

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

QUOTIENT TECHNOLOGY, LLC,
Petitioner,

v.

INTELLIGENT CLEARING NETWORK, INC.,
Patent Owner.

Case No. IPR2024-01323

U.S. Patent No. 9,070,133

**Declaration of Dr. Todd C. Mowry in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 9,070,133**

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PETITIONER’S EXHIBIT LIST

Exhibit	Description
1001	U.S. Patent No. 9,070,133
1002	File History for U.S. Patent No. 9,070,133
1003	Declaration of Dr. Todd C. Mowry
1004	U.S. Patent Application Publication No. US 2004/0140361 (“Paul”)
1005	U.S. Patent Application Publication No. US 2006/0074784 (“Brown”)
1006	U.S. Patent No. 5,832,458 (“Jones”)
1007	Complaint, <i>Inmar Brand Solutions, Inc. v. Quotient Technology Inc.</i> , 23-cv-00994, D. Del. (filed September 7, 2023)
1008	Scheduling Order, <i>Inmar Brand Solutions, Inc. v. Quotient Technology Inc.</i> , 23-cv-00994, D. Del. (filed June 4, 2024)
1009	District Court Trial Statistics (12-Month Period Ending June 30, 2024)
1010	E.F. Codd, “A relational model of data for large shared data banks” Communications of the ACM, Vol. 13, Issue 6, June 1970 377-387
1011	Philip A. Bernstein et al, Principles of Transaction Processing for the Systems Professional, United Kingdom: Elsevier Science, (1997)
1012	A.S. Tanenbaum et al, Distributed Systems: Principles and Paradigms, Prentice Hall (2002)
1013	David Gifford et al, “The CIRBUS banking network” Communications of the ACM, Vol. 28, Issue 8, Aug. 1985 798–807
1014	The UPC at https://www.ibm.com/history/upc https://www.retailtouchpoints.com/blog/a-brief-history-of-the-coupon-and-its-future#:~:text=Retailers%20have%20Coca%2DCola%20to,it%20worked%20like%20a%20dream
1015	Nielsen History at https://nielseniq.com/global/en/landing-page/our-history-niq-driving-force-behind-consumer-intelligence/

Exhibit	Description
1016	Axel Winkelmann, Integrated Couponing: A Process-Based Framework for In-Sore Coupon Promotion Handling in Retail, Logos Verlag, (2006)
1017	Electronic ‘Coupons’: Savings but No Scissors (Apr. 21, 1990) at https://www.nytimes.com/1990/04/21/style/consumer-s-world-electronic-coupons-savings-but-no-scissors.html
1018	U.S. Patent Application Publication No. 2004/0030598 (“Boal”)
1019	U.S. Patent Application Publication No. 2003/0024981 (“Narasimhan”)
1020	U.S. Patent No. 7,231,357 (“Shanman”)
1021	U.S. Patent No. 3,959,624 (“Kaslow”)
1022	U.S. Patent No. 8,511,553 (“McIntyre”)
1023	U.S. Patent Application Publication No. 2005/114211 (“Amjadi”)
1024	U.S. Patent Application Publication No. 2006/0047573 (“Mitchell”)

TABLE OF ABBREVIATIONS

Abbreviation	Term
'133 patent	U.S. Patent No. 9,070,133
AIA	America Invents Act
Challenged Claims	Claims 1-35 U.S. Patent No. 9,070,133
Paul	U.S. Patent Application Pub. No. 2004/0140361 (Ex-1004)
Ex-	Exhibit
Fig.	Figure
IPR	<i>inter partes</i> review
Brown	U.S. Patent Application Publication No. 2006/0074784 (Ex-1005)
Jones	U.S. Patent No. 5,832,458 (Ex-1006)
Patent Owner	Intelligent Clearing Network, Inc.
Petitioner	Quotient Technology, LLC
POSITA	Person[s] of ordinary skill in the art

I, Dr. Todd C. Mowry, declare as follows:

1. I have been retained by counsel for Quotient Technology, LLC to submit a Declaration in support of the Petition for *Inter Partes* Review of U.S. Patent No. 9,070,133 (“the Petition”), which I understand has been assigned to Intelligent Clearing Network, Inc. (“ICN” or “Patent Owner”). I have been asked to opine on whether the ’133 patent is invalid over the prior art. My opinions are based on my experience, knowledge, and skill in computer science, as well as my experience in distributed computing, networked computer systems, database management systems, and transaction processing.

2. In preparing this Declaration, I have reviewed the ’133 patent, its prosecution history, and the exhibits cited in this Declaration. I may rely upon these materials, my experience and knowledge, and/or additional materials to rebut arguments raised by the Patent Owner. Further, I may also consider additional documents and information in forming any necessary opinions, including documents that may not yet have been provided to me. My analysis of the materials is ongoing, and I will continue to review any new material as it is provided. This Declaration represents only those opinions I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

3. I am being paid at my normal hourly rate for my work on this matter. I have no personal or financial stake or interest in the outcome of the Petition.

I. QUALIFICATIONS

4. My qualifications are stated more fully in my curriculum vitae, which is attached as Appendix A. Below is a summary of my education, work experience, and other qualifications.

5. I am a Professor in the Department of Computer Science at Carnegie Mellon University. I also have a courtesy appointment in the Department of Electrical and Computer Engineering. I have served on the faculty of Carnegie Mellon University for 27 years starting in 1997 through the present (2024). I also served on the faculty of the University of Toronto for four years between 1993 and 1997, in the Department of Electrical and Computer Engineering and a courtesy appointment in the Department of Computer Science. Prior to that appointment, I served as a Graduate Research Assistant in the Department of Electrical Engineering at Stanford University for four years between 1989 and 1993. As a faculty member, I have taught and continue to teach courses and directed research in computer systems and software, operating systems, distributed and network systems, parallel processing, and compiler optimization.

6. I received a B.S. degree in Electrical Engineering with Highest Distinction from the University of Virginia in May 1988. I received an M.S. in

Electrical Engineering from Stanford University in June 1989, and a Ph.D. in Electrical Engineering from Stanford University in March 1994.

7. I have worked in the computer industry in various capacities. I was a part-time Computer Architect and then Computer Architecture Consultant at Silicon Graphics, Inc., in Mountain View, California (formerly MIPS Computer Systems in Sunnyvale, California) from 1989 to 1993 and 1993 to 1996, respectively. I was a Visiting Scientist at IBM in Toronto from 1996 to 2004. During that same time period (1996 to 2004), I was also a Member of the Technical Advisory Board of SandCraft, Inc. in Santa Clara, California. I was the Director of the Intel Research Pittsburgh Lab at Intel Corporation in Pittsburgh, Pennsylvania from 2004 to 2007.

8. I have authored 21 journal articles and 71 conference papers. I am also an inventor on 5 patents. I have published a number of papers in the top research conferences and journals in the fields of computer systems and data management (including papers that won the Best Paper awards at top conferences in the fields of operating systems (OSDI '96) and database management systems (ICDE 2004). *See, e.g.,* Christopher B. Colohan, Anastassia Ailamaki, J. Gregory Steffan, and Todd C. Mowry, Incrementally parallelizing database transactions with thread-level speculation, in ACM Transactions on Computer Systems (TOCS), 26(1), February 2008; Amit Manjhi, Charles Garrod, Bruce M. Maggs, Todd C. Mowry,

Anthony Tomasic, Holistic Query Transformations for Dynamic Web Applications, in Proceedings of the 2009 IEEE 25th International Conference on Data Engineering (ICDE), March-April 2009; Charles Garrod, Amit Manjhi, Anastasia Ailamaki, Bruce Maggs, Todd Mowry, Christopher Olston, and Anthony Tomasic, Scalable Query Result Caching for Web Applications, in Proceedings of the 34th International Conference on Very Large Databases (VLDB), August 2008; Ziqi Wang, Michael A. Kozuch, Todd C. Mowry, and Vivek Seshadri, Multiversioned Page Overlays: Enabling Faster Serializable Hardware Transactional Memory, in Proceedings of the 28th International Conference on Parallel Architectures and Compilation Techniques (PACT), September 2019; and Prashanth Menon, Amadou Ngom, Lin Ma, Todd C. Mowry, and Andrew Pavlo, Permutable Compiled Queries: Dynamically Adapting Compiled Queries without Recompiling, in Proceedings of the VLDB Endowment, 14(2):101-113, October 2020.

