 in its entirety, do not claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[4a] a sensed data analyzer for performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit;	Claim 5 depends from claim 4 and recites the additional limitation of the “sensor network intelligence unit comprising “a sensed data analyzer for performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit,” which does not change the basic abstract idea and uses only generic/nonce “sensed data analyzer,” along with functional language. This additional limitation was well-known, routine and conventional in the industry. <i>See, e.g.</i>, discussion for limitations [1c] and [2b]. The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [4a], and claim 4 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).

[4b] an event processor for generating the conditional events including notification and alarm according to a rule set by the application program and managing the generated events; and	An event processor for generating the conditional events including notification and alarm according to a rule set by the application program and managing the generated events; and was well-known, routine, and conventional in the relevant industry at the relevant time period. <i>See, e.g.</i>, discussion for limitations [1c], [2b], 4[pre], [4a]. Reciting an “event processor” that generates conditional events including notification and alarm and does so according to a rule set by the application program and “managing the generated events” recites a generic/nonce structure performing a routine and generic function. In this claim, the “event processor” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [4b], and claim 4 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[4c] a context information manager for sensing and generating the context aware information, based on the sensed data analyzed by the sensed data analyzer.	A context information manager for sensing and generating the context aware information, based on the sensed data analyzed by the sensed data analyzer was well-known, routine, and conventional in the relevant industry at the relevant time period. Reciting a “context information manager” that senses and generates context aware information based on sensed data recites a generic/nonce structure performing a routine and generic function. In this claim, the “context information manager” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”).

	The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [4c], and claim 4 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
5[pre]. The system as recited in claim 4, wherein the service platform management unit comprises:	See response to Claim 4, which is incorporated in full by reference here. This claim is “substantially similar and linked to the same abstract idea” as each of representative claims 1, 6 and 10. <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass’n</i>, 776 F.3d 1343, 1348 (Fed. Cir. 2014). The subject matter of this preamble was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. In this claim, the service platform management unit performs routine and generic processing capabilities RFID and sensor network middleware generally. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The description of each of these components is functional. <i>See id.</i>, 838 F.3d at 1258 (finding abstract a patent claim that included a cellular telephone, a

	graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to <i>how</i> to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). Accordingly, the preamble to claim 5, and claim 5 in its entirety, do not claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[5a] a directory service manager for identifying and searching resources of the sensor network;	A directory service manager for identifying and searching resources of the sensor network was well understood, routine and conventional in the relevant industry at the relevant time period. Reciting a “directory service manager” that can identify and search resources of the sensor network recites only generic/nonce structure performing a routine and generic function. In this claim, the “directory service manager” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [5a], and claim 5 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction &</i>

	<i>Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[5b] a service process manager for scheduling and managing an operation sequence of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program; and	A service process manager for scheduling and managing an operation sequence of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program was well understood, routine and conventional in the relevant industry at the relevant time period. Reciting a “service process manager” that schedules and manages an operation sequence of various different generic/nonce structures, which here are called the “sensed data analyzer,” the “event processor,” the “context information manager,” and the “directory service manager” in order to obtain a desired information service according to the application program recites generic structures performing a routine and generic function. In this claim, the “service process manager” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. Specifically, it manages an operation sequence so that the middleware can provide an information service to an application program, a task that was ubiquitous, well-known, and routine in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [5b], and claim 5 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction &</i>

	<i>Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[5c] an application program interface for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program.	An application program interface for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See, e.g.</i>, discussion for limitation [5b] Reciting an “application program interface” that is configured to provide the application program with the results processed by the different generic/nonce “structures” that here are called the “sensor network monitor,” the “sensed data analyzer,” the “event processor,” the “context information manager,” and the “directory service manager” in an information service form suitable for the application program recites a generic structure performing a routine and generic function. In this claim, the application program interface performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. Specifically, it provides the application program with useful information as part of the information service that the middleware provides to the application program, a task that was ubiquitous, well-known, and routine in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [5c], and claim 5 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction &</i>

