EXHIBIT C

U.S. Patent Nos. 11,842,415 and 11,847,587

DECLARATION OF MICHAEL T. GOODRICH, PH.D. REGARDING U.S. PATENT APPLICATION NUMBERS 11,842,415 AND 11,847,587

I, Michael T. Goodrich, Ph.D., declare and state as follows:

I. SCOPE OF ASSIGNMENT

1. I have been retained to provide information and a declaration regarding Ameranth's two, new "network focused" patents, U.S. Patent Nos. 11,842,415 ('415 Patent) and 11,847,587 ('587 Patent) (collectively, the "Network Patents"). In particular, I have been asked to opine on the state of the art of computer technology at the time of the Network Patents, how improvements disclosed in the Network Patents and allowed claims improved the state of the art of computer technology at the time of the Network Patents, and as to written description and enablement support in the specification and the allowed claims of the Network Patents from the perspective of teaching one of ordinary skill in the art at the relevant time.

2. I make this Declaration based upon my own personal knowledge, information, and belief, and I would and could competently testify to the matters set forth herein if called upon to do so.

II. QUALIFICATIONS

3. Attached hereto as Appendix A is a true and correct copy of my Curriculum Vitae (CV). I summarize some of the relevant information regarding my CV as follows.

4. I received a Bachelor of Arts degree in Mathematics and Computer Science from Calvin University, in Grand Rapids, Michigan, in 1983, a Master of

Science (M.S.) degree in Computer Science from Purdue University, in West Lafayette, Indiana, in 1985, and a Ph.D. in Computer Science from Purdue University in 1987.

5. I am a Distinguished Professor in the Department of Computer Science at the University of California, Irvine, where I have been a faculty member since 2001. The Distinguished Professor title is a campus-level distinction and is reserved for faculty who have achieved the highest levels of scholarship over the course of their careers.[1] Previously, I was a professor in the Department of Computer Science at Johns Hopkins University from 1987-2001.

6. I have authored or coauthored over 350 publications, including several widely adopted books, such as *Data Structures and Algorithms in Java*, *Data Structures and Algorithms in C++*, *Data Structures and Algorithms in Python*, *Introduction to Computer Security*, and *Algorithm Design and Applications*. My publications include contributions to data structures and algorithms, information visualization, networking, distributed and parallel algorithms, information security and privacy, software engineering, and technologies used in the hospitality industry. For example, I have published peer-reviewed research articles, including

[1] *See, e.g.*, https://ap.uci.edu/titles-of-distinction/distinguished-professor/, last visited August 15, 2022.

publications[2] on the use of parallelism in computer systems, including publications J-5, J-7, J-12, J-16, J-19, and J-24; hence, I have experience in the field of distributed computing, which is a subject area of the '130 Patent and Network Patents. Also, several of my textbooks include entire chapters on software engineering, and several of my publications, including Ch-8, Ch-12, J-36, J-45, C-53, C-62, C-63, C-64, C-209, are on algorithm engineering; hence, I have experience in the field of software engineering, which is a subject area of the '130 Patent and Network Patents. Further, together with my collaborators, I developed the Java Data Structures Library (JDSL) in 2000, which is a complete Java application programming interface (API) and implementation of fundamental data structures, including lists, trees, and graphs. JDSL is featured in the Stony Brook Algorithm Repository,[3] and I have published peer-reviewed papers regarding it, including Ch-8, Ch-12, J-45, C-62, C-63, and C-64. In addition, my publications Ch-9, C-116, and C-118 involve technologies to determine whether users are within the building boundaries of an institution, such as a hotel or restaurant, so as to provide them with additional in-premises services. Further, my publication J-56 is directed at solutions for workload management of queries and updates for online databases, partitioning the data space into push or pull

[2] I am using the indexing scheme from my CV. Please see my CV for the corresponding citations.

[3] *See* https://www3.cs.stonybrook.edu/~algorith/implement/jdsl/implement.shtml, last visited August 15, 2022.

regions, which has applications to flight and hotel booking systems such as Orbitz.com. Further, my publication C-210 provides a novel data structure for provisioning drivers in a private-driver service, such as Uber, Lyft, or Doordash, so as to maintain driver locations relative to possible pick-up locations so that when a client makes a request the system can quickly respond with the identity of the driver that is closest to the pick-up location. Altogether, my publications have, according to Google Scholar, been cited over 18,000 times. My research has been supported by grants from the Defense Advanced Research Projects Agency ("DARPA"), the National Security Agency ("NSA"), the Office of Naval Research ("ONR"), the Army Research Office ("ARO"), and the National Science Foundation ("NSF").

7. In addition, I have consulting experience in matters involving the hospitality industry, algorithms, data structures, cryptography, machine learning, digital rights management, computer security, mobile devices, networking, software, video streaming, and storage technologies. For example, my first technical consulting engagement, initiated in 2011, involved technologies for the hospitality industry, where I was retained through Sidley Austin LLP on behalf of the casino-gaming company, IGT, in a patent dispute arbitration, IGT v. Aristocrat Technologies. Further, I was engaged in 2022 by McKool Smith on behalf of American Airlines, Inc., in a patent-related litigation. A POSITA would understand that the hospitality industry encompasses a wide range of businesses and services

that provide accommodations, travel, and entertainment to guests and customers, and that it includes sectors such as food and beverage, hotels, restaurants, travel agencies/applications, event ticketing, theme parks, cruise lines, airlines, and casino gaming.

8. I am a Fellow of the American Association for the Advancement of Science ("AAAS"), a Fellow of the Institute of Electrical and Electronics Engineers ("IEEE"), and a Fellow of the Association for Computing Machinery ("ACM"), as well as being named as a Foreign Member of the Royal Danish Academy of Sciences and Letters. I am also a recipient of a Fulbright Scholarship (for senior specialist service to University of Aarhus, Denmark). In addition, I am a recipient of the IEEE Computer Society Technical Achievement Award ("for outstanding contributions to the design of parallel and distributed algorithms for fundamental combinatorial and geometric problems") and the Pond Award for Excellence in Undergraduate Teaching. Also, I am an ACM Distinguished Scientist.

9. I am a co-inventor on several U.S. patents, including U.S. Patent No. 7,257,711, “Efficient Authenticated Dictionaries with Skip Lists and Commutative Hashing,” which discloses secure distributed data authentication schemes. I am also co-inventor of U.S. Patent No. 7,299,219, “High Refresh-Rate Retrieval of Freshly Published Content using Distributed Crawling,” which discloses a technology for quickly retrieving website data that can change frequently, so as to be stored in a

search engine. I am also co-inventor of U.S. No. Patent 8,681,145, "Attribute Transfer Between Computer Models Including Identifying Isomorphic Regions in Polygonal Meshes," which teaches how to map one mesh-based computer model to another. In addition, I am co-inventor of U.S. Patent No. 9,152,716, "Techniques for Verifying Search Results Over a Distributed Collection," which discloses a system for searching the Internet so as to produce verifiable search results that can be produced by a search engine.

10. I have taught courses at Johns Hopkins University, Brown University, and University of California, Irvine, at both the undergraduate and graduate levels. Topics of my courses have included computer security, algorithms, data structures, information visualization, computer graphics, networking, algorithm engineering, computational geometry, and parallel processing. In addition, I have mentored 25 PhD students over the years, who have written their PhD theses on topics in algorithms, data structures, information visualizations, networking, parallel processing, and computer security and privacy.

11. I have served as an editor on several technical journals, including *Computational Geometry: Theory and Applications, Journal of Computer & System Sciences*, *Journal of Graph Algorithms and Applications*, *Int. Journal of Computational Geometry & Applications*, and *Information Processing Letters*. I have also served on many program committees (PCs) for top conferences and

workshops in Computer Science, including serving as PC chair in several instances. Examples include ACM Symposium on Computational Geometry ("SoCG"), ACM Symposium on Theory of Computing ("STOC"), Workshop/Symposium on Algorithms and Data Structures ("WADS"), Algorithm Engineering and Experimentation ("ALENEX"), which I co-founded with Dr. Catherine McGeoch in 1999), IEEE Symposium on Foundations of Computer Science ("FOCS"), ACM-SIAM Symposium on Discrete Algorithms (SODA), International Symposium on Graph Drawing ("GD"), International Colloquium on Automata, Languages, and Programming ("ICALP"), ACM Conference on Computer and Communications Security ("CCS"), European Symposium on Algorithms ("ESA"), IEEE International Parallel and Distributed Processing Symposium ("IPDPS"), ACM Symposium on Parallel Algorithms and Architectures ("SPAA"), ACM Symposium on Advances in Geographic Information Systems ("GIS"), IEEE Symposium on Security and Privacy ("S&P"), IEEE International Conference on Big Data, IEEE International Conference on Data Engineering ("ICDE"), and International Symposium on Algorithms and Computation ("ISAAC"), and DAGS Conference on Electronic Publishing and the Information Superhighway.

12. Further, I have followed the hospitality industry since I was a graduate student at Purdue University. For example, as a graduate student, I was a regular participant in the John Purdue Room food preparation and service laboratory, which

is an advanced hospitality management simulation designed to give Hospitality & Tourism Management students hands-on practice in a wide range of managerial skills and techniques that are normally associated with the duties of a hospitality operations manager.[4] Since that time, I have followed the development of technologies for the hospitality industry, including Sabre, Orbitz, Grubhub, Doordash, Uber, and Lyft, including working on related research topics, as outlined above.

III. COMPENSATION

13. The rate of compensation for my work in this case is $750 per hour. My compensation in no way depends on the information and opinions expressed in this expert report or the outcome of this case.

IV. PERSON OF ORDINARY SKILL IN THE ART

14. I understand that the factors to be considered in determining the level of ordinary skill in the art to be: (1) the educational level of active workers in the field, including the named inventors of the patent; (2) the type of problems encountered in the art; (3) prior art solutions to those problems; (4) the rapidity with which innovations are made; and (5) the sophistication of the technology in the art.

[4] *See, e.g.*, Purdue Univ. Hospitality & Tourism Management, John Purdue Room, https://web.archive.org/web/20160302065046/https://www.purdue.edu/hhs/htm/restaurants/john_purdue.html.

I further understand that, in a given case, every factor may not be present, and one or more factors may predominate.

15. I further understand that the priority date of each of the Network Patents is as early as July 26, 2005. For example, as I analyze and explain in more detail elsewhere herein, these new Network Patents are a part of a patent family that traces to Patent Application No. 11/190,633, filed on Jul. 26, 2005, now Pat. No. 9,009,060, which was a continuation in part of Patent Application No. 11/112,990.

16. Based on my review of the Network Patents and their claims and my consideration of the above-mentioned factors, it is my opinion that a person of ordinary skill in the art ("POSITA") at the time of the invention of the Network Patents would be someone with a bachelor's degree in computer science, industrial engineering, operations research, or related field, and either (1) two or more years of relevant industry experience for hospitality applications and/or (2) an advanced degree in computer science, industrial engineering, operations research, or related field. This description is approximate, and more work experience could compensate for less education or more education could compensate for less work experience.

17. For example, the Network Patents describe software, networking, application program interfaces (APIs), databases, machine intelligence, and graphical user interfaces (GUIs), with applications to the hospitality industry, all at a conceptual level consistent with my definition of a POSITA.

18. Further, I was a person of at least ordinary skill in the art at the time of the invention of the Network Patents and I have taught persons of ordinary skill in the art in my duties as a professor. Thus, I am qualified to provide opinions regarding the knowledge and understanding of a POSITA with respect to the each of the Network Patents as of its priority date.

V. BACKGROUND

A. Distributed Computing

19. As the '587 Patent discloses, "The World Wide Web is a distributed hypermedia computer system that uses the internet to facilitate global hypermedia communication using specified protocols." '587 Patent at 18:65-19:1. *See also*, '415 Patent at 18:64-67.

20. A POSITA would therefore be aware of distributed computing, where computers are interconnected in a communications network and collectively perform computations by iteratively sending messages to each other and performing algorithms on the data. For example, the *Microsoft Computer Dictionary* includes the following definitions:

> **distribute** *vb*. To allocate among locations or facilities, as in a data-processing function that is performed by a collection of computers and other devices linked together by a network.
>
> **distributed intelligence** *n*. A system in which processing ability (intelligence) is distributed among multiple computers and other devices, each of which can work independently to some degree but can

> also communicate with the other devices to function as part of the larger system. See also distributed processing.
>
> **distributed network** *n*. A network in which processing, storage, and other functions are handled by separate units (nodes) rather than by a single main computer.
>
> **distributed processing** *n*. A form of information processing in which work is performed by separate computers linked through a communications network. Distributed processing is usually categorized as either plain distributed processing or true distributed processing. Plain distributed processing shares the workload among computers that can communicate with one another. True distributed processing has separate computers perform different tasks in such a way that their combined work can contribute to a larger goal. The latter type of processing requires a highly structured environment that allows hardware and software to communicate, share resources, and exchange information freely.
>
> *Microsoft Computer Dictionary,* 5th edition, 2002, at 167-168.

21. A POSITA would also understand that computers in a distributed computing environment can be viewed as nodes or vertices in a topological structure known as a "graph." Based on my experience, graphs are routinely taught to undergraduate computer science majors; hence, a POSITA would know that a graph is defined mathematically as a pair, (V,E), where V is a set of vertices (which are also called "nodes"[5]) and E is a set of edges, which are pairs of vertices. In a distributed computing environment, the edges represent the communication

[5] *See, e.g.,* '415 Patent at 11:16-18, '587 Patent at 11:16-18.

connections that exist between pairs of computers that comprise the nodes in the graph.

B. The CAP Theorem Challenge

22. A POSITA would know that in distributed database systems, a database is distributed across multiple computers and devices in a network.

> **distributed database** *n*. A database implemented on a network. The component partitions are distributed over various nodes (stations) of the network. Depending on the specific update and retrieval traffic, distributing the database can significantly enhance overall performance.

Microsoft Computer Dictionary, 5th edition, 2002, at 167.

23. Such an architecture can provide tremendous benefits. For example, as would also be known in 2005, the year of the priority date for the Network Patents, there were significant challenges for system designers to be able to successfully implement a distributed database that simultaneously achieves the following design goals for consistency, availability, and partition-tolerance:[6]

- **Consistency**. Consistency means that all devices on the network see the same data at the same time. For this to happen, whenever data is written to one node, it must be immediately forwarded and replicated to all the other nodes in the system before the write is deemed successful.