9. I have also been an active member of the Parallel Data Lab at Carnegie Mellon University since 1997, which is often described as “academia’s premiere data systems research center.”

10. I am the recipient of several honors and awards: the Arthur Samuel Thesis Award (awarded by the Stanford Computer Science department to the top two Ph.D. theses in a given year), several IBM Faculty Development Awards

(1996, 1997, 1998, 2000, 2001, 2002, and 2003), several Best Paper Awards (the Second Symposium on Operating Systems Design and Implementation in 1996; the 20th International Conference on Data Engineering (ICDE) in 2004), the Alfred P. Sloan Research Fellowship (awarded to researchers in recognition of distinguished performance and a unique potential to make substantial contributions to their field), the Most Thought-Provoking Idea Award in 2004 (awarded by the Architectural Support for Programming Languages and Operating Systems (ASPLOS)), the TR100 Award in 1999 (awarded by MIT's Technology Review magazine to the top 100 most promising young innovators in science and technology), and I became an ACM Fellow in 2016.

11. I am a member of the Institute of Electrical and Electronics Engineers (IEEE) and the Association of Computing Machinery (ACM). I was the Editor-in-Chief of ACM Transactions on Computer Systems (the premier journal for computer systems research) from 2013–2018. I was an Associate Editor for the journal prior to that, since 2001. I was the Program Chair of the International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS) in 2010. I was the Co-Program Chair of the International Conference on Parallel Architectures and Compilation Techniques (PACT) in 2001. I have been on the programming committee in various years for ASPLOS,

the International Symposium on Computer Architecture (ISCA), and the International Symposium on Microarchitectures.

12. Overall, I have over 30 years of experience in the field of computer science, including distributed computing, networked computer systems, database management systems, and transaction processing. In light of the foregoing, I consider myself to be an expert in the field of computer science and believe that I am qualified to provide an opinion as to what a person of ordinary skill in the art would have understood, known, or concluded regarding the subject matter of the '133 patent at the time of its alleged invention.

II. SCOPE OF OPINIONS

13. I have been asked to provide my opinions regarding whether the Challenged Claims of the '133 patent would have been obvious to one of ordinary skill in the art at the time of the alleged invention in view of Paul (**Ground 1**), the combination of Paul and Brown (**Ground 2**), the combination of Paul and Jones (**Ground 3**), or the combination of Paul, Brown, and Jones (**Ground 4**). This Declaration, including the exhibits cited herein, sets forth my opinions on these topics.

14. It is my opinion that the Challenged Claims of the '133 patent would have been obvious based on the four Grounds listed above. I do not take a position on whether any of the claims are indefinite, and my analysis of the claims and

opinions on validity are not intended to convey an opinion that the claims are not indefinite.

III. MATERIALS REVIEWED AND CONSIDERED

15. The materials I considered and relied upon in preparing my Declaration and forming my opinions include all exhibits cited in this Declaration, including the '133 patent, the file history of the '133 patent, and all of the relevant prior art. I also have relied on my professional experience, knowledge, and skill in computer science, as well as my experience in distributed computing, networked computer systems, database management systems, and transaction processing in reaching the opinions expressed in this Declaration.

IV. LEVEL OF ORDINARY SKILL IN THE ART

16. In rendering the opinions set forth in this Declaration, I was asked to consider the patent claims and the prior art through the eyes of one of ordinary skill in the art at the effective filing date of the claimed invention.

17. I understand that various factors, such as the education level of those working in the field, sophistication of the technology, types of problems encountered in the art, prior art solutions to those problems, and speed at which innovations are made, may help establish the level of skill in the art. In determining the level of ordinary skill in the art, I have taken into account these factors as well as my years

of experience in the computer science industry related to the subject matter of the '133 patent.

18. It is my opinion that one of ordinary skill in the art would have had an undergraduate degree in electrical engineering, computer science, computer engineering, or similar technical field; and one to two years of experience in the analysis, design, development, and implementation of distributed applications that involve client machines communicating with remote server machines over a network to perform queries and update transactions on data stored in database management systems, with additional education substituting for less experience and vice versa.

V. STATEMENT OF LEGAL PRINCIPLES

19. I am not an attorney. In forming my opinions in this Declaration, I applied the relevant legal principles provided to me by counsel, which are summarized in Appendix C attached to my Declaration.

VI. SUMMARY OF THE '133 PATENT

20. The '133 patent is entitled "Intelligent coupon network." Ex-1001. I understand that the '133 patent was filed on May 23, 2006 as U.S. Patent Application No. 11/439,725. For purposes of my analysis, I have assumed that the priority date of the '133 patent is its filing date (May 23, 2006).

A. Challenged Claims

21. The '133 patent has six independent claims (1, 11, 17, 25, 30, and 33).

All six independent claims and their dependent claims are Challenged Claims. The Challenged Claims 1-35 are provided in Appendix B attached to my Declaration.

B. Alleged Invention of the '133 Patent

22. The underlying concept of the '133 patent is very simple—allowing customers to collect digital coupons in a customer coupon account maintained in a centralized database and then redeem them on demand when making purchases at a variety of retail stores. This concept is implemented using a point-of-sale terminal (such as a cash register), servers that communicate over a network, and a coupon storage database. As I explain throughout this Declaration, this concept and all of these elements were well known in the art as of the priority date. None of the components are specialized—they are generic computing devices and storage media. Below I explain how the specification describes the alleged invention.

1. Overview

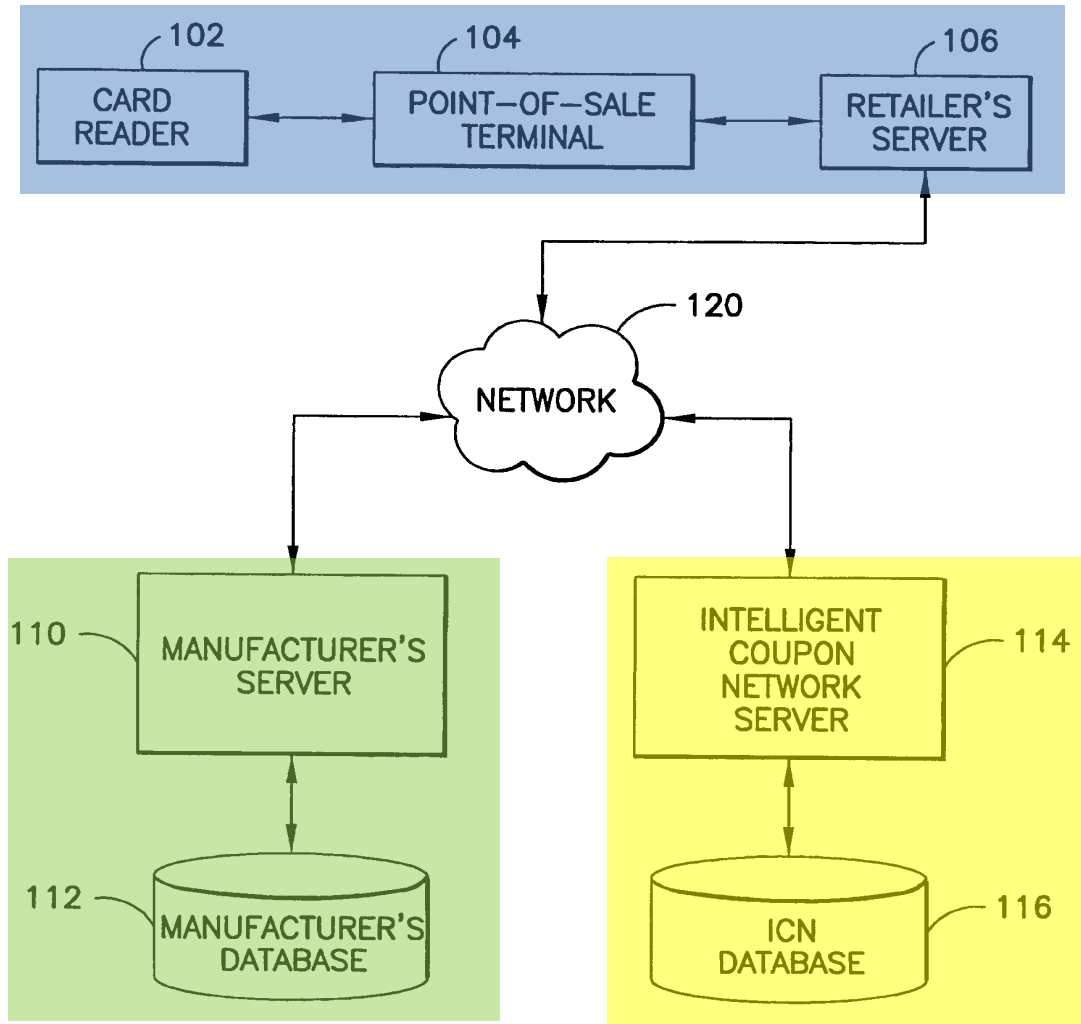
23. The '133 patent claims are directed to coupon processing servers and point-of-sale terminals (“POS terminals”), which operate in tandem to process coupons across a network. Three independent claims (1, 17, 30) are directed to the structure and operation of a coupon processing server. Three independent claims (11, 25, 33) are directed to the structure and operation of a point-of-sale terminal. The claims recite reciprocal actions taken by the coupon processing server and point-