	<i>Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
6[pre]. A Ubiquitous Sensor Network (USN) middleware apparatus for generating an information service based on heterogeneous sensor networks, comprising:	See response to Claim 1, which is incorporated in full by reference here. This claim is “substantially similar and linked to the same abstract idea” as representative claims 1 and 10, and is itself a representative claim. <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass’n</i>, 776 F.3d 1343, 1348 (Fed. Cir. 2014). Claim 6 is directed to: “ A Ubiquitous Sensor Network (USN) middleware apparatus for generating an information service based on heterogeneous sensor networks, comprising: a sensor network abstraction unit for extracting sensed data from a message received from a sensor network; a sensor network intelligence unit for extracting object and environment information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and generating an event, including notification and alarm, and context aware information from the extracted object and environment information; and a service platform management unit for providing the event and the context aware information to the application program in a form suitable for the application program.” This claim does not contain an inventive concept such that it does more than claim the ineligible idea itself. Instead, the claim applies the abstract idea to generic/nonce electronic devices or software: for example a “Ubiquitous Sensor Network (USN) middleware,” “sensor network abstraction unit,” “sensor network intelligence unit,” “service platform management unit,” a “heterogenous sensor network,” and an “application program.” The sensor in the claim does nothing more than sense “environment information” and convey it to the “sensor network data transmitter.” The “sensor network data transmitter,” in turn, collects that data and passes it along. The “middleware” then processes the information and passes along “conditional events, context aware information, and knowledge contents” to an application. Finally, the application provides the user with information.

	To the extent the preamble is limiting: A Ubiquitous Sensor Network (USN) middleware apparatus for generating an information service based on heterogeneous sensor networks was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. <i>See also, e.g.</i>, discussion for limitations 1[pre], [1c], 2[pre]-[2c]. To the extent the preamble is limiting, this claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, the preamble of claim 6, and claim 6 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[6a] a sensor network abstraction unit for extracting sensed data from a message received from a sensor network;	A sensor network abstraction unit for extracting sensed data from a message received from a sensor network was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See, e.g.</i>, discussion for limitations 2[pre]-[2a]. Reciting a “sensor network abstraction unit” that extracts sensed data from a message received from a sensor network recites a generic/nonce structure performing a routine and generic function. In this claim, the “sensor network abstraction unit” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”).

	Accordingly, limitation [6a], and claim 6 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[6b] a sensor network intelligence unit for extracting object and environment information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and generating an event, including notification and alarm, and context aware information from the extracted object and environment information; and	[6b] recites the additional limitation of “a sensor network intelligence unit for extracting object and environment information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and generating an event, including notification and alarm, and context aware information from the extracted object and environment information,” which does not change the basic abstract idea of claim 1 and uses only generic/nonce structures like “sensor network intelligence unit” and “network abstraction unit,” along with functional language. This additional limitation was well-known, routine and conventional in the industry. <i>See also, e.g.</i>, discussion for limitation [2b]. Reciting a “a sensor network intelligence unit” that extracts object and environment information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and generating an event, including notification and alarm, and context aware information from the extracted object and environment information recites generic structures performing a routine and generic function. In this claim, the “sensor network intelligence unit” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts.

	Accordingly, limitation [6b], and claim 6 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[6c] a service platform management unit for providing the event and the context aware information to the application program in a form suitable for the application program.	A service platform management unit for providing the event and the context aware information to the application program in a form suitable for the application program was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitation [2c]. Reciting a “service platform management unit ” that provides event and the context aware information to the application program in a form suitable for the application program was well understood, routine and conventional in the relevant industry at the relevant time period recites generic structures performing a routine and generic function. In this claim, the generic/nonce “service platform management unit” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. Indeed, it was the ubiquitous purpose of middleware to be able to provide such useful information to the application program in a way that the application program could understand. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [6c], and claim 6 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).

7[pre]. The ubiquitous sensor network middleware apparatus as recited in claim 6, wherein the sensor network abstraction unit comprises:	See response to Claim 6, which is incorporated in full by reference here. This claim is “substantially similar and linked to the same abstract idea” as each of representative claims 1, 6 and 10. <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass’n</i>, 776 F.3d 1343, 1348 (Fed. Cir. 2014). In this claim, the sensor network abstraction unit performs routine and generic processing capabilities RFID and sensor network middleware generally. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The description of each of these components is functional. <i>See id.</i>, 838 F.3d at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to <i>how</i> to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). To the extent the preamble is limiting, this claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, the preamble of claim 7, and claim 7 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[7a] a sensor network interface for extracting the sensed data by referring to a	A sensor network interface for extracting the sensed data by referring to a message transfer protocol was well understood, routine and conventional in the relevant industry at the relevant time period.