[6] *See, e.g.*, "What is the CAP Theorem?", https://www.ibm.com/topics/cap-theorem.

- **Availability**. Availability means that that any device making a request for data gets a response, even if one or more other nodes are down. Another way to state this is that all working nodes in the distributed system return a valid response for any request.
- **Partition-tolerance**. A partition is a communications break within a distributed system, such as a delayed or disconnected link between nodes, which disconnects one or more nodes from other nodes in the network. Partition-tolerance means that a cluster of nodes must continue to work despite any communication breakdowns between nodes in the system.

24. The CAP Theorem states that it is not possible to fully achieve all three of these goals 100% of the time using a single network modality, like the Internet. That is, while it is possible to design a distributed system on a network that can optimally achieve any two of the three goals of consistency, availability, and partition-tolerance, it is not possible to fully achieve all three goals all of the time. Thus, system designers faced with the constraints of the CAP Theorem would need to choose which two design goals to emphasize. That is, in the quest for continual computer improvements, the CAP Theorem articulates challenges that are faced by any distributed computing system, and design choices that can effectively deal with these challenges can therefore provide improvements to the functionality of computers, such as is done in the Network Patents, as I explain below.

C. Application Programming Interfaces (APIs)

25. An **application programming interface** (API) is a way for two or more computer programs to communicate with each other using a set of definitions and protocols.[7] For example, a food-ordering app on a smartphone phone could send requests to a server for such a system via its API and show the responses to users as updates on the smartphone concerning the order. Conversely, another example could be a cloud messaging service that provides an API for a database to use to send messages and notifications to the smartphones of users. An API can be thought of as a contract between two applications, with API architecture documentation that explains how developers should structure API requests and what they can expect in response to those requests.

26. An API architecture is usually defined in terms of a client and server, where an application sending a request is called the "client," and the application sending the response is called the "server." Thus, an API is a type of software interface, offering a service to other pieces of software. Further, an API itself comprises software that supports the standard that implements the functionality of

[7] *See, e.g.*, "What is an API (Application Programming Interface?)", https://aws.amazon.com/what-is/api/.

the interface. Thus, the term "API" may refer either to the specification or to the implementation.[8]

27. As will be shown below, the ordered combination of the elements in the claims of the '415 and '587 Patents overcomes the challenge of simultaneously achieving consistency, availability, and partition-tolerance for a distributed database by changing the preconditions inherent in the environment for which these goals were typically articulated and thus improve their networks.

VI. THE NETWORK PATENTS

28. U.S. Patent No. 11,842,415 ('415 Patent) was filed on February 4, 2022, was published as U.S. Patent Publication 2022/0156858 on May 19, 2022, and its allowed claims were allowed on October 30, 2023. Its inventor is Keith R. McNally.

29. U.S. Patent No. 11,847,587 ('587 Patent) was filed on December 8, 2022, and its allowed claims were allowed on November 2, 2023. Its inventor is Keith R. McNally.

30. The legacy of the '415 and '587 patents is rooted in Ameranth's innovative and award-winning products. In addition, Ameranth's inventions have received accolades from Bill Gates, the European Hospital Convention, and

[8] *See, e.g.*, "API," https://en.wikipedia.org/wiki/API.

ComputerWorld as well as receiving a $2.5 million investment from Microsoft. Declaration of Keith McNally at 6-7. Furthermore, Ameranth's patents have been licensed by some of the most recognized brands in the hospitality industry including Taco Bell, Dunkin Donuts, Burger King. *Id* at 8.

A. The Patent Family for the Network Patents

31. Each of the Network Patents is related to a family of patent applications that trace back to Application Ser. No. 11/190,633, filed on July 26, 2005, and published as US 2006/0020497 (now U.S. Patent No. 9,009,060). The Network Patents have virtually identical specifications to each other and also to the specification of U.S. Patent No. 11,276,130 (the '130 Patent), except for the title and some of the priority claims. The claims of each of the Network Patents are different between each other and the '130 Patent.

32. U.S. Patent No. 11,276,130 also traces back to Application Ser. No. 11/190,633. Further, I find that the specification of the '130 Patent significantly overlaps with that for U.S. Patent 9,009,060. Henceforth, I refer to this specification as the "common specification." In addition, I find that the specification of the '130 Patent overlaps with US 2005/0204308 but I do not find in US 2005/0204308 Fig. 10 or the material in the '130 Patent at 13:2-6, 13:31-18:57. Thus, this material appears to be added after April 22, 2005. Consistent with this finding, I find that the specification of the '130 Patent overlaps with U.S. Patent No. 6,982,733 but I do not

find in U.S. Patent No. 6,982,733 Fig. 10 or the material in the ’130 Patent 13:2-6, 13:31-18:57. Thus, this material appears to be added after November 1, 2001. Further, I find that the specification of the ’130 Patent overlaps with U.S. Patent No. 6,384,850 but I do not find in U.S. Patent No. 6,384,850 Figs. 8-10 or the material in the ’130 Patent at 3:52-4:51, 5:27-30, 13:2-6, 13:31-18:57. Thus, this material appears to be added after September 21, 1999. Henceforth, I refer to the continuation-in-part material added after April 22, 2005 collectively as “new CIP material.”

B. The Allowed Claims of the ’415 Patent

33. The allowed claims of the ’415 Patent are as follows:

> 1. An improved and intelligent web server computer with multi-modes of contact, multi-communications protocols, multi-user and parallel operational capabilities for use in a hospitality market comprising:
>
> at least one said web server computer which can be accessed, controlled and provide results, statistics and/or reports to a system administrator via a web based interface;
>
> at least one hospitality software application integrated with the at least one said web server computer;
>
> a master database comprising data and parameters of the at least one hospitality software application integrated with the at least one said web server computer and with a usable file structure dictated prior to execution, thus improving efficiency and reliability, the master database being accessible via a database application program interface (API) and with predefined formats stored within it, wherein the API intelligently learns, updates and stores multiple communication modes of contact and related operational parameters including set periods of time or reflecting other factors associated with hospitality

entities and/or hospitality users along with their prior preferences, if any;

Middleware/Framework Communications Control Software, (MFCCS) which enables via its centralized system layer architecture the at least one web server computer to communicate with two or more different wireless handheld computers, each with different mobile operating systems and with mobile compatible versions of the said hospitality application accessible from and with a different set of handheld GUI screens uniquely enabled for both user initiating actions and later selection of choices directly on and from the touchscreens of said different wireless handheld computers and for multiple modes of contact, multiple communications protocol functionality, integrated with the master database and with the at least one hospitality software application;

at least one external software API, which enables the integration of the at least one hospitality software application via the MFCCS and its layer architecture with one or more non- hospitality applications and to enable real time searches for communication modes of contact and/or related operational parameters, not already stored and available in the master database, if any;

wherein the at least one said web server computer is integrated with the MFCCS and is programmed with instructions executable to choose and apply a primary communications mode of contact, for and with the hospitality entities and/or users, for a period of time, to execute hospitality application task requests from said two or more wireless handheld computers associated with their respective users, and further enabled to automatically choose and execute alternate communication modes of contact and/or alternate communications protocols if needed and appropriate at the time of execution upon failure of the primary communications mode of contact, and/or apply rule based intelligence to not attempt again for an operational period of time the primary communication mode, the instructions being further executable to enable the at least one said web server computer to further improve its efficiency by using less computer resources and less computing time through the avoidance of attempting communications modes of contact to hospitality entities and/or users and/or for subsequent user hospitality application task requests, likely to fail during the operational period of time if attempted again during that time.

9. A network of interconnected, intelligent and improved web server computers with multi-modes of contact, multi-communications protocols, multi-user and parallel operational capabilities for use in a hospitality market comprising;

at least one network of said interconnected web server computers which can be accessed and controlled by system administrators via a web based interface;

at least one hospitality software application integrated with the at least one said web server network;

a master database comprising data and parameters of the at least one said hospitality software application integrated with the at least one said network of web server computers and with a usable file structure dictated prior to execution, the master database being accessible via a database application program interface (API) and with predefined formats stored within it, thus improving network efficiency and reliability, wherein the API intelligently learns, updates and stores inventory data and/or multiple communication modes of contact and related operational parameters associated with hospitality entities and/or hospitality users along with their prior preferences, if any;

Middleware/Framework Communications Control Software (MFCCS) which enables via its centralized system layer architecture the at least one said web server network to communicate with two or more different wireless handheld computers each with different mobile operating systems and with a different set of handheld GUI screens uniquely enabled for both user initiating actions and later selection of choices directly on and from the touchscreens of said different wireless handheld computers and for multiple modes of contact, multiple communications protocol functionality, integrated with the master database and with the at least one hospitality software application;

at least one external software API, which enables the integration of the at least one hospitality software application via the MFCCS with one or more non-hospitality application and to enable access to information not already stored and available in the master database;

wherein the at least one web server network is integrated with the MFCCS and is programmed with instructions enabled to choose and

apply a communications mode of contact for and with the hospitality entities and two or more different communications modes of contact during the same hospitality task with handheld users to execute hospitality application task requests with a first hospitality entity from said wireless handheld computers associated with their respective users, and further enabled to automatically choose and execute with alternate hospitality entities when inventory is learned to be unavailable at a first hospitality entity and then improve efficiency by applying rule based intelligence to not attempt again such a request with the first hospitality entity for a subsequent user request, now known by the interconnected web server network as to be unavailable to enable the web server network to use less computer resources and less computing time through the avoidance of attempting communications modes of contact to hospitality entities known in advance to fail to meet the subsequent user requests.

15. A network of interconnected, intelligent and improved web server computers with multi-modes of contact, multi-communications protocols, multi-user and parallel operational capabilities for use in a hospitality market comprising;

at least one network of said interconnected web server computers which can be accessed and controlled by system administrators via a web based interface;

at least one hospitality software application integrated with the at least one said web server network;

a master database comprising data and parameters of the at least one said hospitality software application integrated with the at least one said network of web server computers and with a usable file structure dictated prior to execution. the master database being accessible via a database application program interface (API) and with predefined formats stored within it thus improving network efficiency and reliability, wherein the API intelligently learns, updates and stores inventory data and multiple communication modes of contact and related operational parameters associated with hospitality entities and/or hospitality users along with their prior preferences, if any;

Middleware/Framework Communications Control Software (MFCCS) which enables via its centralized system layer architecture the at least

one said web server network to communicate with two or more different wireless handheld computers each with different mobile operating systems and with a different set of handheld GUI screens uniquely enabled for both user initiating actions and later selection of choices directly on and from the touchscreens of said different wireless handheld computers and for multiple modes of contact, integrated with the master database and with the at least one hospitality software application;

at least one external software API, which enables the integration of the at least one hospitality software application with a second and different hospitality application via the MFCCS and both further integrated with one or more non- hospitality application and with the non-hospitality application enabling access to information not already stored and available in the master database;

wherein the at least one said web server network is integrated with the MFCCS and is enabled to be programmed with instructions to intelligently choose and apply a communications mode of contact for and with the hospitality entities and for two or more different communications modes of contact with the handheld users to execute hospitality application task requests and with the dual modes of contact with the handheld users improving efficiency and reducing the use of computing resources in the wireless handheld computers, thus improving them.

4. The web server of claim 1 in which the at least one hospitality software application includes executable instructions for restaurant and/or hotel reservations.

5. The web server of claim 1 in which the at least one hospitality software application includes executable instructions for event ticketing.

6. The web server of claim 1 in which the at least one hospitality software application includes executable instructions for food/drink ordering.

7. The web server of claim 1, in which best and secondary communication modes of contact include at least two of email address, text message, voice message, instant message, automated assistant

message, database exchange, email, fixed/landline phone number, and/or mobile phone numbers.

8. The web server network of claim 2 in which the at least one hospitality software application includes executable instructions for food/drink ordering.

9. The web server network of claim 2 in which the at least one hospitality software application includes executable instructions for restaurant and/or hotel reservations.

10. The web server network of claim 3 in which the at least one hospitality software application includes executable instructions for event ticketing.

11. The web server network of claim 3 in which the at least one hospitality software application includes executable instructions for food/drink ordering.

12. The web server of claim 1, in which free text and/or instant messaging is used as one alternate mode of contact with the handheld computer equipped users, and as part of the same hospitality transaction and with switching between the different modes of contact during the transaction and thus improving efficiency.

13. The web server network of claim 2, in which free text and/or instant messaging is used as one alternate mode of contact with the handheld computer equipped users, and as part of the same hospitality transaction and with switching between the different modes of contact during the transaction and thus improving efficiency.

14. The web server network of claim 3, in which free text and/or instant messaging is used as one alternate mode of contact with the handheld computer equipped users, and as part of the same hospitality transaction and with switching between the different modes of contact during the transaction and thus improving efficiency.

15. The web server of claim 1, further enabled to continuously synchronize between one or more computers, two or more wireless handheld computers, two or more databases and one or more website.

16. The web server network of claim 2, further enabled to continuously synchronize between one or more computers, two or more wireless handheld computers, two or more databases and one or more websites.

17. The web server network of claim 3, further enabled to continuously synchronize between one or more different computers, and two or more databases.

18. The web server of claim 1, further enabled to automatically switch between modes of contact, based upon learning and rule based intelligence.

19. The web server network of claim 2, further enabled to automatically switch between modes of contact, based upon learning and rule based intelligence.

20. The web server network of claim 3, further enabled to automatically switch between modes of contact, based upon learning and rule based intelligence.