of-sale terminal. For example, a coupon processing server *receives* what a point-of-sale terminal *transmits*:

- Claim 1 requires “***receiving***, at a coupon processing server, a unique account identifier from a first point of sale terminal”
- Claim 11 requires “***transmitting***, from the point of sale terminal, the unique account identifier to a coupon processing server”

24. The '133 patent relates generally to the “distribution and electronic processing of coupons and, in particular, to a network based system and method for validating and redeeming coupons.” Ex-1001, 1:5-7. The '133 patent “allows for automatic processing of coupons and provides linkage between a coupon card and coupon information stored in a centralized database.” Ex-1001, 2:60-63. The '133 patent purports to “present novel ways of bundling technologies, including existing technologies such as real time communications and large volume data processing facilities, into a functioning operational platform[.]” Ex-1001, 2:66-3:2. The '133 patent also purports to avoid the lengthy and labor-intensive manual coupon clearing process and satisfy the “need for a fast, convenient way for processing coupons and quickly providing comprehensive market intelligence to retailers and manufacturers,” which is “a benefit not known to be provided by current technologies.” Ex-1001 at 1:21-30, 1:31-34, 8:62-65.

25. Figure 1 depicts a “system for redeeming coupons associated with a coupon card via a centralized database.” Ex-1001, 3:6-8, FIG. 1 (highlighted):



26. The system operates at both a retail store (boxed in blue) and an Intelligent Coupon Network (“ICN”) (boxed in yellow). The system can also interact with manufacturers (boxed in green). Point-of-Sale Terminal 104 (“POS terminal”) is located at a retail store (boxed in blue). The Intelligent Coupon Network Server 114 (“ICN server”) is part of an Intelligent Coupon Network (ICN)

that is located remotely from the retail store (boxed in yellow). Ex-1001, 3:6–34. The ICN server 114 is linked to an ICN database 116 that maintains customer coupon accounts. Ex-1001, 3:31–45; 4:7–61. The POS terminal 104 and ICN server 114 communicate with each other over a network 120, with the Retailer’s Server 106 acting as an intermediary. Below, I explain in detail the structure and operation of the POS terminal 104, ICN server 114, and ICN database 116.

2. Point-of-Sale Terminal 104

27. The retail store components of the coupon processing system (boxed in blue) include a card reader 102, a POS terminal 104, and a retailer’s server 106. Ex-1001, FIG. 1. The POS terminal 104 is connected to both the card reader 102 and the retailer’s server 106. The card reader 102 can scan coupon information or customer identification information from a coupon card and provide it to the POS terminal 104. Ex-1001, 3:20–27. Via the retailer’s server 106, the POS terminal 104 can communicate with the ICN server 114 over a network 120.

3. ICN Server 114

28. The ICN components of the coupon processing system (boxed in yellow) include an ICN server 114 and an ICN database 116 that are coupled together. Ex-1001, FIG. 1. The ICN can communicate with the retail store over a network 120. The ICN server 114 processes coupons for one or more manufacturers and “may notify the manufacturer of a completed transaction or completed set of

transactions by sending status information to the manufacturer's server 110." Ex-1001, 3:45–48.

4. ICN Database 116

29. The ICN database 116 is a centralized database of customer accounts. Ex-1001, 4:7–61. Each customer has a unique customer identifier associated with their customer account. Ex-1001, 4:7–24. A customer account stores coupons that have been assigned to the customer. Ex-1001, 4:7–24. A customer can use their unique account identifier to access coupons in their coupon account in the ICN database 116 during checkout at a retail store. Ex-1001, 4:14–26. Figure 6 depicts an example of an ICN database 624 that stores coupons associated with a unique account identifier (Ex-1001, FIG. 6.):

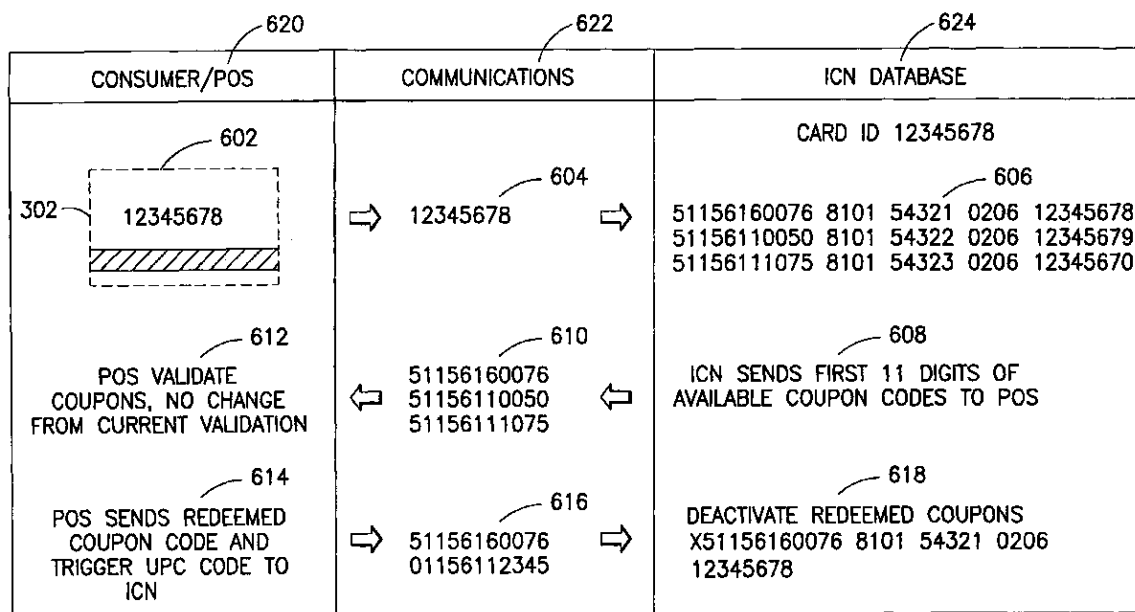


FIG.6

5. Operation of the Coupon Processing System

30. During a purchase transaction at a retail store, customers present and swipe their coupon card at the card reader 102 connected to POS terminal 104. Ex-1001, 3:20–27. POS terminal 104 receives and sends their unique account identifiers to ICN server 114 through retailer's server 106 and over the network 120. Ex-1001, 3:24–45; 4:15–61. The ICN server 114 accesses the coupon accounts in ICN database 116 and checks for any valid coupons saved in the account. Ex-1001, 4:31–61. Any valid (i.e., active and available) coupons are sent to POS terminal 104, which validates whether the customer's purchase satisfies coupon requirements and allows a customer to redeem the coupon. Ex-1001, 4:40–61. Thus, a customer can use their unique account identifier to access and redeem coupons in their coupon account in the ICN database 116 during checkout at a retail store.