message transfer protocol;	<i>See also, e.g.,</i> discussion for limitations 3[pre]-[3a]. Reciting a “sensor network interface” that extracts sensed data by referring to a message transfer protocol recites generic structures performing a routine and generic function. In this claim, the generic/nonce “sensor network interface” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [7a], and claim 7 in its entirety, fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[7b] a sensor network interface protocol storage for managing a rule for the message transfer protocol; and	A sensor network interface protocol storage for managing a rule for the message transfer protocol was well understood, routine and conventional in the relevant industry at the relevant time period. Reciting a “sensor network interface protocol storage” that manages a rule for the message transfer protocol recites generic structures performing a routine and generic function. In this claim, the generic/nonce “sensor network interface protocol storage” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). At the relevant time, the structures and functions of this claim were well-known, routine and conventional in the art.

	The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [7b], and claim 7 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[7c] a sensor network monitor for monitoring a state of the sensor network, based on the data received from the sensor network interface.	A sensor network monitor for monitoring a state of the sensor network, based on the data received from the sensor network interface was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitation [3c]. Reciting a “sensor network monitor” that monitors a state of the sensor network, based on the data received from the sensor network interface recites generic structures performing a routine and generic function. In this claim, the “sensor network monitor” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time.

	This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [7c], and claim 7 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
8[pre]. The ubiquitous sensor network middleware apparatus as recited in claim 7, wherein the sensor network intelligence unit comprises:	See response to Claim 7, which is incorporated in full by reference here. This claim is “substantially similar and linked to the same abstract idea” as each of representative claims 1, 6 and 10. <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass’n</i>, 776 F.3d 1343, 1348 (Fed. Cir. 2014). In this claim, the “ubiquitous sensor network middleware apparatus” and “sensor network intelligence unit” thereof perform routine and generic processing capabilities RFID and sensor network middleware generally. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The description of each of these components is functional. <i>See id.</i>, 838 F.3d at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to <i>how</i> to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). To the extent the preamble is limiting, this claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including

	but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. Accordingly, the preamble of claim 8, and claim 8 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[8a] a sensed data analyzer for performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit;	A sensed data analyzer for performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitation 4[pre]-[4a]. Reciting a “sensed data analyzer” that performs an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit recites generic structures performing a routine and generic function. In this claim, the generic/nonce “sensed data analyzer” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time.

	This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [8a], and claim 8 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[8b] an event processor for generating the event including the knowledge contents according to a rule set by the application program and managing the generated event; and	An event processor for generating the event including the knowledge contents according to a rule set by the application program and managing the generated event was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitation [4b]. Reciting an “event processor” that generates event(s) including knowledge contents according to a rule set by the application program and managing the generated event recites generic structures performing a routine and generic function. In this claim, the generic/nonce “event processor” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references

	listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [8b], and claim 8 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[8c] a context information manager for sensing and generating the environment condition information, based on the sensed data analyzed by the sensed data analyzer.	A context information manager for sensing and generating the environment condition information, based on the sensed data analyzed by the sensed data analyzer was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitation [4c]. Reciting a “context information manager” that senses and generates environment condition information based on sensed data recites generic structures performing a routine and generic function. In this claim, the generic/nonce “context information manager” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts.

	Accordingly, limitation [8c], and claim 8 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
9[pre]. The ubiquitous sensor network middleware apparatus as recited in claim 8, wherein the service platform management unit comprises:	See response to Claim 8, which is incorporated in full by reference here. This claim is “substantially similar and linked to the same abstract idea” as each of representative claims 1, 6 and 10. <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass’n</i>, 776 F.3d 1343, 1348 (Fed. Cir. 2014). <i>See also, e.g.</i>, discussion for limitations 5[pre]-[5a]. In this claim, the “ubiquitous sensor network middleware,” and the “service platform management unit” thereof, performs routine and generic processing capabilities RFID and sensor network middleware generally. See <i>Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The description of each of these components is functional. See <i>id.</i>, 838 F.3d at 1258 (finding abstract a patent claim that included a cellular telephone, a graphical user interface, and a downloadable application, because “the claimed invention [was] entirely functional in nature”). “There is nothing in [the claim] that is directed to how to implement the [idea]. Rather, the claim is drawn to the idea itself.” <i>Id.</i> Put another way, “the recited physical components ‘merely provide a generic environment in which to carry out the abstract idea’” <i>Id.</i> at 1260 (citing <i>In re TLI Comms. LLC Patent Litigation</i>, 823 F.3d 607, 611 (Fed. Cir. 2016)). To the extent the preamble is limiting, this claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts.