C. The Allowed Claims of the ’587 Patent

34. The allowed claims of the ’587 Patent are as follows (I am assuming a renumbering based on omitting the cancelled claims):

1. An intelligent backoffice and handheld/mobile distributed computing network with varying, multi-modes of contact, and parallel operational capabilities for use in completing remotely initiated hospitality tasks in the hospitality market comprising:

a network of distributed and linked backoffice servers that are continuously synchronized in real time and which are enabled to be remotely accessed and managed by a system administrator via a web based interface;

one or more hospitality software applications linked with the backoffice servers and with handheld/mobile compatible versions available to be remotely accessed and used by handheld/mobile equipped users and including two or more different handheld/mobile computers with their respective and different mobile operating systems;

a master database comprising multiple linked and continuously synchronized in real-time databases throughout the network and with data and parameters of the one or more hospitality software applications integrated with the said network and with predefined formats, the master database comprising a usable file structure dictated prior to execution, thus improving efficiency and reliability, wherein the one or more hospitality software applications learn, update, store and intelligently apply varying modes of contact with the handheld/mobile equipped hospitality users and in accordance with their preferences, if any;

Middleware/Framework Communications Control Software (MFCCS) which enables via its centralized system layer architecture the parallel operations capable network to communicate with said two or more different wireless handheld computers, each with different mobile operating systems and with mobile compatible versions of the said hospitality application accessible from the back office servers;

at least one external software application program interface (API), which enables the full integration of the one or more hospitality software applications via the MFCCS and its layer architecture with one or more non-hospitality applications;

additionally the network is further enabled to automatically contact one or more other entities when the remotely initiated hospitality task cannot be completed with a first entity and to intelligently continue this, until the task is completed;

additionally the network is further enabled to intelligently apply time constraints and/or hold times, associated with the hospitality task, when applicable;

wherein the parallel operations capable network is integrated with the MFCCS and the backend servers are programmed with instructions executable to choose and apply varying modes of contact during the same remotely initiated hospitality task, for and with the handheld/mobile customers and/or handheld/mobile equipped entity staff, to intelligently execute and support completion of the hospitality application task requests.

2. An intelligent backoffice and handheld/mobile distributed computing network with varying, multi-modes of contact, and parallel operational capabilities for use in completing remotely initiated hospitality tasks in the hospitality market comprising:

a network of distributed and linked backoffice servers that are continuously synchronized in real time and which are enabled to be remotely accessed and managed by a system administrator via a web based interface;

one or more hospitality software applications linked with the backoffice servers and with handheld/mobile compatible versions available to be remotely accessed and used by handheld/mobile equipped users and including two or more different handheld/mobile computers with their respective and different mobile operating systems;

a master database comprising multiple linked and continuously synchronized in realtime databases throughout the network and with data and parameters of the one or more hospitality software applications integrated with the said network and with predefined formats. the master database comprising a usable file structure dictated prior to execution, thus improving efficiency and reliability, wherein the one or more hospitality software applications learn, update, store and intelligently apply varying modes of contact with the handheld/mobile equipped hospitality users and in accordance with their preferences, if any;

Middleware/Framework Communications Control Software (MFCCS) which enables via its centralized system layer architecture the network to communicate with said two or more different wireless handheld computers, each with different mobile operating systems and with mobile compatible versions of the said hospitality application accessible from the backoffice servers;

at least one external software application program interface (API), which enables the full integration of the one or more hospitality software applications via the MFCCS and its layer architecture with one or more non-hospitality applications;

additionally, the network is further enabled to automatically communicate alerts to the handheld/mobile equipped management staff when corresponding criteria are met;

wherein the network is integrated with the MFCCS and the backend servers are programmed with instructions executable to choose and apply varying modes of contact during the same remotely initiated hospitality task, for and with the handheld/mobile customers and/or handheld/mobile equipped entity staff, to intelligently execute and support completion of the hospitality application task requests.

3. The network of claim 1 in which the at least one hospitality software application includes executable instructions for food/drink ordering.

4. The network of claim 1 in which the at least one hospitality software application includes executable instructions for restaurant and/or hotel reservations.

5. The network of claim 2 in which the at least one hospitality software application includes executable instructions for event ticketing.

6. The network of claim 2 in which the at least one hospitality software application includes executable instructions for food/drink ordering.

7. The network of claim 1, in which free text and/or instant messaging is used as one alternate mode of contact with the handheld computer equipped users, and as part of the same hospitality transaction and with switching between the different modes of contact during the transaction and thus improving efficiency.

8. The network of claim 2, in which free text and/or instant messaging is used as one alternate mode of contact with the handheld computer equipped users, and as part of the same hospitality transaction and with switching between the different modes of contact during the transaction and thus improving efficiency.

9. The network of claim 1, further enabled to continuously synchronize between one or more computers, two or more wireless handheld computers, two or more databases and one or more websites.

10. The network of claim 2, further enabled to continuously synchronize between one or more different computers, and two or more databases.

11. The network of claim 1, further enabled to automatically switch between modes of contact, based upon learning and rule based intelligence.

12. The network of claim 2, further enabled to automatically switch between modes of contact, based upon learning and rule based intelligence.

VII. ANALYSIS FOR THE ’415 PATENT

35. In my opinion, as I explain below, a POSITA would understand that the claims of the ’415 Patent recite benefits with respect to the claimed “web server computer” (claims 1-8) and “network of interconnected, intelligent and improved web server computers” (claims 9-20), and the ’415 Patent claims are directed to subject matter that is squarely in the computing realm and which improves the functionality of computers. For example, the ability for an intelligent web server to provide real-time notifications for food ordering applications was recently touted by Doordash’s own engineers as being non-routine and unconventional.[9]

A. An Improved and Intelligent Web Server and Computer Network

36. Claim 1 of the ’415 Patent recites an intelligent web server with multi-modes of contact, multi-communication protocols, and parallel operational

[9] Yang, C., Zhang, F. *Leveraging Flink to Detect User Sessions and Engage DoorDash Consumers with Real-Time Notifications,* November 7, 2023. https://doordash.engineering/2023/11/07/leveraging-flink-to-detect-user-sessions-and-engage-doordash-consumers-with-real-time-notifications/

capabilities in a hospitality market. In my opinion, this is supported by the specification.

1. For use in a hospitality market

As an initial matter, in my opinion, the focus on at least one hospitality software application is found throughout the specification. *See, e.g.,* the ’415 Patent at Figs. 1-10, 1:31-41, 2:47-63, 3:61-65, 4:13-61, 8:12-42, 9:51-65, 11:44-63, 13:16-43, 15:52-16:7, 18:437-19:2, 19:36-58, 20:55-21:22; ’587 Patent at 1:31-43, 2:49-64, 3:62-65, 4:14-62, 8:12-42, 9:51-65, 11:44-63, 13:16-43, 15:52-16:8, 18:43-19:3, 19:38-59, 20:5-6:24 Thus, I find these disclosures to be sufficient to support the limitations, “for use in a hospitality market” and “hospitality application accessible from and with different set of handheld GUI screens uniquely enabled for both user initiation actions and later selection of choices,” and “hospitality software application.”

2. An intelligent web server and intelligent database API

37. In my opinion, a POSITA would also find ample support for the claimed web server being “[a]n intelligent web server computer” integrated with “an advanced master database” with an “application program interface (API)” that “intelligently learns, updates, and stores multiple communication modes of contact and related operational parameters for hospitality entities and for remote hospitality users along with their prior attributes or preferences, if any and then intelligently

applies them," as well as at least one said web server being "programmed with instructions enabled to intelligently choose and apply multiple and different modes of contact and/or different communication protocols."

38. For example, in my opinion, although the common specification does not contain the words "intelligence" or "intelligent," a POSITA would understand the four corners of the claimed "intelligent web server computer" and for the limitation of "wherein the API intelligently learns, updates and stores multiple communication modes of contact and related operational parameters including set periods of time or reflecting other factors associated with hospitality entities and/or hospitality users along with their prior preferences, if any," as claimed. For example, *see Microsoft Computer Dictionary* (5th ed., 2002) at **intelligence** ("The ability of a program to monitor its environment and initiate appropriate actions to achieve a desired state. For example, a program waiting for data to be read from disk might switch to another task in the meantime."). Accordingly, a POSITA would understand that the claimed "intelligent web server" would have the ability to monitor its environment and initiate appropriate actions to achieve a desired state.

39. For example, the specification discloses its system monitoring its environment and initiating appropriate actions to achieve a desired state.

> A communications control program ***monitors*** and routes all communications to the appropriate devices. It continuously ***monitors*** the wireless network access point and all other devices connected to the

> network such as pagers, remote devices, internet Web links and POS software.

Id. at '415 Patent at 10:51-55; '587 Patent at 10:51-55 emphasis added.

Further, in my opinion, a POSITA would understand that the "web server" and "master database" elements of claim 1 are specialized to support multi-modes of contact, multi-communication protocols, multi-user and parallel operational capabilities. For example, a POSITA would understand that a "web server" is a term of art that connotes a specialized computing device with specialized software. For example, *Microsoft Computer Dictionary*, 5/e, 2002, includes the following definitions:

> **Web server** *n. See* HTTP server.
>
> **HTTP server** *n.* 1. Server software that uses HTTP to serve up HTML documents and any associated files and scripts when requested by a client, such as a Web browser. The connection between client and server is usually broken after the requested document or file has been served. HTTP servers are used on Web and Intranet sites. Also called: Web server. See also HTML, HTTP, server (definition 2). Compare application server. 2. Any machine on which an HTTP server program is running.

40. Thus, a POSITA would understand that, rather than being only a generic, conventional computer, the improved "web server" of claim 1, and as it is defined in the preamble is specialized to employ technical improvements, including multi-modes of contact, multi-communications protocols, multi-user, and parallel

operational capabilities, which is supported by the specification.[10] *See also, e.g.,* the '415 Patent at 17:38-42; '587 Patent at 17:39-43 ("A computer operating to communicate with the entity as discussed herein might, for example, be dedicated to performing such operations. As another example, such a computer might be one performing other tasks (e.g., acting as a web server)."). Further, the above definition of a Web server from *Microsoft Computer Dictionary* does not mention any of limitations of a web server additionally having multi-modes of contact, multi-communications protocols, multi-user, and parallel operational capabilities.

Further, the patents disclose components in the claimed system "coming to know" information based on interactions with the computers and entities in the system:

> In various embodiments, one or more databases and/or computers might come to know of the results of communicating with the entity, one or more statistics might be stored, updated, and/or generated, and/or one or more reports might be stored, updated, and/or generated (e.g., as shown in FIG. 10).

'587 Patent at 16:65-17:3, '415 Patent at 16:64-17:2.

3. A network with multi-modes of contact

41. Further, a POSITA would understand the following disclosure in the common specification to disclose a web server integrated with a master database so

[10] Since the '415 and '587 Patents share a common specification, for the sake of efficiency, I may sometimes refer to citations in the '415 Patent to support conclusions regarding the '587 Patent, and vice versa.

as to intelligently utilize multiple communication modes of contact, based on it monitoring its environment, in a network:

> For example, a computer (e.g., a server) might act to contact the entity in an ***automated manner***. The computer might, for example, determine the phone number of the entity (e.g., via database lookup) and place an automated telephone call to the entity. As another example, the computer might, alternately or additionally, determine a messaging address and/or telephone number of the entity (e.g., via database lookup) and send a message (e.g., of the sort discussed above) in an ***automated manner*** to the entity.

'415 Patent at 14:43-451; '587 Patent at 14:43-51, emphasis added.

> It is additionally noted that, in various embodiments, multiple modes of contact might be available to the computer for communicating with the entity. For example, the computer might be able to employ one or more telephone calls, web pages, emails, pages, facsimiles, instant messages, and/or text messages conveying (e.g., subsequent to automatic conversion of information provided by the user) the desired appointment and/or reservation, and/or seeking responses from the entity. As another example, the computer might be able to receive and/or interpret (e.g., with automatic conversion of information provided by the entity) one or more telephone calls, web pages, emails, pages, facsimiles, instant messages, and/or text messages conveying the entity's responses. ***In various embodiments, in the case where one mode of contact was not successful, another mode might then be tried***.

Id. at '415 Patent at 16:27-43, '587 Patent at 16:29-44, emphasis added.

42. This aspect of the claimed "intelligent web server" monitoring its environment and intelligently initiating appropriate actions to achieve a desired goal is further disclosed in the following passages from the specification of the '130 Patent (which I have highlighted to emphasize disclosures for the computer monitoring its environment and/or intelligently initiating appropriate actions):

> Any message received is decoded by the software, and then routed to the appropriate device. ***No user action is needed during operation of the software once the application has been launched***.

Id. at ’415 Patent at 10:56-58, ‘587 Patent at 10:56-58emphasis added.

> It is noted that, in various embodiments, in the case where the computer was not able to successfully reach the entity and/or receive a valid response from the entity, ***the computer might keep trying and/or try alternate contact modes***. Alternately or additionally the computer might in various embodiments, if appropriate, attempt to contact one or more other entities.

Id. at ‘415 Patent at 15:42-57; ‘587 Patent at 15:53-68 emphasis added.

> The computer might, in various embodiments, ***attempt to reach*** (e.g., in a manner discussed above) each of such multiple specified entities seeking appointment and/or reservation. For example, the computer ***might attempt to reach*** each of such multiple specified entities in one or more orders corresponding to user ranking (e.g., attempting to reach the highest-ranking entity first). The computer might, in various embodiments, ***stop attempting to reach*** such multiple specified entities in the case where an appointment and/or reservation was successfully made. It is noted that ***such functionality could, in various embodiments, occur without human action*** on the part of the user and/or a provider of the web page.

Id. at ‘415 Patent at 15:62-16:7; ‘587 Patent at 15:63-16:8 emphasis added.

43. Thus, there is support for an improved computer network, which was not routine and conventional as of the priority date, that encompasses a computer, such as a web server, which is integrated with a master database via its API and which engages with an entity through automated communication that uses multiple modes of communication. For instance, one approach involves the computer identifying the entity's phone number, typically through a database lookup (e.g.,

using the claimed master database), and initiating an automated telephone call to establish contact. Alternatively, or additionally, the computer may identify a messaging address or phone number through another database lookup and automatically send a message, similar to those previously discussed, to the entity. It is crucial to note that various embodiments allow the computer to leverage multiple communication modes, which collectively comprise a computer network, when interacting with the entity. This versatility enables the computer to utilize different communication channels, such as telephone calls, web pages, emails, pages, facsimiles, instant messages, and text messages, via the network, for tasks like conveying appointment or reservation details and soliciting responses from the entity. Furthermore, the computer can adapt to the user's preferred method of communication by automatically converting information provided by the user. Further, as I explain and expand upon elsewhere herein, in instances where one mode of contact proves unsuccessful, the system, comprising the network and web server computer, is designed to seamlessly transition to an alternative mode. For example, if an automated phone call fails to connect with the entity, the computer can then attempt communication through another channel, ensuring a robust and flexible communication process. This multi-modal approach was new, and non-conventional in 2005 and it enhances the reliability and effectiveness of the computer network in

establishing and maintaining automated communication with the entity via this multi-modal network.

4. Parallel operational capabilities

44. The phrase "parallel operational capabilities," as is claimed is unique to these claims and it includes, but is not limited to mere parallel computing, which involves using multiple CPUs or processes operating at the same time to perform tasks.