31. If the customer redeems a coupon, POS terminal 104 notifies ICN server 114, and the customer's coupon account in ICN database 116 is updated to reflect that the coupon was redeemed. Ex-1001, 3:37–45; 8:50–62. POS terminal 104 can also send purchase transaction information, such as the product purchased, the time of purchase, and the location of purchase. Ex-1001, 7:10–33. Thereby, ICN server 114 can monitor the volume and traffic of redeemed coupons to identify abnormalities. Ex-1001, 10:53–61. ICN server 114 can also notify the manufacturer

(boxed in green in highlighted Figure 1 above) associated with the redeemed coupon of the redemption and provide purchase transaction information. Ex-1001, 3:45–60.

C. Prosecution History

32. The '133 patent issued from U.S. Patent Application No. 11/439,725, which was filed on May 23, 2006. I provide my understanding of the relevant prosecution history of the '133 patent below.

33. On April 27, 2011, the examiner finally rejected the then-pending claims as anticipated by Fajkowski (US 2005/0230473).

34. On June 28, 2011, applicant submitted arguments explaining why Fajkowski is not anticipatory. Ex-1002, 173. Applicant's arguments can be summarized as follows:

- Fajkowski has no coupon processing server that stores coupon codes associated with customer identification information.
- Fajkowski has no disclosure or suggestion that customer identification information is being transmitted by a POS terminal to a coupon processing server.
- Fajkowski has no **remote** coupon processing server that provides coupon data to a point-of-sale terminal **in real time** during the customer transaction.

35. On October 31, 2011, the applicant filed a Request for Continued Examination cancelling all pending claims (1-67) and adding new claims 68-123. Ex-1002, 140–152. Applicant submitted renewed arguments that Fajkowski is not anticipatory because it does not disclose a **remote** coupon processing server that is configured to communicate with a **plurality** of point-of-sale terminals for **real time** coupon redemption during a purchase transaction. Ex-1002, 154-156.

36. On December 21, 2012, applicant amended the independent claims to recite that the unique account identifier was scanned at the point-of-sale terminal at a retail store and that the coupon processing server was **remote** from the retail store. Ex-1002, 117-130. I note that the '133 patent specification does not describe the claimed coupon processing server as being “remote” from the retail store, instead referring to a “centralized database.” Thus, under applicant’s reasoning, art describing a system with a centralized database or other similar language would disclose using a remote server. In other words, “remote” is not magic language and the fact that a system is operating remotely can be inferred from context.

37. On October 9, 2014, the examiner rejected the then-pending claims as ineligible subject matter under 35 U.S.C. § 101. The examiner explained that the claims were directed to the abstract idea of validating coupons during a purchase transaction, a fundamental economic practice. Ex-1002, 71-72. On April 9, 2015,

applicant submitted arguments in response to the examiner's § 101 rejection. Ex-1002, 55-56. Applicant's arguments can be summarized as follows:

- Coupon activity at each local retail store location is not monitored by a central server, e.g., an in-store system does not include central monitoring from a **remote** server that can monitor coupon transactions (volume/traffic) to prevent store personnel and/or others from fraudulently redeeming coupons.
- The inventors have improved upon previous coupon validation systems and methods by developing improved systems and methods that include, at a minimum, coupon processing servers that are at a **remote** location relative to the retail stores.
- Digital coupons can be defined, edited, and/or corrected in **real time** in a centralized database at the **remote** processing server so that each retail store has instant access.

38. On May 22, 2015, the examiner allowed the then-pending claims. The examiner explained that the § 101 rejection had been overcome because “the use of the **remote** location for coupon validation improves the technology by providing more efficient validation by eliminating the counting and clearing of paper for both retailers and manufacturers by clearing electronically.” Ex-1002, 20-21. The

examiner also explained that Fajkowski did not disclose using a server that is **remote** from the retail store. Ex-1002, 21-22.

39. I note that the patent that issued from the Paul application (U.S. Patent No. 7,240,843) was included in an IDS filed by the applicant, but was never mentioned by the examiner. The examiner's statement that "the prior art does not disclose a situation in which the coupon information of a pending transaction is transmitted to a server that is remote from the retail store in order to obtain coupon validation for the pending transaction and once the validation of the coupon is received back at the POS terminal completing the pending transaction by successfully redeeming the coupon" misses the mark because the '133 patent requires sending a unique account identifier to the server, not coupon information of a pending transaction. Ex-1002, 20-22. Thus, the examiner appears to have overlooked the '843 patent based on a misunderstanding of the claims. Further, the '843 patent was not listed in the examiner's final Notice of References Cited. Ex-1002, 24.

40. Thus, the prosecution history demonstrates that the allegedly novel contribution of the '133 patent is the use of a **remote** coupon processing server communicating in **real time** with a **plurality** of point-of-sale terminals. As I explain below, there is nothing novel about using a remote server to process coupons in real time for multiple point-of-sale terminals.

VII. STATE OF THE ART

41. To put in context my opinions herein, I provide an overview of the relevant technological background, which relates to coupons, computing systems and their network communication capabilities, and financial transaction processing. As further explained below, the '133 patent did not contribute any novel technology to the electronic coupon processing field. The distributed computing and database management technology needed to implement the coupon processing servers and point-of-sale terminals claimed in the '133 patent was well-known and established before its priority date.

A. Computer Networking

42. A key event in the development of wide-area networking technology was the creation of the ARPANET in 1969. The initial network link (connecting nodes at Stanford and UCLA) eventually grew into the Internet as we know it today. For the first several decades of its existence, however, use of the Internet was restricted to academic and military applications (focusing mostly on networking research and communication between universities and government agencies). In the early 1990s, the U.S. Congress passed the Scientific and Advanced-Technology Act that legalized use of the Internet for commercial purposes. This led to the emergence of a major boom in electronic commerce (e-commerce) such as the creation of numerous “dot-com” companies such as

Amazon, eBay, etc. E-commerce quickly became a driving force in the expansion of the Internet, necessitating advancements in web technologies, secure payment systems, and digital communication protocols. The rapid growth of online shopping, digital payments, and internet-based services further fueled investment in the underlying infrastructure of the Internet, transforming it into a critical platform for business and commerce by the year 2000.

43. While the Internet was being created, another technological breakthrough was happening in database management technology. In the early 1970s, Ted Codd (a researcher at IBM) published a seminal paper that introduced the “relational” model that revolutionized how data was stored, queried and managed in databases. Relational databases, characterized by their use of tables to store data and Structured Query Language (SQL) for querying, became the foundation for modern data management. Ex-1010. By the late 1980s and early 1990s, relational database management systems (RDBMS) had become the standard for enterprise data management, particularly within banks and financial institutions. Examples included IBM’s DB2, Oracle, Microsoft SQL Server, Sybase and Informix. These systems enabled institutions to efficiently manage large volumes of customer data, query account balances, and execute transactions with high levels of accuracy and reliability.

44. By the early 2000s, relational DBMS technologies had matured, offering robust transaction processing capabilities that were especially important for financial applications. Banks relied heavily on these systems to perform complex queries and maintain the integrity of financial transactions. The introduction of features such as ACID (Atomicity, Consistency, Isolation, Durability) properties ensured that transactions were processed reliably, even in the event of system failures. This reliability made relational databases indispensable for handling sensitive financial data, where the accuracy of account balances and the consistency of transactional updates were critically important. Ex-1011.

45. The development of distributed computing further enhanced the capabilities of databases and transaction processing systems. Distributed computing architectures, particularly the client-server model, became prevalent in the 1990s, enabling remote hosts to interact with centralized servers over a network. This model allowed for the distribution of computational tasks across multiple machines, improving scalability and reliability. Distributed systems facilitated the processing of transactions across multiple locations, making it possible for companies to maintain a global presence while ensuring that their systems could handle the demands of a distributed user base. The rise of distributed databases, where data could be stored and processed across multiple servers in different geographic locations, was a direct consequence of these advancements. Ex-1012.