	The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. Accordingly, the preamble of claim 9, and claim 9 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[9a] a directory service manager for identifying and searching resources of the sensor network;	A directory service manager for identifying and searching resources of the sensor network was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitations 5[pre]-[5a]. Reciting a “directory service manager” that identifies and searches resources of the sensor network recites generic structures performing a routine and generic function. In this claim, the generic/nonce “directory service manager” performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [9a], and claim 9 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the

	industry.”” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i> , 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i> , 134 S. Ct. at 2359).
[9b] a service process manager for scheduling and managing an operation order of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program; and	A service process manager for scheduling and managing an operation order of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitation [5b]. Reciting a “service process manager” that schedules and manages an operation order of other generic structures of the middleware, which here are called the “sensed data analyzer,” the “event processor,” the “context information manager,” and the “directory service manager” so that the middleware can provide an information service according to the application program recites generic structures performing a routine and generic function. Specifically, it manages an operation sequence so that the middleware can provide an information service to an application program and thereby performs routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [9b], and claim 9 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.”” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).

[9c] an application program interface for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program.	An application program interface for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitation [5c]. Reciting an “application program interface” that provides the application program with the results processed by the various generic structures of the middleware, which here are referred to as the “sensor network monitor,” the “sensed data analyzer,” the “event processor,” the “context information manager,” and the “directory service manager” to provide an information service to the application in a form suitable for the application program recites generic structures performing a routine and generic function. Specifically, it provides the application program with useful information as part of the information service that the middleware provides to the application program, a task that was ubiquitous, well-known, and routine in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [9c], and claim 9 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
10[pre]. A method for generating an information service based on heterogeneous sensor networks in a	This claim is “substantially similar and linked to the same abstract idea” as representative claims 1 and 6, and is itself a representative claim. <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass’n</i>, 776 F.3d 1343, 1348 (Fed. Cir. 2014). <i>See also, e.g.</i>, discussion for limitation 1[pre].

ubiquitous sensor network middleware apparatus, comprising:	Claim 10 is directed to: “A method for generating an information service based on heterogeneous sensor networks in a ubiquitous sensor network middleware apparatus, comprising: extracting sensed data and monitoring a state management of a sensor network, based on the extracted sensed data; performing an analysis operation to clean, classify and integrate the extracted sensed data; extracting object and environment information from the analyzed sensed data, and generating context aware information based on the extracted object and environment information; generating an event including notification event, alarm, and knowledge contents according to a rule set by an application program; scheduling an operation sequence for providing an information service to the application program; and providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events and context aware information.” This claim does not contain an inventive concept such that it does more than claim the ineligible idea itself. Instead, the claim applies the abstract idea, with only minimal reference to generic and/or nonce structures and in purely functional language. In this claim middleware provides an information service based on data from a heterogeneous sensor network. To accomplish this, the middleware merely performs well-known and conventional processes that are akin to mental steps. It “extracts sensed data,” “monitors a state management,” “performs an analysis operation,” “cleans, classifies and integrates” extracted data, “extracts object and environment information,” “generates context aware information,” “generates an event,” “schedules an operation sequence for providing an information service,” and “provides [an] application program with [an] information service.” Ultimately, the sensors of the claim simply generate “sensed data,” which the middleware processes and uses to provide relevant information to the application. To the extent the preamble is limiting, it was well-understood, routine and conventional in the relevant industry at the relevant time period, including for the reasons described above. To the extent the preamble is limiting, this claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including
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	but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. <i>See also, e.g.</i>, discussion for limitations 1[pre], [1c], 2[pre]-[2c]. Accordingly, the preamble to claim 10, and claim 10 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[10a] extracting sensed data and monitoring a state management of a sensor network, based on the extracted sensed data;	Extracting sensed data and monitoring a state management of a sensor network, based on the extracted sensed data was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitations 3[pre]-[3c]. Reciting “extracting sensed data and monitoring a state management of a sensor network, based on the extracted sensed data” simply recites generic structures performing a routine and generic function. “Extracting sensed data” and “monitoring a state management of a sensor network” were routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts.