> **parallel computer** *n*. A computer that uses several processors that work concurrently. Software written for parallel computers can increase the amount of work done in a specific amount of time by dividing a computing task among several simultaneously functioning processors.
>
> **parallel computing** *n*. The use of multiple computers or processors to solve a problem or perform a function.

Microsoft Computer Dictionary, 5th edition, 2002, at 390.

45. A POSITA would recognize that parallel computing has the advantage of improving the speed in which tasks can be completed while increasing the volume of tasks that can be completed at a given time. In addition, a POSITA would understand that the claimed "parallel operational capabilities" applies to a network comprising at least one web server and, as I explain below, this element is part of the ordered combination of limitations defined with the preamble which together improves the functionality of web servers.

> **parallel server** *n*. A computer system that implements some form of parallel processing to improve its performance as a server.

Microsoft Computer Dictionary, 5th edition, 2002, at 391.

46. Further, the claims of the Network Patents recite a "web server computer" (with related limitations that require an associated network for communicating with multiple handheld computers), as well as "A network of interconnected, intelligent, and improved web server computers with multi-modes of contact, multi-communications protocols, multi-user and parallel operational capabilities" and "An intelligent backoffice and handheld/mobile distributed network with varying, multi-modes of contact, and parallel operational capabilities." Thus, a POSITA would understand that the parallel operational capabilities that are claimed are inclusive of parallel operations using the claimed/implied network, which a POSITA would also understand is a critical new inventive concept and which provides a technical solution to prior technological problems, thus improving the functionality of distributed networks and systems, including networks containing distributed databases, as is claimed with respect to element involving the recited "master database" and its "API."

> **distributed database** *n.* A database implemented on a network. The component partitions are distributed over various nodes (stations) of the network. Depending on the specific update and retrieval traffic, distributing the database can significantly enhance overall performance.
>
> **distributed intelligence** *n*. A system in which processing ability (intelligence) is distributed among multiple computers and other devices, each of which can work independently to some degree but can

> also communicate with the other devices to function as part of the larger system. See also distributed processing.
>
> **distributed network** *n*. A network in which processing, storage, and other functions are handled by separate units (nodes) rather than by a single main computer.
>
> **distributed system** *n*. A noncentralized network consisting of numerous computers that can communicate with one another and that appear to users as parts of a single, large, accessible "storehouse" of shared hardware, software, and data.
>
> **system area network** *n*. See storage area network.
>
> **storage area network** *n*. A high-speed network that provides a direct connection between servers and storage, including shared storage, clusters, and disaster-recovery devices. A storage area network, or SAN, includes components such as hubs and routers that are also used in local area networks (LANs), but it differs in being something of a "subnetwork" dedicated to providing a high-speed connection between storage elements and servers. Most SANs rely on fiber-channel connections that deliver speeds up to 1000 Mbps and can support up to 128 devices. SANs are implemented to provide the scalability, speed, and manageability required in environments that demand high data availability. Acronym: SAN. Also called: system area network.

Microsoft Computer Dictionary, 5th edition, 2002, at 167, 168, 498-499, 508.

47. Nevertheless, a POSITA would also recognize that using parallel computing as part of an overall network, with respect to the claimed limitations, was not routine and conventional as of the 2005 priority date of the Network Patents. Instead, a POSITA would understand that employing parallel operational capabilities effectively in 2005 required new insights and new techniques, e.g., for intelligently coordinating and synchronizing the multiple computations, instructions,

and data transactions that are going on at the same time, as are recited in the Network Patent claims.

> **parallel database** *n.* A database system involving the concurrent use of two or more processors or operating system processes to service database management requests such as SQL queries and updates, transaction logging, I/O handling, and data buffering. A parallel database is capable of performing a large number of simultaneous tasks across multiple processors and storage devices, providing quick access to databases containing many gigabytes of data.

Microsoft Computer Dictionary, 5th edition, 2002, at 390.

The parallel operational capabilities of the claimed network, which are also part of the ordered combination and claimed systemic and network synchronization, are disclosed in part: "Such synchronization might for instance, be of the sort discussed herein, (e.g. as shown in Figure 10). For example, synchronization might occur between one or more computers that operate to communicate with the user, one or more web servers, one or more web sites, one or more cell phones (e.g. smart phones) and or PDAs and/or one or more back office servers (central databases)." '415 Patent at 18:23-30; '587 Patent at 18:23-37.

48. Moreover, the common specification further supports the use of parallel/distributed processing, while also explaining the details that would inform a POSITA how to use parallel operational capabilities as a part of the claimed elements, and achieve the improvements to computers that are achieved by using these techniques in these newly claimed ways. *See, e.g.*, '130 patent at 16:8-21,

17:38-51, 17:59-18:6, 18:33-36; ’587 Patent at 16:9-22, 17:39-52, 17:60-18:7, 18:34-37.

49. For example, the common specification explains how parallel operational capabilities can be intelligently implemented using “related operational parameters,” which provide a set of operational criteria or rules related to the modes of contact and associated with the hospitality entities and for remote hospitality users, such as times of day, alternate modes, multi-thread communications, restaurant inventory/menu options that are set aside for one or more particular purposes, location, type and/or price range. *See, e.g.*, ’415 Patent at 13:61-65, 13:67-14:9, 15:52-55, 17:38-51, 15:65-16:1, 16:55-17-15, 18:14-21, 33-36; ‘587 Patent at 13:61-65, 13:67-14:9, 15:53-56, 17:39-52, 15:66-16:2, 16:56-17-13, 18:15-22, 34-37.

> **parameter** *n*. In programming, a value that is given to a variable, either at the beginning of an operation or before an expression is evaluated by a program. Until the operation is completed, a parameter is effectively treated as a constant value by the program. A parameter can be text, a number, or an argument name assigned to a value that is passed from one routine to another. Parameters are used as a means of customizing program operation.

Microsoft Computer Dictionary, 5th edition, 2002, at 391.

50. Further, a POSITA would understand the following disclosures in the common specification to disclose parallel operational capabilities:

> The computer might, in various embodiments, ***act to pursue multiple entities in parallel***. In so pursuing entities ***in parallel*** the computer

> might, for example, present to the user results and/or progress of its work (e.g., as appointment and/or reservation availability results), and/or allow the user to select from presented possibilities a desired choice. The multiple entities so pursued might, in various embodiments, ***be automatically chosen by the computer***. For example, the computer might choose the multiple entities in accordance with matches to search criteria (e.g., ***real-time search criteria***). As another example, the computer might, alternately or additionally, choose the multiple entities in accordance with previously established (e.g., stored) ***user unique lists*** (e.g., a list of the user's 15 favorite restaurants)."

'415 Patent at 16:8-21; '587 Patent at 9-22, emphasis added.

> It is additionally noted that, in various embodiments, a computer interacting with a user desiring to make an online appointment and/or reservation (e.g., as discussed above) ***might take into account such inventory information in interacting with the user***. For example, the user might be prevented from specifying a desired appointment and/or reservation date and/or time known by the computer to correspond to inventory that was not available.

Id. at '415 Patent at 18:14-21; '587 Patent at 18:15-22, emphasis added.

> In this embodiment, only items from the master menu that satisfy specified ***parameters*** will be included in the generated menu.

Id. at '415 Patent at 20:61-63, '587 Patent 20:62-64 emphasis added.

51. Thus, the common specification, which includes the above-cited new CIP material, discloses the use of parallel operational capabilities and the use of related operational parameters. For example, the common specification teaches that diverse approaches can be employed in parallel by a web server computer to automatically select multiple entities in various implementations. One method involves selecting entities based on their alignment with specific search criteria, which may be dynamically generated in real-time. For instance, the computer could

identify and choose entities that match immediate search parameters, adapting to changing conditions or user preferences based on these related operational parameters. Alternatively, or in conjunction with real-time criteria, the computer may opt to select multiple entities based on predefined user preferences stored in the system. This could involve referencing user-specific lists established beforehand, such as a catalog of the user's favorite restaurants. In this scenario, the computer intelligently leverages stored information to automatically choose entities that align with the user's established preferences.

52. In essence, the process of automatically choosing multiple entities in parallel involves a new technical approach, which was not routine or conventional as of the priority date of the Network Patents, of dynamically responding to real-time conditions in parallel through search criteria while also concurrently and intelligently considering operational parameters, such as user-specific preferences stored in advance or determined in real time. This dual mechanism ensures a dynamic and personalized selection process, enhancing the user experience by tailoring the chosen entities to both immediate needs and established user preferences. The '415 and '587 patents also claim priority to U.S. Patent Application No. 11/190,633 to July 26, 2005, which includes claims 56 and 65 which further teach a programming step as understood by one of ordinary skill in the art as related

to the disclosed parallel processing where wireless messaging is used in parallel with multiple entities.

5. A master database and API

53. In my opinion, the specification supports the limitation of "a master database comprising data and parameters of the at least one hospitality software application integrated with the at least one said web server computer and with a usable file structure dictated prior to execution, thus improving efficiency and reliability, the master database being accessible via a database application program interface (API) and with predefined formats stored within it, wherein the API intelligently learns, updates and stores multiple communication modes of contact and related operational parameters":

> The information management and synchronous communications system of the present invention features include fast synchronization between a central database and multiple handheld devices, synchronization and communication between a web server and multiple handheld devices, a well-defined API that enables third parties such as POS companies, affinity program companies and internet content providers to fully integrate with computerized hospitality applications, real-time communication over the internet with direct connections or regular modem dialup connections and support for batch processing that can be done periodically throughout the day to keep multiple sites in synch with the central database.

Id.,'415 Patent at 5:7-20; '587 Patent at 7:20.

> Advanced database functions are provided in the preferred embodiment of the invention, including an automated download process onto handheld devices and/or Web sites. In the preferred embodiment, the menu generation system of the present invention uses an API called ActiveX Data Objects ("ADO") for database access.

Id. at '415 Patent at 5:11:64-12:2; '587 Patent at11:64-12:2.

> In addition to the menu generation described above, a set of software libraries described herein in conformance with the present invention not only enhances the basic Windows CE® functionality by adding new features but also maximizes the full potential of wireless handheld computing devices. Such features include fast synchronization between a central database and multiple handheld devices, synchronization and communication between a Web server and multiple handheld devices, a well-defined API that enables third parties such as POS companies, affinity program companies and internet content 45 providers to fully integrate with computerized hospitality applications, real-time communication over the internet with direct connections or regular modem dialup connections and support for batch processing that can be done periodically throughout the day to keep multiple sites in synch with the central database.

Id. at '415 Patent at 12:37-53; '587 Patent at 12:37-53.

> In various embodiments, one or more databases and/or computers might **come to know** of the results of communicating with the entity, one or more statistics might be stored, updated, and/or generated, and/or one or more reports might be stored, updated, and/or generated (e.g., as shown in Fig. 10). Accordingly, for instance, one or more records of appointments and/or reservations and/or availabilities for the entity might be updated. Some or all of such results, statistics, and/or reports might, in various embodiments, be accessible (e.g., via web page and/or via text-to-voice) by, for instance, entities and/or system administrators.

Id. At '415 Patent at 16:64-17:4; '587 Patent at 16:65-17:5(emphasis added).

54. Thus, the common specification, including the above-cited new CIP material, supports a computer network that incorporates a master database that holds data and parameters, e.g., of at least one hospitality software application. *See, e.g.*, the above specification citations and the cited dictionary definition for "parallel database." This master database is integrated with a web server computer as

components in the network in a way that improves operational efficiency, reliability, and dependability. Accessible through a database application program interface (API), the master database features predefined formats and evolves intelligently learning, updating, and storing multiple communication modes of contact and related operational parameters, in that it will "**come to know** of the results of communicating with the entity, one or more statistics might be stored, updated, and/or generated, and/or one or more reports might be stored, updated, and/or generated (e.g., as shown in Fig. 10)." *Id*. at '415 Patent at 16:65-17:2; '587 Patent at 16:65-17:2.

55. Key aspects of this innovative system include swift synchronization between a central database and numerous handheld devices, as well as communication between a web server and multiple handheld devices across the network. The well-defined API facilitates third-party integration with computerized hospitality applications. Real-time Internet communication is supported in the network, accommodating both direct connections and regular modem dial-up connections. Batch processing capabilities are also featured, allowing periodic synchronization throughout the day to maintain consistency across multiple sites.

56. In addition, the advanced functionalities and computer improvements extend to the master database as well, offering automated download processes onto handheld devices and/or websites. Beyond the menu generation, specialized

software libraries conforming to this invention enhance new features and maximize the potential of wireless handheld computing devices.

57. Further, the improved network comprising a master databases, web server, and handheld computers may support gathering information about communication outcomes, allowing the master database to store, update, and generate statistics, and produce reports. This could include updating records of appointments, reservations, and entity availabilities. Results, statistics, and reports may be accessible to entities and system administrators through means such as web pages or text-to-voice interfaces coordinating with the database, thus providing valuable insights into system performance and communication outcomes.

6. A hospitality software application

58. In my opinion, a POSITA would understand that the "hospitality software application" element of claim 1 is supported by the specification. For example, a POSITA would understand that the claim term "application" is a term of art and refers to a program that performs a **specific** task. For instance, *Microsoft Computer Dictionary*, 5/e, 2002, includes the following definition:

> **application** *n*. A program designed to assist in the performance of a specific task, such as word processing, accounting, or inventory management. *Compare* utility.

59. Thus, a POSITA would understand that the "hospitality software application" of claim 1 is a program designed to assist in the performance of a specific task for the hospitality market, such as for food/drink ordering.

60. Further, claim 1 provides additional limitations regarding the "hospitality software application" element, which further specialize this element, and these are supported, for instance, in the common specification; *see, e.g,* '415 Patent at Figs. 1-10, 1:31-41, 2:47-63, 3:61-65, 4:13-61, 8:12-42, 9:51-65, 11:44-63, 13:16-43, 15:52-16:7, 18:437-19:2, 19:36-58, 20:55-21:22; '587 Patent at 1:31-43, 2:49-64, 3:62-65, 4:14-62, 8:12-42, 9:51-65, 11:44-63, 13:16-43, 15:52-16:8, 18:43-19:3, 19:38-59, 20:5-6:24.