46. One example of how distributed systems were used to perform financial transactions was the CIRRUS network, which was established in 1982 to manage ATM transactions across various banks in the United States. Ex-1013. When a customer initiated a transaction, the ATM's host system processed the request by reading the account information from the card. If the account was not held by the host bank, the transaction was routed through the CIRRUS switch, utilizing the ANSI X9.2 message protocol. This protocol ensured that the transaction request, including account number, transaction type, and amount, was forwarded to the appropriate bank's node. Upon receipt, the customer's bank verified the transaction, updated the customer's account in its database (using a memo post), and sent an approval message back through the network. This CIRRUS network system (which also leveraged redundant messaging to handle potential timeouts) maintained database consistency and ensured accurate account updates. During the mid-1990s, I gave lectures on how the CIRRUS network worked to undergraduate computer science majors at the University of Toronto in one of the classes that I regularly taught (CS372: Microprocessor Software).

B. Coupon Processing Systems

47. The first known coupon was distributed by the Coca-Cola Company in 1894. Ex-1024, ¶3. The coupon offered the consumer a free glass as an incentive to try Coca-Cola. It was estimated that one in nine Americans used this coupon by

1913. Other companies began using coupons to boost sales. By 1957, the coupon industry was so large that the Nielsen Coupon Clearing House was created entirely to manage coupon clearing, which is the process of collecting and settling coupons for manufactures and realters. Ex-1015. By 2002, around 3.8 billion coupons were being redeemed a year. Ex-1024, ¶3.

48. Originally, coupon processing was completed manually. Ex-1016. First, paper coupons were distributed to customers through vouchers, newspapers or other periodicals. Then a customer redeemed the coupon at a retail location. The cashier had to autonomously validate the coupon by determining if the coupon was genuine, not expired, and met quantity requirements or total amount limits, and then calculate the benefit to the customer. Coupon validation required training and had a high risk of fraud. The coupons would then be physically mailed to clearing houses. The clearing houses would count and sort the coupons by manufacturer and determine the amount owed to the retailer by the manufacturer. In a two-step clearing process, the manufacturer will also count the coupons and verify the amount.

49. In the late 1990s to early 2000s, computing and network evolved and changed the entire coupon validation and clearing process. Ex-1017. Instead of printing coupons in newspapers, coupon distribution became digital. These

technological developments are reflected in the prior art references that I rely upon in forming my opinions, which is described further below.

50. Other references also demonstrate it was known that electronic coupons could be distributed based on a customer identification, and then the customer could retrieve their available coupons stored on a central server. Ex-1018. Also, instead of a customer clipping a paper coupon and bringing it into the retail store, systems for an automated coupon redemption were also known in the art. Retail store devices could scan a product barcode and automatically search the network for coupons available for that product. Ex-1019, ¶7. The coupons would then be available for immediate redemption at the retail store, and the redemption information would be transmitted in real-time to the coupon issuer and/or product manufacturer. Ex-1019, ¶¶15, 28.

51. It was also known that coupons could be distributed via data processing systems that generated personalized shopping lists and distributed coupons that matched planned purchases. Ex-1020. Specifically, a customer could enter their shopping list into a terminal, and then the computer server would automatically return a file with electronic coupons that corresponded with an item on a shopping list. Ex-1020, Abstract, 5:3–19, cl. 1.

52. With the introduction of terminals with scanners that could read and interpret barcodes, automatic coupon validation became easy and routine Ex-1024;

Ex-1016. Coupons could have a Uniform Product Code (“UPC”) that corresponded to a product scanned at a Point of Sale (“POS”) terminal, and the terminal that could automatically determine the appropriate discount. Ex-1021. Cashiers no longer had to determine if a coupon was valid—computers communicating in real-time over networks could. Ex-1022; Ex-1016, 92-93.

53. McIntyre (Ex-1022), a patent filed in 2003, describes at 3:23–29:

[A] real-time, secure Internet-based method and process for purchase validation award processing and make real-time status information available at all times to the purchaser, seller and manufacturer using unique transaction data that is supplied to the purchaser by the selling operation at the time of purchase and/or delivery.

54. Specifically, after a consumer bought a qualified product from the retailer, a unique transaction code was sent to a remote server via a network. Ex-1022, 4:1–30. The remote server then determined based on pre-determined rules if the award was available to the consumer (i.e., the process of validating a coupon). Ex-1022, 4:1-30. If yes, the remote sever sent the correct award information back to the retail store for the consumer to redeem the coupon. Ex-1022, 4:1-30. Other methods were also known for real-time validation, including the use of a central server. Ex-1023.

VIII. APPLICATION OF THE PRIOR ART TO THE CLAIMS

A. Priority Date

55. As noted above, for purposes of my analysis I have assumed that the priority date of the '133 patent is May 23, 2006, which is the filing date of the 11/439,725 application. Should Patent Owner argue that the '133 patent is entitled to an earlier priority date, I reserve the right to supplement my Declaration to address Patent Owner's arguments.

B. Claim Construction

56. I understand that a claim subject to IPR shall be construed using the same standard as in a civil action. 37 C.F.R. § 42.100(b). Unless I specify otherwise, I have applied the ordinary and customary meaning of the terms of the Challenged Claims throughout my analysis in this Declaration.

C. Overview of the Prior Art

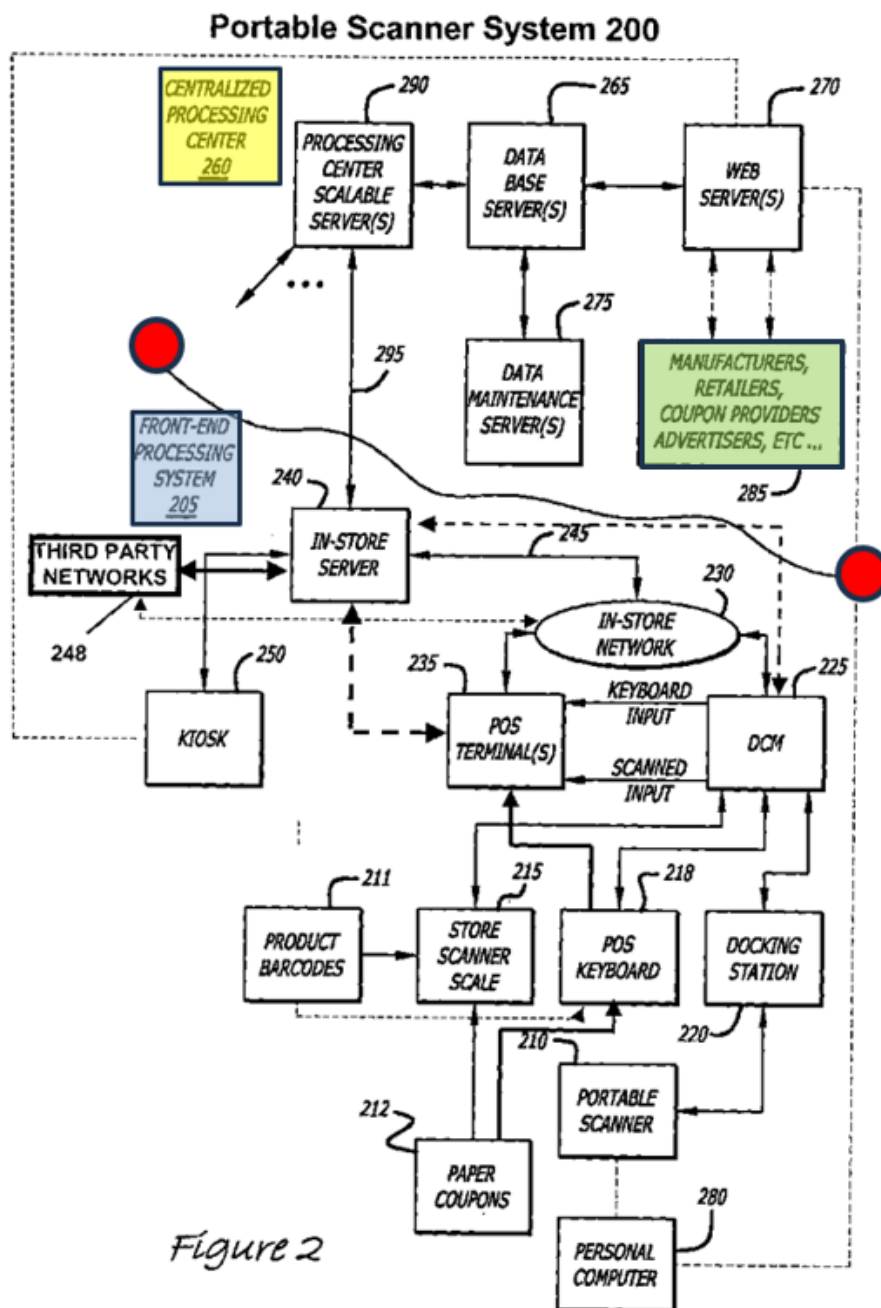
1. U.S. Patent Application Publication No. US 2004/0140361 ("Paul")