	Accordingly, limitation [10a], and claim 10 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[10b] performing an analysis operation to clean, classify and integrate the extracted sensed data;	Performing an analysis operation to clean, classify and integrate the extracted sensed data was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitation [1c]. Reciting “performing an analysis operation” and “clean, classify, and integrate” simply recites generic structures performing routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [10b], and claim 10 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[10c] extracting object and environment information from the	Extracting object and environment information from the analyzed sensed data, and generating context aware information based on the extracted object and environment information was well understood, routine and conventional in the relevant industry at the relevant time period.

analyzed sensed data, and generating context aware information based on the extracted object and environment information;	<i>See also, e.g.</i>, discussion for limitation [2b]. Reciting “extracting object and environment information” from analyzed sensed data and “generating context aware information based on the extracted object and environment information” simply recites generic structures performing routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [10c], and claim 10 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[10d] generating an event including notification event, alarm, and knowledge contents according to a rule set by an application program;	Generating an event including notification event, alarm, and knowledge contents according to a rule set by an application program was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitations [1c], [2b] and [4b]. Reciting “generating an event including notification event, alarm, and knowledge contents according to a rule set by an application program” simply recites generic structures performing routine and generic

	functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [10d], and claim 10 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[10e] scheduling an operation sequence for providing an information service to the application program; and	Scheduling an operation sequence for providing an information service to the application program was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitation [1c]. Reciting “scheduling an operation sequence” and “providing an information service to [an] application program” simply recites generic structures performing routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”).

	The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [10e], and claim 10 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
[10f] providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events and context aware information.	Providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events and context aware information was well understood, routine and conventional in the relevant industry at the relevant time period. <i>See also, e.g.</i>, discussion for limitations [1c] and [5b]. Reciting “providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events and context aware information” simply recites generic structures performing routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time.

	This claim limitation was well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, limitation [10f], and claim 10 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
11. The method as recited in claim 10, wherein the performing an analysis operation to clean, classify and integrate the extracted sensed data analyzes sensed data from a specific single sensor network, or analyzes sensed data from a plurality of sensor networks, or analyzes sensed data from the sensor network in association with predefined legacy data.	See response to Claim 10, which is incorporated in full by reference here. This claim is “substantially similar and linked to the same abstract idea” as each of representative claims 1, 6 and 10. <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass’n</i>, 776 F.3d 1343, 1348 (Fed. Cir. 2014). <i>See also, e.g.</i>, discussion for limitation [1c]. Reciting “performing an analysis operation to clean, classify and integrate the extracted sensed data” and “analyz[ing] sensed data from a specific single sensor network” or from “a plurality of sensor networks,” or “in association with predefined legacy data” simply recites routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. The additional limitation of claim 11 (as well as the subject matter of claim 10) were well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the

	relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, the additional limitation of claim 11, and claim 11 in its entirety, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
12. The method as recited in claim 10, wherein the providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events and context aware information provides the information service to the application program only one time, or periodically provides the information service during a request period of the application program, or provides the information service at a specific time	See response to Claim 10, which is incorporated in full by reference here. This claim is “substantially similar and linked to the same abstract idea” as each of representative claims 1, 6 and 10. <i>Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass’n</i>, 776 F.3d 1343, 1348 (Fed. Cir. 2014). <i>See also, e.g.</i>, discussion for limitations [1c] and [5b]. Reciting “providing the application program with the information service obtained according to the scheduled operation sequence, the information service including events and context aware information” and “provid[ing] the information service to the application program only one time” or “periodically . . . during a request period of the application program,” “at a specific time point when a requirement from the application program is satisfied” simply recites generic structures performing routine and generic functionality that was well-understood, routine and conventional of RFID and sensor network middleware generally and well-known in the art. <i>See Affinity Labs</i>, 838 F.3d at 1262 (characterizing “transmitting and receiving signals” as “routine functions.”). The above description of the industry shows that this element, both individually and in combination with other elements of that claim, was well understood, routine, and conventional, in the relevant industry at the relevant time. The additional limitation of claim 12 (as well as the subject matter of claim 10) were well known routine, and conventional at the relevant time, as shown by its disclosure in numerous prior art references as of the

point when a requirement from the application program is satisfied.	relevant time, including but not limited to the references listed in the Defendants’ Invalidity Contentions as to this claim element and their corresponding claim charts. Accordingly, the additional limitation of claim 12, and claim 12 in its entirety,, is directed to an abstract idea and fails to claim “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” <i>Content Extraction & Transmission LLC v. Wells Fargo Bank, National Ass’n</i>, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014) (quoting <i>Alice</i>, 134 S. Ct. at 2359).
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