7. Middleware/Framework Communications Control Software (MFCCS) for at Least One Hospitality Food/Drink Ordering Software Application

61. The '415 Patent claim 1 has the following limitation [emphasis added]:

> **Middleware/Framework Communications Control Software (MFCCS) which enables via its centralized system layer architecture** the at least one said web server computer to communicate with two or more remote wireless handheld computers and for multiple modes of contact, multiple communications protocol functionality, integrated with the master database and with the **at least one hospitality food/drink ordering software application;**

In my opinion, as I explain below, and as is shown clearly to a POSITA via Figure 10, this limitation (the "middleware/framework" limitation) is supported by the common specification that the '415 Patent shares with the '130 Patent. For example,

the "middleware/framework" of the above passage is disclosed as being for a "at least one hospitality food/drink ordering software application." *See, e.g,* '415 Patent at Fig. 10, 2:47-64, 3:61-65, 14:43-63, 15:27-16:7, 16:44-17:19, 18:20-60; '587 Patent at Fig. 10, 2:49-64, 3:62-65, 14:43-63, 15:29-16:9, 16:45-17:20, 18:21-61.

A POSITA would understand that developing a middleware/framework requires the development of a comprehensive design, which provides the layered architecture for the middleware/framework and describes its functionality. In my opinion, the common specification provides such a design for a middleware/framework for the hospitality industry. For example, the common specification provides a system design diagram for a middleware/framework for food/drink ordering systems in the hospitality industry in its Fig. 10, which I excerpt below:

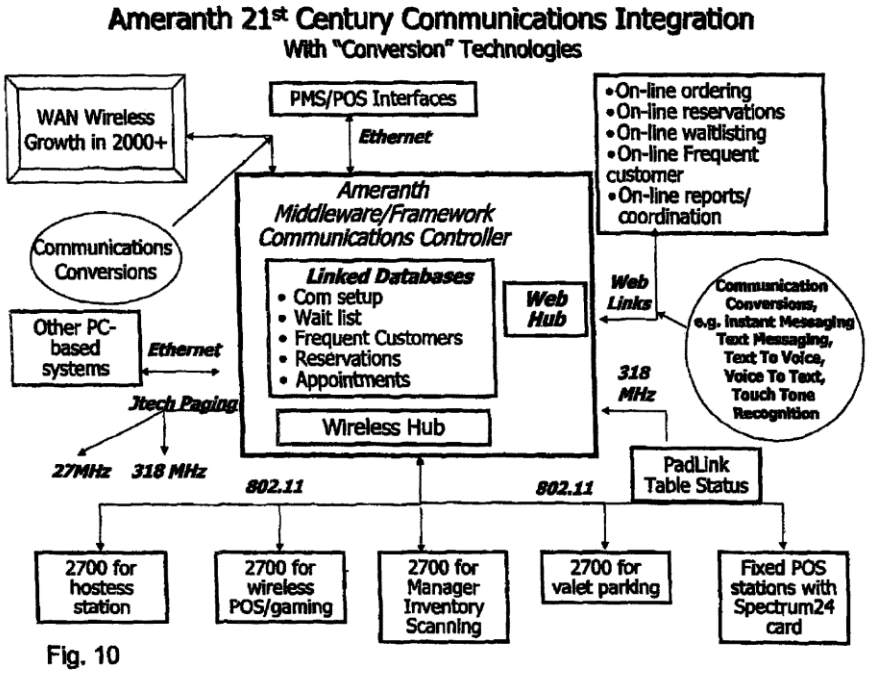

Fig. 10

’130 Patent at Fig. 10.

62. This figure and accompanying disclosures in the common specification disclose a system architecture diagram and design description for a middleware/framework for a distributed system for food/drink ordering applications in the hospitality industry. *See*, *e.g.*,’415 Patent at Fig. 10, and at 3:55-64, 14:43-63, 15:27-43, 15:45-49; ’587 Patent at Fig. 10, and at 3:52-61, 14:43-63, 15:27-43, 15:45-49 (“With the individual affiliated with the entity specifying one of the choices, the computer might, for example, make note of the selection, and/or process and/or store the selection for integration with one or more operations discussed herein (e.g., synchronization).”), ‘415 Patent at 16:44-64, 16:64-17:7; ‘587 Patent at 16:45-61; 16:65-17:8 (“In various embodiments, one or more databases and/or computers might come to know of the results of communicating with the entity, one or more statistics might be stored, updated, and/or generated, and/or one or more reports might be stored, updated, and/or generated (e.g., as shown in Fig. 10). Accordingly, for instance, one or more records of appointments and/or reservations and/or availabilities for the entity might be updated. Some or all of such results, statistics, and/or reports might, in various embodiments, be accessible (e.g., via web page and/or via text-to-voice) by, for instance, entities and/or system administrators.”), ‘415 Patent at 17:9-19, 18:22-35, and 18:55-60; ‘587 Patent at 17:10-20, 18:23-36, and 18:56-61 (“Shown in Fig. 10 is an exemplary system

diagram relating to embodiments of the present invention wherein, for example, various of the functionality discussed above (e.g., messaging, text-to-voice, and communications with landline telephones, cellular telephones, and wireless devices) is depicted."). A POSITA would understand these disclosures, which include new CIP material, to describe multiple communication modes, distributed computing components (including a server and multiple clients), and synchronization functionalities. A POSITA would understand, therefore, that these disclosures are for a middleware/framework for distributed food/drink ordering applications in the hospitality industry. The '415 and '587 patents also claim priority to U.S. Patent Application No. 11/190,633 filed to July 26, 2005, which includes claims 42 and 43 which further teach a programming step as understood by one of ordinary skill in the art as related to multi-modes of contact including instant messaging and texting.

63. For at least the above reasons, I conclude that the Middleware/Framework Communications Control Software (MFCCS) limitation is supported by the patent specification.

B. Claims 9 and 15

64. Claims 9 and 15 have similar limitations as claim 1, as well as differing limitations, such as "a network of interconnected, intelligent, and improved web server computers" and these are further supported by the specification, for similar reasons as those given above for claim 1.

65. In addition, claim 9 recites additional improvements to computers in its limitation, "for and with the hospitality entities and two or more different communications modes of contact during the same hospitality task with handheld users to execute hospitality application task requests with a first hospitality entity from said wireless handheld computers associated with their respective users, and further enabled to automatically choose and execute with alternate hospitality entities when inventory is learned to be unavailable at a first hospitality entity and then improve efficiency by applying rule based intelligence to not attempt again such a request with the first hospitality entity for a subsequent user request, now known by the **interconnected** web server network as to be unavailable to enable the web server network to use less computer resources and less computing time through the avoidance of attempting communications modes of contact to hospitality entities known in advance to fail to meet the subsequent user requests."

66. For example, the claim provides improvements to the efficiencies of the networks by using less computer resources, through the avoidance of computer tasks, which would otherwise fail (due to lack of connectivity) and thus waste those resources. A POSITA would therefore conclude that this improves the network and provides the means and teachings of "how" to do so. Further, I note that this limitation and the common specification provides the "how" to a POSITA in order to optimize the network to achieve the claimed improvement to networks/computers.

For example, the claim recites the structural limitations of "hospitality entities and two or more different communications modes of contact" and "automatically choose and execute with alternate hospitality entities when inventory is learned to be unavailable at a first hospitality entity" as well as "applying rule based intelligence to not attempt again such a request with the first hospitality entity for a subsequent user request." This then has the claimed result of enabling "the web server network to use less computer resources and less computing time through the avoidance of attempting communications modes of contact to hospitality entities known in advance to fail to meet the subsequent user requests." *See also, e.g.,* '415 Patent at 15:52-16:44, 17:38-51; '587 Patent at 15:53-16:45, 17:39-52 for additional structure for "how" to achieve these results.

67. In addition, claim 15 recites additional improvements to computers in its limitation, "wherein the at least one said web server network is integrated with the MFCCS and is enabled to be programmed with instructions to intelligently choose and apply a communications mode of contact for and with the hospitality entities and for two or more different communications modes of contact with the handheld users to execute hospitality application task requests and with the dual modes of contact with the handheld users improving efficiency and reducing the use of computing resources in the wireless handheld computers, thus improving them." Further, I note that this limitation provides the "how" to achieve the claimed

improvement to computers. For example, the claim recites the structural limitations of the web server network being "enabled to be programmed with instructions to intelligently choose and apply a communications mode of contact for and with the hospitality entities and for two or more different communications modes of contact with the handheld users to execute hospitality application task requests" as well as "dual modes of contact with the handheld users," which has the claimed result of "improving efficiency and reducing the use of computing resources in the wireless handheld computers, thus improving them." *See also, e.g.*, '415 Patent at 15:52-16:44, 17:38-51; '587 Patent at 15:53-16:45, 17:39-52 for additional structure for "how" to achieve these results.

C. Dependent Claims

68. The dependent claims derive from the earlier independent claims and contain additional inventive concepts. Thus, they also claim the benefits of the claims from which they are derived.

VIII. ANALYSIS FOR THE '587 PATENT

69. In my opinion, as I explain below, which a POSITA would understand, the claims of the '587 Patent recite benefits with respect to the claimed "web server computer" and the '587 Patent claims are directed to subject matter that is squarely in the computing realm and which improves the functionality of computers. For example, the ability for an intelligent web server to provide real-time notifications

for food ordering applications was recently touted by Doordash engineers as being non-routine and unconventional.[11]

A. Claim 1

1. a network of distributed and linked backoffice servers

70. Claim 1 of the ’587 Patent recites, “a network of distributed and linked backoffice servers that are continuously synchronized in real time and which are enabled to be remotely accessed and managed by a system administrator via a web based interface.”

71. I include by reference my analysis above for the web server computer(s) for the ’415 Patent.

2. a master database

72. Claim 1 of the a network of the ’587 Patent recites, “a master database comprising multiple linked and continuously synchronized in real-time databases throughout the network and with data and parameters of the one or more hospitality software applications integrated with the said network and with predefined formats, the master database comprising a usable file structure dictated prior to execution, thus improving efficiency and reliability, wherein the one or more hospitality

[11] Yang, C., Zhang, F. *Leveraging Flink to Detect User Sessions and Engage DoorDash Consumers with Real-Time Notifications,* November 7, 2023. https://doordash.engineering/2023/11/07/leveraging-flink-to-detect-user-sessions-and-engage-doordash-consumers-with-real-time-notifications/

software applications learns, updates, stores and intelligently applies varying modes of contact with the handheld/mobile equipped hospitality users and in accordance with their preferences, if any;" Thus, this synchronization of the databases is part of the overall ordered combinations within the '587 patent claims, including concurrent and real time synchronization, across both the network and its multiple databases and this was new and unconventional in 2005. This is nevertheless taught and disclosed in the specification, e.g.. "In various embodiments, as this process continues, synchronization (e.g., database synchronization throughout the system network) may be maintained (e.g., as shown in Fig. 10). It is noted that, in various embodiments, such synchronization may occur at all times."

73. I include by reference my analysis above for a master database, hospitality software application, file structure, and multi-modes of operation for the '415 Patent.

3. MFCCS

74. Claim 1 of the '587 Patent recites a limitation for an MFCCS. I include by reference my analysis for the MFCCS limitation of the '415 Patent.

4. API

75. Claim 1 of the '587 Patent recites a limitation for an API. I include by reference my analysis for the API limitation of the '415 Patent.

5. automatically contact one or more other entities

76. Claim 1 of the ’587 Patent recites a limitation, “additionally the network is further enabled to automatically contact one or more other entities when the remotely initiated hospitality task cannot be completed with a first entity and to intelligently continue this, until the task is completed; additionally, the network is further enabled to intelligently apply time constraints and/or hold times, associated with the hospitality task, when applicable;”.

77. I include by reference my analysis for multi-modes of communication for the ’415 Patent. Further, regarding time constraints and/or hold times, the specification supports this limitation as well. For example, see the following:

> In various embodiments, the entity might be able to offer one or more alternate appointments and/or reservations (e.g., in the case where a desired appointment and/or reservation could not be provided). Such functionality might be implemented in a number of ways. The entity might, in various embodiments, be able to specify that such an suggested alternate appointment and/or reservation would be held until a particular date and/or time, and/or that such an suggested alternate appointment and/or reservation would not be held, and that the user was advised to provide a decision regarding the acceptability of the suggested alternate appointment and/or reservation by a specified time and/or date. Accordingly, in various embodiments, in the case where the user did not indicate such an suggested alternate appointment and/or reservation to be acceptable by the termination of the hold, the corresponding inventory (e.g., availability inventory) might be freed up for use by others. The provision of one or more alternate appointment and/or reservation times, dates, and/or other information by an entity might, for example, be via touch tone keypad, voice, preset availability, and/or messaging. In various embodiments, one or more databases and/or computers might come to know of the results of communicating with the entity, one or more statistics might be stored, updated, and/or

> generated, and/or one or more 65 reports might be stored, updated, and/or generated (e.g., as shown in FIG. 10).

'587 patent at 16:45-17:3.

6. the parallel operations capable network is integrated with the MFCCS

78. Claim 1 of the ’587 Patent recites “wherein the ‘parallel operations capable network’ is integrated with the MFCCS and the backend servers are programmed with instructions executable to choose and apply **varying modes** of contact **during the same** remotely initiated hospitality task, for and with the handheld/mobile customers and/or handheld/mobile equipped entity staff, **to intelligently execute and support completion** of the hospitality application task requests.” This technological limitation is a new inventive concept and was not a routine or conventional element in 2005. Further, the claim provides structure regarding how to apply varying modes of contact during the same hospitality task and it also integrates with and leverages the claimed “parallel operational capabilities” of the claimed network. A POSITA would therefore understand that this provides, along with the supportive teachings in the specification, as is explained further herein, the “how” and specific programming guidance to a POSITA, e.g., through “instructions executable to choose and apply **varying modes** of contact during the same remotely initiated hospitality task.” This switching or **varying** of modes of contact, which occurs during the “same hospitality tasks,” such as, e.g. switching/varying from email to text and/or back, was new (hence, not routine or

conventional). Additionally, dependent claim 12 adds the additional inventive concept that the 'switching/varying' of the modes occurs 'automatically' and based upon 'learning' and 'rule based intelligence'. Thus, these are technological improvements, which provide structure to improve the prior computers and also improve the way that prior, conventional networks operated, while concurrently addressing and overcoming the CAP Theorem challenges via significant technical improvements to overcome the occurrences of network partitions. The varying between modes of contact, is specifically taught/disclosed in the specification, *e.g.* at 14:47-51 in the '587 Patent ("As another example, the computer might, alternately or additionally, determine a messaging address and/or telephone number of the entity (e.g., via database lookup) and send a message (e.g., of the sort discussed above) in an automated manner to the entity".) *See also, e.g., Id*. at 14:58-63 ("It is noted that, in various embodiments, in the case where the computer was not able to successfully reach the entity and/or receive a valid response from the entity, the computer might keep trying and/or try alternate contact modes.") Further, *see, e.g., Id.* at 18:23-31 ("Such synchronization might for instance, be of the sort discussed herein, (e.g. as shown in Figure 10). For example, synchronization might occur between one or more computers that operate to communicate with the user, one or more web servers, one or more web sites, one or more cell phones (e.g. smart phones) and or PDAs and/or one or more back office servers (central databases).") Further, these specific

network architectural teaching to a POSITA comprise new CIP Material teachings, which provide the programming guidance as is clearly stated in the specification. *See, e.g., Id.* at 18:33-36. ("It is noted that such computers, servers and/or web sites may for example, employ software programmed to employ one or more of the operations discussed above.") Further, these are the specific operations discussed above, because the inventor defined them as such via the limitations and scope of these claims, and which are defined within the claims themselves. Thus, it would be clear to a POSITA that the inventor identified prior conventional systems and their problems and taught and claimed technological improvements to them.