57. U.S. Patent Application Publication No. US 2004/0140361 ("Paul"), titled "Universal club card and real-time coupon validation," was published on July 22, 2004. Ex-1004. I understand that Paul is available as prior art under pre-AIA 35 U.S.C. § 102(b) because it published over a year before the '133 patent's filing date (May 23, 2006).

a) Overview of Paul's Real-Time Coupon Processing System

58. Paul discloses using a remote server to process coupons in real-time—the very features the examiner incorrectly thought were missing from the prior art. But just like the '133 patent, Paul discloses “a system and method for real-time validation and redemption of paper and electronic coupons; electronic coupon distribution; electronic clearing and reporting of paper and electronic coupon redemptions; and an ‘Universal Club Card’ that combines coupon scanning, coupon redemption, coupon distribution, loyalty cards, club cards, gift cards, frequent shopper programs, store credits and many other retail store promotions into one efficient and convenient portable scanning device.” Ex-1004, Abstract. “[A]ll coupon redemption, clearing and account settlement information will be available in electronic format to both retailers and manufacturers in real time.” Ex-1004, ¶114.

59. Figure 2 depicts an “coupon validation/redemption/distribution system in accordance with the invention.” Ex-1004, ¶13, FIG. 2 (highlighted):



60. The system comprises a front-end processing system 205 (boxed in blue) that is “deployed within a store” and “adapted for communication with a centralized processing center 260” (boxed in yellow) that is “physically located away from the store.” Ex-1004, ¶¶32-34. The wavy line (between the annotated

red dots) reflects that centralized processing center 260 and its constituent servers (290, 265, 275) above the wavy line are located away from the front-end processing system 205 at the store. Although physically located away from each other, the front-end processing system 205 and centralized processing center 260 communicate over a network 295 to perform real-time validation and redemption of coupons. Ex-1004, ¶¶93, 41 (“[A]t least one physical or wireless communication link 295 is established between in-store server 240 and central server 290. This link 295 may be through the Internet or through a private network.”).

61. Although Paul discloses a portable scanning device 210 that stores coupons locally and can be used at a retail store to identify a specific customer based on the unique ID number assigned to the device, Paul’s coupon processing system does not exclusively rely on the portable scanning device 210 to identify customers and allow them to access their coupons. For instance, Paul explains that if the portable scanning device is not available, customers can be identified by other means and gain access to the coupons available in their customer files/account stored at the database server 265. Ex-1004, ¶¶82 (“[W]hen a registered customer is identified through other means, redemption and distribution software will access the customer’s account for applicable coupons saved in their account.”), 86 (“Even if a registered customer of the PSS 200 is identified through other means (such as their phone number or last name entered through a key board or swiping a loyalty

card etc.), the I/R software will identify registered customer and access their customer files (blocks 505 & 515).”). Paul further states that “new customers with paper coupons who do not own a scanner [can] participate in the PSS 200.” Ex-1004, ¶67. Also, “the scanner does not have to be connected to the PSS for the coupon selection and filtration process to take place.” Ex-1004, ¶76. Further, the ’133 patent also discloses that the coupon card used to identify customers can optionally have memory and store data, like the portable scanning device 210 in Paul. Ex-1001, 5:39-43 (“The coupon card memory 506 may be of one or more types of memory, including volatile memory, such as random access memory, and/or non-volatile memory, such as battery backed random access memory and/or read only memory.”).

b) Front-End Processing System 205

62. The front-end processing system 205 is “situated at a store” and comprises “one or more POS terminals 235” connected to a scanner/scale 215 and an in-store server 240. Ex-1004, ¶¶33, 36, 41, 93, FIG. 2. The POS terminal 235 operates withing a “POS system” that includes the POS terminal 235 and a docking station. Ex-1004, Claim 16. In-store server 240 communicates with POS terminals 235 and central server 290. Ex-1004, ¶¶33, 36, 41, 93, FIG. 2. Thus, POS terminal 235 communicates with central server 290 via the in-store server 240. Ex-1004, ¶¶33, 36, 41, 93, FIG. 2.

c) Centralized Processing Center 260

63. The centralized processing center 260 comprises central server 290 that communicates with at least one database server (“DBS”) 265 and in-store server 240. Ex-1004, ¶35. DBS 265 stores customer files/accounts including “all coupon offers, customer information and transaction data” at a centralized site that is remote from the retail store. Ex-1004, ¶57 (“Data stored at DBS 265 includes customer account information.”). Each registered customer has been assigned a “unique ID number.” Ex-1004, ¶115. The customer files/accounts are organized by the unique ID number assigned to each customer. Ex-1004, ¶¶43, 63, 115.

d) Operation of Paul’s Real-Time Coupon Processing System

64. During a purchase transaction at POS terminal 235 in a retail store, the customer provides a unique ID number, such as by swiping a card at the scanner 215. Ex-1004, ¶¶43, 63, 86, 115, 117. Then, “central server 290 [] identifies the customer through the unique ID number” and accesses the customer files/account within DBS 265 at the centralized processing center 260. Ex-1004, ¶¶ 57, 86, 117. Central server 290 retrieves the available coupons saved in the customer account and transmits them to POS terminal 235. Ex-1004, ¶¶59, 71, 82, 86. After the customer redeems a coupon at POS terminal 235, detailed coupon redemption data is sent to central server 290 in real-time, and the customer files/account in DBS 265 are updated to reflect that the coupon was redeemed. Ex-1004, ¶¶80, 91, 107, 121,

131-32. Coupon redemption activity can be monitored to enforce redemption limits. Ex-1004, ¶81. Central server 290 can also generate redemption and settlement reports with coupon redemption data for each manufacturer. Ex-1004, ¶¶69, 111-14.

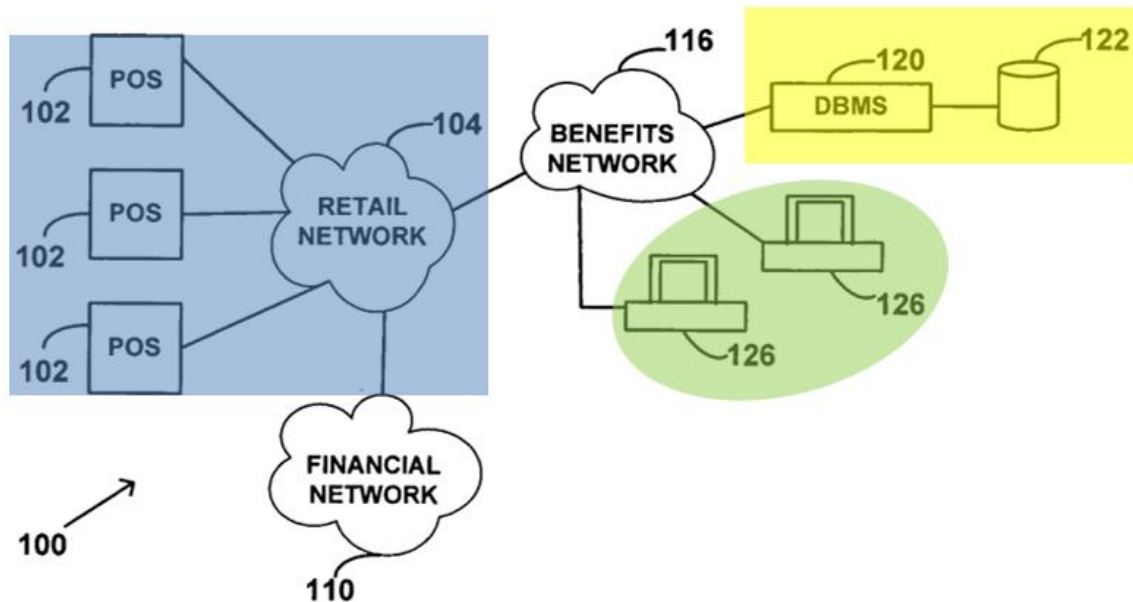
65. Based on my review, it is my opinion that a POSITA reading Paul would have been able to implement Paul's coupon processing system with little or no experimentation required. Paul provides ample detail regarding coupon processing such that a POSITA with knowledge of the state of the art would have been able to build the system for real-time coupon validation and redemption without undue experimentation.