79. I include by reference my analysis above for parallel operational capabilities for the '415 Patent.

IX. IMPROVING THE CLAIMED COMPUTER NETWORKS BY OVERCOMING THE CAP THEOREM CHALLENGE

80. As explained above, the CAP Theorem identifies specific challenges for the designers of distributed systems. These challenges are well recognized as technological challenges by the Doordash Engineering Team as well.[12] Further, in

[12] "How Doordash Is Scaling its Data Platform to Delight Customers and Meet Our Growing Demand", Sept 25, 2024, https://careers.doordash.com/blog/how-doordash-is-scaling-its-data-platform/ – "For example, in most offline analytical cases we should strive for consistency of data rather than availability, as discussed in the CAP theorem."

my opinion, the ordered combination of the elements in the claims of the ’415 and ’587 Patents improved their networks by overcoming the challenge of simultaneously achieving consistency, availability, and partition-tolerance for a distributed database by changing the preconditions inherent in the environment for which these goals were typically articulated. These elements include the web server, network, parallel operational capabilities, hospitality software application, master database and its API, the MFCCS, and multi-modes of communication. These elements, in turn, support real-time searches for communication modes of contact and/or related operational parameters. For instance, rather than accepting the underlying assumption that there is only a single type of network and network protocol for connecting the devices in a distributed database design, specifications of the Network Patents introduce a new and unconventional approach utilizing multi-modes of contact, multi-communication protocols, and parallel operational capabilities for its system, and combines this with the above-listed elements. Accordingly, the Network Patents claim an invention that can effectively achieve

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“Cassandra Unleased: How We Enhanced Cassandra Fleet’s Efficiency and Performance,” Jan. 30, 2024, https://careers.doordash.com/blog/cassandra-unleashed-how-we-enhanced-cassandra-fleets-efficiency-and-performance/ – “Consistency trade-off: in Accordance with the CAP theorem, Cassandra often trades off consistency for availability and partition tolerance, which might not suit all use cases.”

consistency and availability, in real time, as well as partition-tolerance, for example, such that when a communication link is down in one communication modality or protocol, the system can then utilize another communication modality or protocol that is not down, thereby reducing the odds of a communication partition for the entire (multi-modal) network to be infinitesimally small. Further, the Network Patent claims themselves specifically identify, teach, and claim, partition tolerance as improvements to the networks, via the limitations involving multi-modes of communication, and as such it is clear that such improvements are included in and taught by the claims.

81. This combination of elements of claim 1 is supported in the specification, e.g., in embodiments disclosed in Fig. 10 at 16:28-43, 18:61-19:3;- of the ’415 Patent and Fig. 10 at 16:29-44, 18:62-19:4;- of the ’587 Patent, for instance, which teach multi-modes of communication (e.g., instant messaging, text messaging, email, web pages, pages, facsimiles, text to voice, voice to text, and/or touch tone recognition) message, mobile app message, ethernet, paging (e.g., 27MHz/318MHz), Wi-Fi (802.11), and web links), multiple communications protocols (e.g., HTTP, 802.11, Paging, Ethernet, and WAN Wireless protocols), and parallel operational capabilities, together with a MFCCS, linked databases, servers, and handheld devices:

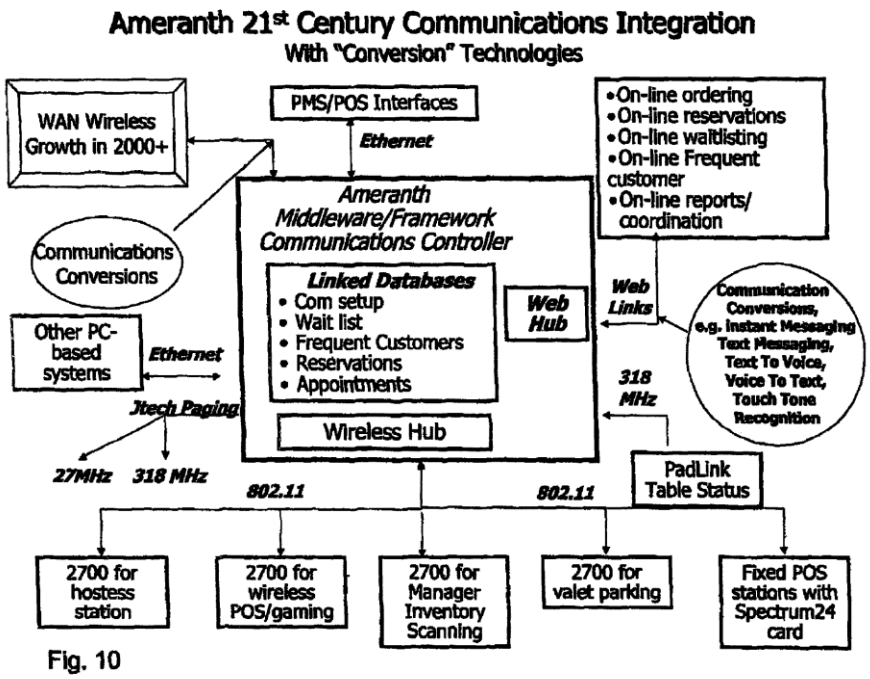


Fig. 10

'415 and '587 Patents at Fig. 10.

82. A POSITA would understand that the claims of the '415 and '587 Patents recite non-routine and unconventional combinations of the following elements:

- a web server with multi-modes of contact, multi-communications protocols, multi-user and parallel operational capabilities;
- at least one hospitality food/drink ordering software application
- an advanced master database, with its own database API;
- Middleware/Framework Communications Control Software (MFCCS), which enables at least one web server to communicate with at least two remote handheld computers and for multiple modes of contact and multiple communications protocols; and
- at least one external software API, which integrates the hospitality software application and the MFCCS with the Internet and leverages the advanced master database to support learning, updating, and storing

multiple communication modes of contact and related operational parameters.

83. In my opinion, a POSITA would understand that these components work together as is taught and disclosed in the specification.

84. The claims of the Network Patents recite that their combination of elements provides for the improvement in the functionality of computers and/or networks, such as "improving efficiency and reliability" and/or enabling the web server computer "to further improve its efficiency by using less computer resources and less computing time through the avoidance of attempting communication modes of contact to hospitality entities and/or users and/or for subsequent user hospitality application task requests likely to fail during the operational period of time if attempted again during that time." Further, this improved functionality is supported by the common specification. *See, e.g.,* '415 Patent at 2:64-3:3, 3:4-20, 4:55-5:5; '587 Patent at 2:65-3:4, 3:5-21, 4:56-5:7. Therefore, a POSITA would recognize that the claimed web server and network improve the functionality of computers and/or computer networks for applications in the hospitality industry, which used a single mode of communication, with a system that utilizes multi-modes of communication and thereby overcomes the limitations of the CAP Theorem challenge.

85. Moreover, the claim elements include explaining "how" to achieve these improvements (e.g., "automatically choose and execute alternate communication modes of contact and/or alternate communications protocols if

needed and appropriate at the time of execution"). A person of ordinary skill in the art would understand this eliminating the necessity of continually querying or checking a mode of communication to be improving the functionality of computers in that its system effectively achieves consistency and availability for real-time searching in a distributed database. That is, it effectively achieves consistency, since one node in the system does not need to check or continually check another node in the system to know that its data is consistent with the data of the other node. Similarly, this limitation effectively achieves availability, since it implies that there is no need to continually be checking if another node is available or not. Moreover, a person of ordinary skill in the art would understand that the invention effectively provides partition-tolerance through its multi-modes of contact, multi-communications protocols, multi-user and parallel operational capabilities, whereby a partition in one mode of communication (such as the Internet) can be overcome by communicating over another modality (such as text messaging).

86. For instance, a person of ordinary skill in the art would understand the specification to disclose that the claimed distributed computing, multi modes of contact and parallel operational capabilities are supported by teachings such as the following (as well as the multi-modal citations I highlight above in my discussion regarding an intelligent web server, which I include here by reference):

> A single point of entry works to **keep all wireless handheld devices and linked web sites in synch with the backoffice**

> **server** applications so that the different components are in equilibrium at any given time and an **overall consistency is achieved**. For example, a reservation made online can be automatically communicated to the backoffice server and then synchronized with all the wireless handheld devices **wirelessly**. Similarly, changes made on any of the wireless handheld devices are **reflected instantaneously on the backoffice server**[] **Web pages and the other handheld devices**.

'415 Patent at 5:32-42; ‘587 Patent at 5:33-43 emphasis added.

87. For instance, the above passage discloses that “overall consistency is achieved” and that changes are, e.g., “reflected instantaneously,” since it is utilizing multi-modes of communication that include the Internet and wireless communications. Further, it also provides support for the claimed “backoffice server.” In utilizing multi modes of communication, a POSITA would understand that the claimed invention discloses how it effectively achieves both consistency and availability:

> According to various embodiments of the present invention, messaging (e.g., wireless text messaging and/or wireless instant messaging) and/or text-to-voice functionality may be employed, for instance, in appointment, waitlist, and/or reservation operations. Such functionality might, in various embodiments, involve messaging (e.g., wireless messaging), text-to-voice, and/or two-way interactivity, and/or may involve communication via landline telephones, cellular telephones, and/or wireless devices.

’415 Patent at 13:34-43; ’587 Patent at 13:44-52.

> Such synchronization might for instance be of the sort discussed herein, (e.g. as shown in FIG.10) , For example synchronization might occur between one or more computers that operate to communicate with the entity, one or more computers that operate to communicate with the user, one or more web servers, one or more web sites, one or

> more cell phones(e.g. smart phones) and/or PDA's, and/or one or more backoffice servers (central databases).

'415 Patent at 18:22-30; '587 Patent at 18:23-31.

88. Further, the multi-modal communication is also taught as being performed in parallel:

> A computer operating to communicate with the entity as discussed herein might, for example, be dedicated to performing such operations. As another example, such a computer might be one performing other tasks (e.g., acting as a web server). It is noted that, in various embodiments, one or more rules may be followed in communicating with the entity and/or the user.

Id. at 415 Patent at 17:38-44' '587 Patent at 17:39-45. (And further parallel operational capabilities functionality combined with the learning/intelligence is taught/disclosed at '415 Patent at 16:8-21; '587 Patent at 16:9-22)

89. Thus, the above passages, which include new 2005 CIP material, expressly ties the consistency and availability achieved in the claimed invention of the specification to its multi-modes of communication, along with parallel operational capabilities (*see*, *e.g.*, *id.* at '415 Patent at 12:9-13 and 10:64-67; '587 Patent at 12:10-14 and 10:64-47), which a person of ordinary skill in the art would understand to effectively provide partition-tolerance.

90. The specification further discloses the benefits and functionality of its multi-modal communication approach as follows:

> A communications control program monitors and routes all communications to the appropriate devices. It **continuously monitors the wireless network access point and all other**

> **devices connected to the network** such as pagers, remote devices, internet Web links and POS software. Any message received is decoded by the software, and then routed to the appropriate device. No user action is needed during operation of the software once the application has been launched.

'415 Patent at 10:51-59; '587 Patent at 10:51-59, emphasis added.

91. For at least the above reasons, I conclude that a person of ordinary skill in the art would understand that the specification provides written description support for multi-modes of contact, multi-communication protocols, multi-user and parallel operational capabilities, combined with the other above-listed elements in a way a POSITA would conclude that the claimed ordered combination of elements was non-routine and unconventional in 2005.

X. HOW CLAIMED FUNCTIONALITY IS REALIZED

92. As further evidence that the common specification provides written description support for the claims of the Network Patents, I note that the specification provides concrete technical details with sufficient specificity to disclose to a POSITA how the claimed functionality is realized. Accordingly, as I explain throughout this declaration, the specification contains a written description of the invention that sufficiently conveys the details of the claimed web server system; hence, a POSITA would understand the written description enough, for instance, to write software code to implement the functionality described, for instance, as I explain below.

93. The specification and figures provide sufficient specificity that would enable a POSITA to fully implement its claimed inventions. Moreover, this includes the new teachings from the specification and Figure 10, in which examples are provided to the POSITA.

A. Computer Programming Language Flexibility

94. The specification advantageously teaches and discloses that its invention is not tied to a specific computer programming language, such as Visual Basic, SQL, or C++.

95. For example, the specification discloses regarding its advanced master database, "Queries can be built using SQL syntax for experienced users ***or can be created*** using a query builder which guides users through the creating process." '415 Patent at 12:5-9 and '587 Patent at 12:5-9 (emphasis added).

96. Further, the specification discloses, "In the preferred embodiment, the menu generation system of the present invention uses an API called ActiveX Data Objects ("ADO") for database access." '415 Patent at 12:67-17:3; '587 Patent at 11:67-12:3. A POSITA would be aware, for instance, that ADO can be used in computer programs written in a variety of computer programming languages, including Visual Basic or C++, to connect to SQL servers and other databases.[13]

[13] *See, e.g.*, https://learn.microsoft.com/en-us/sql/ado/microsoft-activex-data-objects-ado?view=sql-server-ver16.

Thus, a POSITA would understand that the ’130 Patent advantageously does not restrict its invention to a specific computer programming language, such as Visual Basic, SQL, or C++.