66. As shown in the limitation-by-limitation analysis of the Challenged Claims below, Paul alone or in combination with Brown renders obvious each of the Challenged Claims.

2. U.S. Patent Application Publication No. US 2006/0074784 (“Brown”)

67. U.S. Patent Application Publication No. US 2006/0074784 (“Brown”), titled “Stored value account for use with virtual coupons,” was published on April 6, 2006 from an application filed on September 27, 2004. Ex-1005. I understand that Brown is available as prior art under pre-AIA 35 U.S.C. § 102(a) and 102(e) because it was filed and published before the '133 patent's priority date (May 23, 2006).

68. Like the '133 patent, Brown discloses a “system and method for the purchase of products, wherein a database account is credited with virtual coupons.” Ex-1005, Abstract. The “system includes a database for storing credits to the account, the credits representing virtual coupons.” Ex-1005, ¶6. When a “product is purchased, the associated coupon is debited from the account.” Ex-1005, ¶6. Figure 1 provides a “diagram showing a system for facilitating the redemption of coupon units.” Ex-1005, ¶9, FIG. 1 (highlighted).



69. The system 100 includes a plurality of point-of-sale (“POS”) terminals 102 located at retail establishments that are connected to a database management system or server (“DBMS”) 120 (boxed in yellow) through the retail network 104 and benefits network 116. Ex-1005, ¶15, 18, 35. POS terminals 102 and retail

network 104 (boxed in blue) are “geographically distributed” (i.e., remote) from benefits network 116 and DBMS 120. Ex-1005, ¶22.

70. Customers are given benefits cards with account numbers to identify themselves at POS terminals 102. Ex-1005, ¶¶18, 24, 27. During a purchase, customers provide their benefits cards, and POS terminal 102 sends their account numbers to benefits network 116 through retail network 104. Ex-1005, ¶19 (explaining that during operation of the system 100 “customer and account information is entered [] at one of the POS terminals 102 [and] communicated through the retail network 104 to the benefits network 116.”). Although Brown contemplates that product information can be transmitted to DBMS 120 with the account numbers, the “benefits information [could be] read (and displayed at screen 310) before any product information is entered at the POS terminal.” Ex-1005, ¶41. The benefits network 116 processes “information entered at the POS terminals 102 that pertains to the redemption of electronic or virtual coupons maintained in a benefits account.” Ex-1005, ¶18.

71. DBMS 120 manages a database 122 of customer benefit accounts storing their virtual coupons. Ex-1005, ¶¶18, 35. DBMS 120 uses database 122 to confirm that the account is active and determines whether there are any valid coupons in the account. Ex-1005, ¶¶28, 39. If the account is active and has at least one valid coupon, the customers is informed of the valid coupon at POS terminal

102 and given the option to redeem the coupon on eligible products. Ex-1005, ¶¶28-29, 40. If the customer redeems the valid coupon, “the account is debited (the applicable coupons are redeemed).” Ex-1005, ¶¶28-29, 40. Database 122 would be updated to reflect that the coupon was redeemed. Ex-1005, ¶¶35, 37.

72. The government benefit program administrator (circled in green) can receive useful information about the coupons redeemed during purchases that helps with “determining the coupon use habits of participants[.]” Ex-1005, ¶¶32-34. While the virtual coupons in Brown are issued by the government, they could just as easily be issued by a manufacturer. In both scenarios, customers are making purchases at retail stores using the virtual coupons available in their accounts maintained in a remote centralized database. In fact, the ’133 patent notes the similarities between the alleged invention and systems implementing “Electronic Benefit Transactions (EBT)”, which are government benefit programs like in Brown. Ex-1001, 7:4-9 (“In an embodiment, similar to debit, credit and Electronic Benefit Transactions (EBT), the POS terminal reads a unique code from a coupon code and transmits this unique code to a centralized database, such as the centralized database of a coupon processing server via a network.”).

73. Based on my review, it is my opinion that a POSITA reading Brown would have been able to implement Brown’s coupon processing system with little or no experimentation required. The state of the art and Brown’s extensive

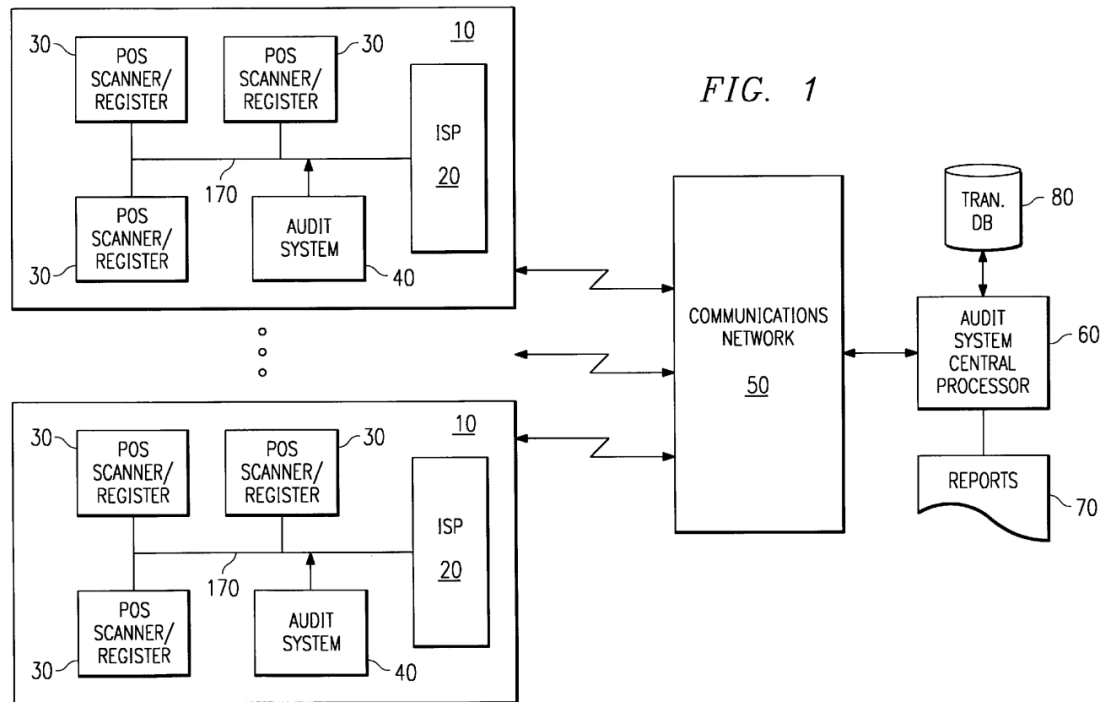
disclosure provides ample detail regarding coupon processing such that a POSITA would have been able to build the system for remote, real-time coupon validation and redemption without undue experimentation.

74. As shown in the limitation-by-limitation analysis of the Challenged Claims below, Paul in combination with Brown renders obvious each of the Challenged Claims.

3. U.S. Patent No. 5,832,458 (“Jones”)

75. U.S. Patent No. 5,832,458 (“Jones”), titled “System and method for electronically auditing point-of-sale transactions,” issued on November 3, 1998. Ex-1006. I understand that Jones is available as prior art under pre-AIA 35 U.S.C. § 102(b) because it issued over a year before the ’133 patent’s filing date (May 23, 2006).