97. In addition, the specification discloses that a preferred embodiment can have components written in the Hypertext Mark-up Language (“HTML”) and/or Extensible Mark-up Language (“XML”). *See, e.g.*, ’415 Patent at 19:2-36; ‘587 Patent at 19:4-37. Thus, a POSITA would understand that the ’130 Patent does not restrict its invention to a specific language for rendering user interface components, such as HTML or XML.

98. Further, the specification expressly advantageously states that its invention is not limited to a specific computer programming language:

> The software applications for performing **the functions falling within the described invention can be written in any commonly used computer language**.

Id. at ‘415 Patent at 13:10-12; ‘587 Patent at 13:10-12, emphasis added.

99. Given this disclosure, a POSITA would understand that embodiments can be written in any commonly used computer language, such as Visual Basic, C++, or SQL. Thus, a POSITA would understand that it is sufficient for the specification to describe its algorithms in prose or ***pseudocode***, which is a plain language description of the steps in an algorithm, which is written primarily for humans not

machines.[14] *See, e.g.,* the '415 Patent at 8:35-42, 9:22-50, 10:29-50, 14:22-63, 15:13-51, 16:44-17:2, and 17:20-37; '587 Patent at 8:35-42, 9:2-50, 10:29-50, 14:22-63, 15:13-52, 16:45-17:3, and 17:21-38, for example algorithm descriptions. In fact, there are multi-faceted advantages to not limiting an invention to a particular software language via the inclusion of language specific, source code in a patent application, and as a repeated inventor myself, with multiple issued patents, I would not do so. For example, when it is considered that over the 20-year life of patents, computer languages are continually evolving and advancing.

B. Graphical User Interfaces (GUIs)

As part of the disclosure that a POSITA would find to enable its invention, the specification discloses use of one "conventional" technology, namely, graphical user interfaces (GUI). For example, the specification acknowledges that GUIs and their functionality of supporting menus as well as text windows for entering search words and filling in text in a form is conventional. *See, e.g.,*'415 Patent at 6:43-44; '587 Patent at 6:43-44 ("The use of menus is conventional in GUIs for software applications."), 7:16-18 ("As is conventional, the GUI is configured to present a

[14] *See, e.g.,* https://en.wikipedia.org/wiki/Pseudocode. *See also, e.g., Microsoft Computer Dictionary* (5th ed., 2002) at **pseudocode** ("Any informal, transparent notation in which a program or algorithm description is written. Many programmers write their programs first in a pseudocode that looks much like a mixture of English and their favorite programming language, such as C or Pascal, and then translate it line by line into the actual language being used.").

graphical display on the display screen arranged to resemble a single desktop."), and at '415 Patent at 19:44-50; '587 Patent at 19:45-51 ("The user may conventionally search for an item by entering a key word search query in a box on a form. When a user selects an item, the server may provide a linked form that describes that item in further detail. The user may also conventionally enter ordering information into boxes on the form, such as the type and quantity of the item desired."). Thus, as a POSITA would understand, the specification of the '130 Patent need not provide additional details for how to implement its teachings with a GUI, e.g., given that how to implement GUI text boxes would be known to a POSITA.

100. For example, the common specification discloses exemplary GUI components in its Figs. 2-8. I provide an excerpt of one of these figures below:

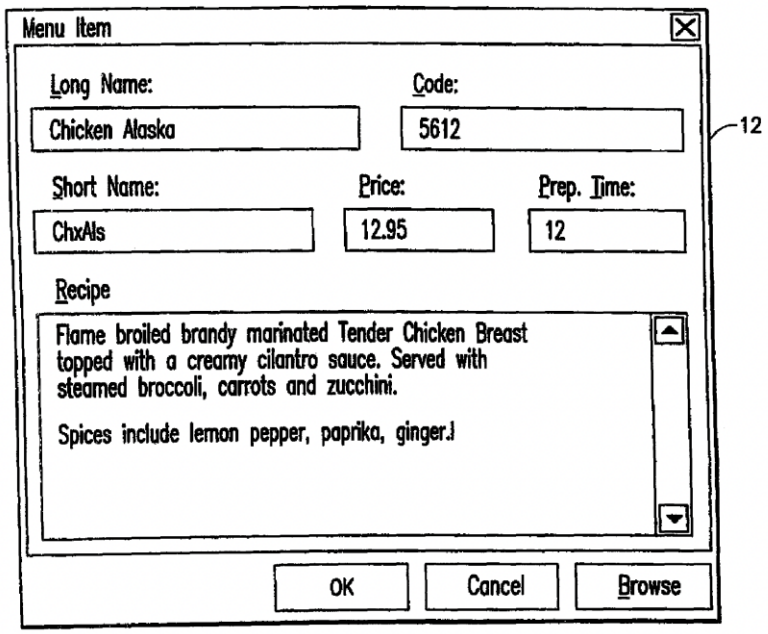


FIG.4

’415 and ’587 Patents at Fig. 4.

C. File Structures and the Master Database

101. With respect to the claimed file structure, the specification provides an exemplary tree-based file structure that could be configured for a user based on operational parameters:

```
Menu
>>      Entrees
        >>      Red Meat
                >>      NY Strip
                        >>      Vegetables
                                >>  Tomato
                                >>  Lettuce
                                Meat Temperature
                                >>  Medium Rare
```

’415 and ’587 Patents at 8:20-28.

102. Further, the specification provides pseudocode for an exemplary algorithm for building a file structure:

> The steps taken in building a menu are as follows:
> 1. Add Modifiers;
> 2. Add Sub-Modifiers and link them to the Modifiers;
> 3. Create Menu categories;
> 4. Add menu items to the categories;
> 5. Assign Modifiers to the menu items;
> 6. Preview the menu on the POS emulator on the desktop PC;
> 7. Download the menu database to the handheld device.

’415 and ‘587 Patents at 8:34-41.

103. Further, the specification, includes numerous examples from the newly added material and repeated references to Figure 10 and its framework, which provide the “how” and programming guidance to a POSITA, while also identifying

specific exemplary technologies and embodiments for realizing updating and querying, including a client-server system (’415 Patent at 19:13-58 and ‘587 Patent 19:12-59) utilizing client and server devices employing an advanced master database (’415 and ‘587 Patents at 11:64-65), Hypertext Transfer Protocol, HTTP (’415 Patent at 18:61-19:2; ‘587 Patent at 18:62-19:3), Hypertext Mark-up Language, HTML (*id.* at ‘415 Patent at 19:3-7 and ‘587 Patent at 19:4-8), Extensible Mark-up Language, XML (*id.* at ‘415 Patent at19:7-13 and ‘587 Patent at 19:8-14), Structured Query Language, SQL (*Id.* at 12:3-6), ActiveX Data Objects, ADO (*Id.* at 11:7-12:3), graphical user interfaces, GUIs (*Id.* at Figs. 1-8, 6:18-59, 7:16-50-, 11:3-25, 13:61-14:9). In my opinion, a POSITA in 2005 would not have considered this suite of technologies to be a set of generic components and certainly not in their ordered combination as in the claims, (inclusive of the multiple, new ‘inventive concepts’ as defined above), but rather to be specific technologies for realizing an improved and specialized distributed client-server system for food/drink ordering applications which is further enhanced via the claimed combination of above-cited elements of claim 1.

104. In order to accomplish such functionality, given the clear structure disclosed, e.g., with respect to the above-cited technology and algorithmic teachings from the specification/figures, as well as the claims themselves, a POSITA would know how to develop the following exemplary source code, which is provided in

pseudocode form, to facilitate readability and, consistent with the disclosure, that the invention can use any computer language (*id.* at 13:10-15), and multiple modes of communication for connecting to wireless devices (*e.g.*, *id. a*t 13:34-43).

105. For example, the following is exemplary pseudo-code for building a menu file structure prior to execution:

```
// Build and preview menus prior to execution

define BuildMenus() {
     POS_Emulator.Preview(BuildBreakfast());
     POS_Emulator.Preview(BuildLunch());
     POS_Emulator.Preview(BuildDinner());
}

define BuildBreakfast() {
     Menu items = {
     CATEGORY American;
          SUBCATEGORY Eggs;
               Modifier Scrambled;
               Modifier Poached;
               Modifier Fried;
          SUBCATEGORY Sausage;
               Modifier Pork;
                    SubModifier Mild;
                    SubModifier Medium;
                    SubModifier Spicy;
               Modifier Turkey;
                    SubModifier Mild;
                    SubModifier Spicy;
          SUBCATEGORY Hashbrown Potatoes;
               Modifier Toppings;
                    SubModifier Ketchup;
                    SubModifier Salsa;
                    SubModifier Guacamole;
     CATEGORY Pancakes;
          SUBCATEGORY Buttermilk;
          SUBCATEGORY Blueberry;
          SUBCATEGORY Chocolate;
     CATEGORY Bread;
          SUBCATEGORY Toast;
```

```
                Modifier avocado;
                Modifier jam;
                Modifier honey;
           SUBCATEGORY Bagel;
                Modifier topping;
                     SubModifier Butter;
                     SubModifier Cream cheese (plain);
                     SubModifier Cream cheese (strawberry);
                     SubModifier Cream cheese (cherry);
                     SubModifier No topping;
           SUBCATEGORY Sourdough;
      CATEGORY Add-on;
           SUBCATEGORY Steak;
                Modifier Rare;
                Modifier Medium Rare;
                Modifier Medium;
                Modifier Medium Well;
                Modifier Well;
           SUBCATEGORY Cereal;
                Modifier Oatmeal;
                Modifier Raisin Bran;
                Modifier Frosted Flakes;
      }
      // Add items to Master Database with breakfast parameters
      MasterDatabase.addMenu("Breakfast",items,"7:00am-10:30am");
      Return items;
}
```

106. As a related example, the following is exemplary pseudo-code for building a menu file structure (e.g., Build Lunch, Build Dinner), which would then be communicated to a handheld device based on operational parameters:

```
define BuildLunch() {
      Menu items = {
      CATEGORY Cheeseburger;
           SUBCATEGORY Beef;
                Modifier American;
                Modifier Cheddar;
                Modifier Swiss;
                Modifier Toppings;
                     SubModifier Ketchup;
                     SubModifier Onions;
```

```
                    SubModifier Guacamole;
          SUBCATEGORY Turkey;
               Modifier American;
               Modifier Cheddar;
               Modifier Swiss;
               Modifier Toppings;
                    SubModifier Ketchup;
                    SubModifier Onions;
                    SubModifier Guacamole;
          SUBCATEGORY Vegetarian-patty;
               Modifier American;
               Modifier Cheddar;
               Modifier Swiss;
               Modifier Toppings;
                    SubModifier Ketchup;
                    SubModifier Onions;
                    SubModifier Guacamole;
     CATEGORY French Fries;
          SUBCATEGORY Small;
          SUBCATEGORY Medium;
          SUBCATEGORY Large;
     }
     // Add items to Master Database with lunch parameters
     MasterDatabase.addMenu("Lunch",items,"11:00am-2:00pm");
     Return items;
}

define BuildDinner() {
     Menu items = {
     CATEGORY Appetizers;
          SUBCATEGORY French Fries;
               Modifier Traditional;
                    Modifier Curly;
                    Modifier Sweet Potato;
          SUBCATEGORY Wings;
               Modifier Flavor;
                    SubModifier Buffalo;
                    SubModifier Teriyaki;
                    SubModifier BBQ;
               Modifier Sauce;
                    SubModifier Ranch;
                    SubModifier Blue Cheese;
          SUBCATEGORY Nachos;
               Modifier Toppings;
                    SubModifier Protein;
```

```
                    SubModifier Sour Cream;
                    SubModifier Guacamole;
     CATEGORY Soups;
          SUBCATEGORY Chicken Noodle;
          SUBCATEGORY Tortilla;
          SUBCATEGORY Clam chowder;
     CATEGORY Salads;
          SUBCATEGORY Caesar;
               Modifier dressing;
               Modifier no dressing;
               Modifier side dressing;
          SUBCATEGORY House;
               Modifier dressing;
                    SubModifier Ranch;
                    SubModifier Ranch on the side;
                    SubModifier Thousand Island;
                    SubModifier Thousand Island on the side;
                    SubModifier No dressing;
          SUBCATEGORY Cobb;
     CATEGORY Entrees;
          SUBCATEGORY Steak;
               Modifier Rare;
               Modifier Medium Rare;
               Modifier Medium;
               Modifier Medium Well;
               Modifier Well;
          SUBCATEGORY Chicken Parmesan;
          SUBCATEGORY Pizza;
               Modifier Size;
               Modifier Crust;
               Modifier Toppings;
     CATEGORY Desserts;
          SUBCATEGORY Ice Cream;
               Modifier Scoops;
               Modifier Flavor;
               Modifier Toppings;
          SUBCATEGORY Cheesecake;
          SUBCATEGORY Apple pie;
               Modifier Temperature;
               Modifier A la mode;
     }
     // Add items to Master Database with dinner parameters
     MasterDatabase.addMenu(“Dinner”,items,“4:00pm-10:00pm”);
     Return items;
}
```

```
// Process a request based on operational parameters
// This method is thread-safe and can be executed in parallel
define ProcessRequest(Message request, Target target) {
     if (request.type == “Menu”) {
          menu = MasterDatabase.RetrieveMenu(current_time());
          handheld = target;
          SendMessage(handheld, menu); // multi-modal comm.
     } else if (request.type == “Order”) {
          order = ProcessOrder(request);
          restaurant = target;
          SendMessage(restaurant, order); // multi-modal comm.

     } else
          Print(“Error: request must be for a menu or order.”);
}
```

D. The claimed database API

107. The disclosed and claimed database API is non-conventional, intelligent and it provides the ability "…to enable automatic database updates and communication exchanges when a change or input occurs in any of the other system elements." '415 and '587 Patents at 3:33-36.

108. In addition to the citations given above to support the claimed intelligent "database API," the specification also describes and claims an invention that contains middleware to, e.g., order food items and ensure that "If there is an existing menu database on the handheld device, the system will ask if the existing database should be replaced." *Id.* at 10:19-21. A POSITA would understand this "synchronization may occur at all times" (*id.* at 14:59-60) and the description of

menu items may include "Long Name, Short Name, Code, Prep Time, Recipe, and Price" (*id.* at 9:36-37) and "modifiers to the menu items" (*id.* at 9:12-52).

109. Given the above-cited portions of the specification and the claims of the Network Patents, as well as at Fig. 10, 12:24-66, 14:52-60, and 18:19-32, a POSITA would understand that this functionality could be implemented with source code similar to the exemplary code below:

```
// API for menu components
define MenuComponents = {
     DEFINE LongName;
     DEFINE ShortName;
     DEFINE Code;
     DEFINE PrepTime;
     DEFINE Recipe;
     DEFINE Price;
     DEFINE CATEGORY;
     DEFINE SUBCATEGORY;
     DEFINE Modifier;
}

// Initial ranking of communication modes (which is updated and
// reordered in real time. The initial ranking first tries using
// the Internet (TCP), then wireless, then text message, voice
// message, FAX, and finally pager.
modeRank[] = {TCP, wireless, SMS, Voice, FAX, Pager};

// Learn an update status for multi-modal communication
define UpdateMode(mode, status) {
     // Update the learned status of the communication mode
     mode.status = status;
     // update mode ranking based on the new leaned status
     UpdateModePriorities(modeRank, mode);
}

// Communication Initialization API
define SystemStartup() {
     CHECK connection between backoffice server and wireless
     handheld devices;
```

```
     SYNCHRONIZE clocks between backoffice server and wireless
     handheld devices;
     CHECK for most recent version of menu;
          IF menu outdated THEN download most recent menu;
          ELSE read current menu;
     CHECK for most recent prices of food items;
          IF prices outdated THEN download most recent prices;
          ELSE read current prices;
}

// Database API for adding a menu
define addMenu(meal, items, timeRange) {
     MenuTable.add(meal, items, timeRange)
}

// API to retrieve a menu based on time-of-day
define RetrieveMenu(current_time) {
     for (i = 1 to MenuTable.size) {
          if (current_time is in MenuTable[i].timeRange)
               return MenuTable[i];
          }
     }
     return error("No menu for this time of day.");
}

// API to build a set of GUI components (server-side)
define BuildGUI (menu) {
     // Build display components for available food inventory
     gui = new GUI(); // initially GUI components are empty
     for (each category in menu.CATEGORIES)
        for (each subcategory in category.SUBCATEGORIES)
            for (each modifier in subcategory.Modifier)
               gui.add(menu, category, subcategory, modifier);
     return gui;
}

// API to process an order
define ProcessOrder(restaurant, order) {
     cart = new ShoppingCart(); // initially null
     for (each food in order) {
         if (food is available) {
               cart.add(food);
               cart.cost = cart.cost + food.price;
          }
     // pay for the food, e.g., using POS
```

```
     if (cart.ProcessPayment() == success)
          SendMessage(restaurant, cart);
     else
          error("Insufficient funds for this order.");
     UPDATE inventory of food items in backoffice server based
     on previous order;
}
```

E. Multi-modal Communication

110. The specification also describes and claims an invention that contains middleware to support the claimed multi-modal communication and parallel operational capabilities. This includes "A single point of entry to keep all wireless handheld devices and linked websites in synch with the back-office server applications so that the different components are in equilibrium at any given time and an overall consistency is achieved." *Id.* at 5:33-38.

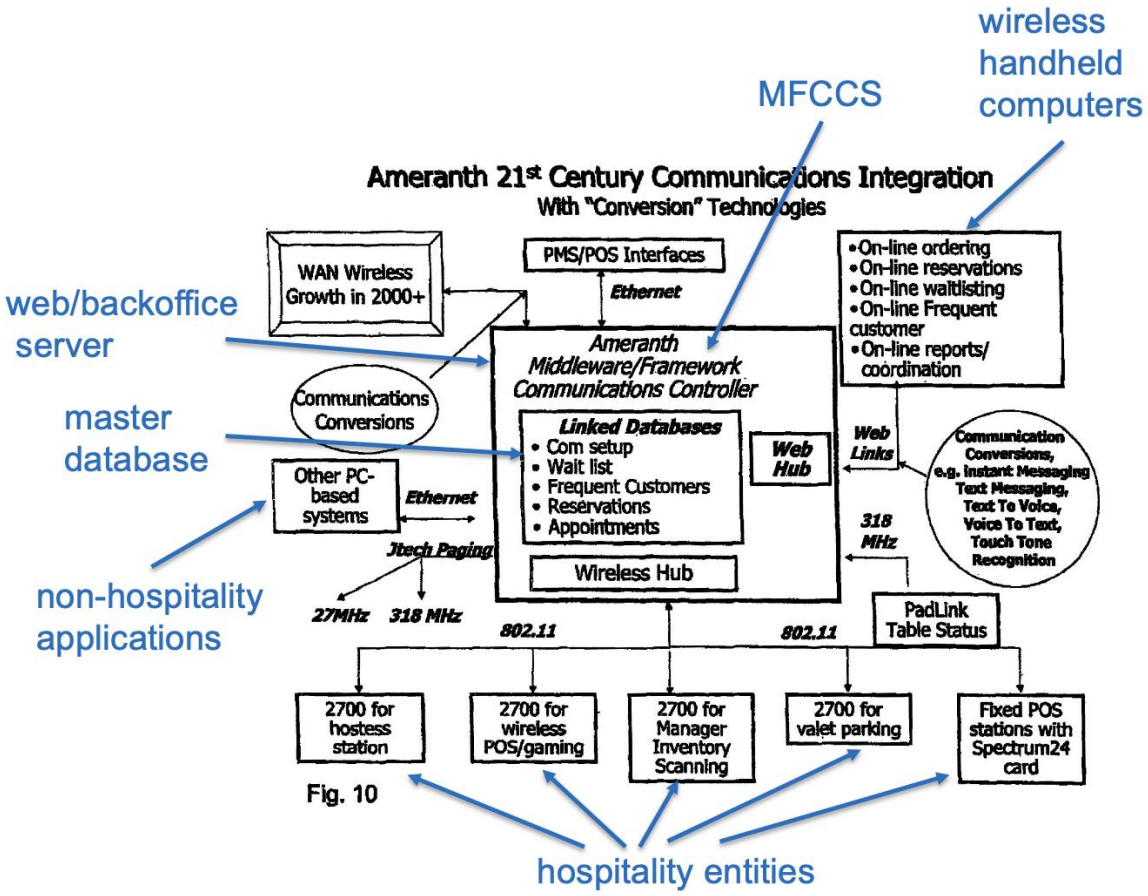
111. From the specifications and figures, a POSITA would also easily understand how to implement the source code, in the selected programming language at that time, to support "A communications control program monitors and routes all communications to the appropriate devices. It continuously monitors the wireless network access points and all other devices connected to the network such as pagers, remote devices, internet Web links and POS software." *Id.* at 10:51-55. Also, "multiple modes of contact might be available to the computer for communicating with the entity." *Id.* at '415 Patent at 16:28-30; '587 Patent at 16:29-31. From this disclosure, a POSITA would understand how to design a multi-modal

communication method, such as the following exemplary pseudocode description, which is based on the database API that intelligently learns :

```
// Multimodal communication
define SendMessage(target, message) {
     // Try each mode of communication, based on the ranking
     // learned by the database API
     for (i = 1 to modeRank.size) {
          mode = modeRank[i];
          mode.initializeComm(target); // init. comm. to target
          if (mode != null) { // mode init. was successful
               Send(mode, message); // send via this comm. mode
               UpdateMode(mode, “success”);
               return;
          }
          else
               UpdateMode(mode, “fail”);
     }
     // If we get here in the code, then all comm. modes have
     // failed -> this should NEVER happen (e.g., all
     // communication modes are down)
     error(“All modes of communication have failed!”);
}
```

F. Data Flow

112. The Patents-in-Suit describe processing information in the disclosed distributed system using message passing and data flows. An embodiment of the system is illustrated in Fig. 10 from the Patents-in-Suit, which I have annotated below with what a POSITA would understand to be possible mappings to claim terms:



113. The message flows disclosed in the Patents-in-Suit, which support the communications resighted in the claims between the various system components, include the following:

- Between handheld devices and hospitality entities using hospitality application software. ’587 Patent at 3:66-4:13, 13:16-19, 14:29-42; ’415 Patent at 3:64-4:12, 13:16-19, 14:29-42.

- Between handheld devices and web/backoffice servers. ’587 Patent at 13:2-9, ’415 Patent at 13:2-9.

- Between hospitality entities and web/backoffice servers. ’587 Patent at 14:43-55, ’415 Patent at 14:43-55.

- Between the master database and other components. ’587 Patent at 14:58-63, ’415 Patent at 14:58-63.

G. The Claims Explain How the Claimed Functionality is to be Performed

114. As I explain, the claims of the ’587 and ’415 Patents explain how the claimed functionality is to be performed. That is, in my opinion, the claims do not merely recite results-oriented functionality without describing how to engineer or

program a system to achieve the results stated in the Asserted Claims. I provide some examples below that support this conclusion.

1. The ’587 Patent

(i) Claim 1

115. Claim 1 of the ’587 Patent recites a master database comprising “predefined formats” and “a usable file structure dictated prior to execution.” A person of ordinary skill in the art would understand these elements to provide structure, e.g., regarding the formatting and organization of the data stored in the master database. For instance, a POSITA would understand that predefined formats could include data formats, such as ASCII, binary, or Unicode, and “a usable file structure dictated prior to execution” could include a Unix-style or Microsoft-style file structure hierarchy with a top-level root and subfolders. See, e.g., ’587 Patent at 6:18-59, 8:13-33, 10:8-28, 21:25-33. Thus, in my opinion, these elements are directed at computer-based solutions, not abstract concepts.

116. Claim 1 also recites “handheld/mobile computers with different mobile operating systems.” A POSITA would understand that computer systems can either be closed systems that work with only a single operating system, or they can be general solutions that work with multiple operating systems. Claim 1 is clearly limiting itself to general solutions where handheld computers have different mobile operating systems. A POSITA would therefore understand that this limitation is

directed to a computer-based solution and is an improvement to the functioning of computers in that it is directed to solutions that work with handheld devices with different mobile operating systems, rather that requiring a closed system. See, e.g., ’587 Patent at 6:18-59, 7:3-36, 12:18-33.

117. Claim 1 also recites “the network is further enabled to automatically contact one or more other entities when the remotely initiated hospitality task cannot be completed with a first entity and to intelligently continue this, until the task is completed” and “the MFCCS and the backend servers are programmed with instructions executable to choose and apply varying modes of contact during the remotely initiated task.” A POSITA would understand these limitations to provide algorithmic structure (in prose form) for the procedure for implementing the multi-modes of communication functionality I discuss above. Indeed, a POSITA would understand the “when”, “continue”, and “until” keywords to correspond to decision and loop constructions used in flowcharts and programming implementations. See, e.g., ’587 Patent at 16:29-44.

(ii) Claim 7

118. See above for claim 1.

119. In addition, Claim 7 of the ’587 Patent recites “the network is further enabled to automatically communicate alerts to the handheld/mobile equipped management staff when corresponding criteria are met.” A POSITA would

understand that this provides structure for the functionality of keeping the mobile users apprised of the status of their orders. For example, the limitation includes the algorithmic decision construct of performing an action **when** certain criteria are met. See, e.g., ’587 Patent at 11:57-63, 13:16-43, 13:53-14:9, 16:45-17:20, 20:56-21:11.

2. The ’415 Patent

(i) Claim 1

120. Claim 1 of the ’415 Patent recites “software with a usable file structure dictated prior to execution.” A person of ordinary skill in the art would understand this element to provide structure, e.g., regarding the organization of the data stored in the system. For instance, a POSITA would understand that “software with a usable file structure dictated prior to execution” could include a Unix-style or Microsoft-style file structure hierarchy with a top-level root and subfolders. See, e.g., ’587 Patent at 6:18-59, 8:13-33, 10:8-28, 21:25-33. Thus, in my opinion, this element is directed at computer-based solutions, not abstract concepts.

121. Claim 1 also recites “a database application program interface (API) and with predefined formats stored within it, wherein the API intelligently learns, updates and stores multiple communication modes of contact and related operational parameters including set periods of time or reflecting other factors associated with hospitality entities and/or hospitality users along with their prior preferences, if any.” A POSITA would understand that this element provides structure, in the form of an

API, that includes specific programming requirements, including that it intelligently learns, updates, and stores multiple communication modes of contact and that it uses related operational parameters, including set periods of time or other factors associated with hospitality users along with their prior preferences, if any. See, e.g., '415 Patent at 11:4-25.

122. Claim 1 also recites "wireless handheld computers, each with different mobile operating systems and with mobile compatible versions of the said hospitality application accessible from and with a different set of handheld GUI screens uniquely enabled for both user initiating actions and later selection of choices directly on and from the touchscreens of said different wireless handheld computers and for multiple modes of contact, multiple communications protocol functionality, integrated with the master database and with the at least one hospitality software application." A POSITA would understand that computer systems can either be closed systems that work with only a single operating system, or they can be general solutions that work with multiple operating systems. Claim 1 is clearly limiting itself to general solutions where handheld computers have different mobile operating systems. A POSITA would therefore understand that this limitation is directed to a computer-based solution and is an improvement to the functioning of computers in that it is directed to solutions that work with handheld devices with

different mobile operating systems, rather that requiring a closed system. See, e.g., '587 Patent at 6:18-59, 7:3-36, 12:18-33.

123. Claim 1 also recites "wherein the at least one said web server computer is integrated with the MFCCS and is programmed with instructions executable to choose and apply a primary communications mode of contact, for and with the hospitality entities and/or users, for a period of time, to execute hospitality application task requests from said two or more wireless handheld computers associated with their respective users, and further enabled to automatically choose and execute alternate communication modes of contact and/or alternate communications protocols if needed and appropriate at the time of execution upon failure of the primary communications mode of contact, and/or apply rule based intelligence to not attempt again for an operational period of time the primary communication mode, the instructions being further executable to enable the at least one said web server computer to further improve its efficiency by using less computer resources and less computing time through the avoidance of attempting communications modes of contact to hospitality entities and/or users and/or for subsequent user hospitality application task requests, likely to fail during the operational period of time if attempted again during that time." A POSITA would understand these limitations to provide algorithmic structure (in prose form) for the procedure for implementing the multi-modes of communication functionality I

discuss above. Indeed, a POSITA would understand the limitations of "programmed with instructions", "execution upon failure of the primary communications mode of contact", and "rule based intelligence to not attempt again for an operational period of time" keywords to correspond to decision and loop constructions used in rule-based programming implementations. See, e.g., '587 Patent at 16:29-44.

I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true.

Executed this September 16, 2024, in Irvine, California.

_____

Michael T. Goodrich, Ph.D.