76. Jones describes a “system and method for conducting an electronic audit with respect to sales transactions, including those involving coupon redemption, based on the transaction data recorded by a POS terminal[.]” Ex-1006, 3:37-43. Figure 1 shows a “an electronic audit system and method for a point-of-sale system.” Ex-1006, 5:7-10.



77. Each retail store 10 has an in-store audit system 40 that collects, processes, and stores retail sales transaction data, including coupon redemption. Ex-1006, 5:36-42. Periodically, audit system 40 transmits the data to audit system central processor 60 for further processing and use by manufacturers and retailers. Ex-1006, 5:47-51. Audit system central processor 60 can analyze the data and prepare reports, such as a summary of coupon redeemed with statistically high exceptions flagged or a “[c]omparison of flagged stores with cashier habits, extremely high coupon activity, extremely fast total transaction times (sometimes indicative of fraudulent misredemptions), non-normal variations in UPC distributions, and high frequency of manual overrides.” Ex-1006, 10:31-58. “By identifying possible variances in coupon activity, according to the system and

method of the present invention, [and] quickly calling to the attention of the retailer or manufacturer agent these variations[,] attempts at deceiving the manufacturer can be identified before they compound into larger dollar issues and complicate settlement between the parties.” Ex-1006, 11:12-20. Based on my review, it is my opinion that a POSITA reading Jones would have been able to implement Jones’s financial transaction/coupon processing and fraud monitoring system with little or no experimentation required. The state of the art and Jones’s extensive disclosure provides ample detail regarding coupon processing such that a POSITA would have been able to build the system without undue experimentation.

D. Grounds 1 and 2: Claims 1-35 Are Obvious Over Paul Or Obvious Over The Combination Of Paul And Brown

78. I have analyzed claims 1-35 of the ’133 patent, and it is my opinion that each claim is obvious over Paul (**Ground 1**). Alternatively, the combination of Paul and Brown (**Ground 2**) renders claims 1-35 obvious.

1. Motivation to Combine Paul and Brown

79. A POSITA would have been motivated to combine Paul and Brown, and would have had a reasonable expectation of success in doing so.

80. Paul and Brown are extraordinarily similar. Fundamentally, they disclose the same system—a **remote** coupon processing system that operates in **real-time** to provide customers with digital coupons stored in their accounts for use at a **plurality of point-of-sale terminals** located at retail stores. The

emphasized features were the only allegedly novel aspects of the '133 patent discussed by the examiner during prosecution. But these features were well-known in the art before the '133 patent's priority date, including in Paul and Brown. In fact, Paul renders obvious all claims in view of the knowledge and common sense of a POSITA. To the extent that any claim or limitation is not disclosed or rendered obvious by Paul, it is disclosed by Brown, and the combination of Paul and Brown renders it obvious. In other words, anything missing from Paul can be found in the art, in Brown, or by common sense.

81. The only difference of any significance between Paul and Brown is that the coupons in Paul are issued by a manufacturer or retailer, while the coupons in Brown are issued as part of a government benefits program. A POSITA would have viewed that difference as immaterial to the operation of the system, as even the '133 patent discloses that EBT systems (government benefits programs) are similar in operation to the alleged invention in the '133 patent. Ex-1001, 7:4–9. However, regardless of the source of the coupons, the systems work exactly the same way and accomplish the same goal—allowing customers at retail stores to purchase products using digital coupons stored in their accounts at a remote, centralized database.

82. Any minor differences between Paul and Brown are not really differences at all—they are immaterial and come down to word choice or the depth

of disclosure in the specification. A POSITA would have viewed them as simply design choices or inherent aspects to a coupon processing system to operate as intended requiring no explicit disclosure. Further, any minor differences have nothing to do with the allegedly novel aspects of the '133 patent—they were well-known in the art and would have been obvious improvements (if an improvement at all) over each reference.

83. A POSITA looking to implement the coupon processing system in Paul or Brown would have looked at other similar systems to enhance the system, even if in only minor ways. These enhancements could relate to the structure of the system (the number and location of computing devices), its operation (the specific actions to perform and which computing devices should perform them), its ease of use (sending relevant information and informative messages), and its ability to address known issues in coupon processing (improper coupon redemptions and fraud). For example, some of the minor differences between Paul and Brown that a POSITA would have appreciated and offer a motivation to combine them include:

- To the extent that any claims require using a single coupon processing server for all operations, and to the extent that Paul does not disclose or render obvious using a single coupon processing server, Brown discloses using a single coupon processing server (DBMS). A POSITA would have found that potentially advantageous because using a single device would be more cost effective and require

less maintenance. Thus, a POSITA would have been motivated to use that aspect of Brown in the combined system. A POSITA would have expected success because it was well-known and easy to implement a server that performs multiple operations. Also, the use of a single or multiple servers is simply a design choice. The same applies to the design decision of which devices in the system perform specific operations, so long as the remote nature of the coupon processing server and centralized database is maintained. For example, the operation of the point-of-sale terminal could be split between two devices at a retail store, and that would be a design choice.

- To the extent that Paul does not disclose or render obvious updating a database of accounts upon receiving an indication of at least one redeemed coupon, Brown discloses it. A POSITA would have found it advantageous to update the database after a coupon is redeemed to prevent a customer from redeeming a coupon more than once, and thus been motivated to use that aspect of Brown in the combined system. Also, updating a database upon receiving information about coupon redemption is inherently an aspect of coupon processing, and a POSITA would have found it necessary for the system to operate as intended and thus been motivated to use that aspect of Brown in the combined system. A POSITA would have expected success because updating a database is a simple step easily implemented with existing software.

- To the extent that Paul does not disclose or render obvious that the unique account identifier was “scanned” at the point-of-sale terminal, Brown discloses it. A POSITA would have found it advantageous to put the unique account identifiers on customer coupon cards that could be scanned using scanning equipment that was already available at checkout in retail stores (barcode readers, credit card swipe machines, etc.), and thus been motivated to include that aspect of Brown in the combined system. Paul discloses using such a coupon card that can be scanned, but also discloses using a portable scanning device that requires a docking station not traditionally available at checkout. Thus, assuming that Paul does not disclose using a coupon card, a POSITA would have been motivated to use the coupon card in Brown that can be scanned to avoid needing new equipment at checkout. A POSITA would have expected success because many systems already operated using cards that are scanned at a point-of-sale terminal (credit cards, loyalty cards, coupon barcodes).

- To the extent that Paul does not disclose or render obvious sending a “no coupons available” message, Brown discloses it. A POSITA would have found it advantageous to send such a message because the message would communicate that the system was operational and not leave the customer/retail store wondering whether the system was experiencing downtime, and thus been motivated to include that aspect of Brown in the combined system. Further, sending such a message is

nothing more than the use of a known technique (sending messages that data is unavailable) to improve a system (coupon processing) in the same way to yield predictable results (a more informative system without unnecessary troubleshooting and downtime). Also, sending an indication that requested data is not available is an inherent aspect of any transaction processing system that involves querying databases, and a POSITA would have found it necessary for the system to operate as intended. A POSITA would have expected success because sending updates about data availability was easily implemented in systems operating across networks.

- To the extent that Paul does not disclose or render obvious determining whether a coupon is valid (by checking whether it is expired, previously redeemed, or other useful metrics) before sending it to the point-of-sale terminal, Brown discloses it. A POSITA would have found it advantageous to only send valid coupons to reduce the size of the message being sent over the network to the point-of-sale terminal (conserve bandwidth). Also, it would reduce the processing required at the point-of-sale terminal, which is often a less sophisticated and slower device than a central server. Further, sending coupons that are not valid (because they are expired, already redeemed, or otherwise should not be redeemed) could lead to improper redemptions, which are expensive to manufacturers and retailers. Thus, a POSITA would have been motivated to implement this aspect of Brown in the

combined system. A POSITA would have expected success because making a determination about coupon validity was a known operation that could have been implemented at any stage of the coupon processing system.

84. For these reasons, a POSITA would have been motivated to combine Paul and Brown to achieve the claimed invention and had a reasonable expectation of success. A POSITA would have had a reasonable expectation of success because any changes to the existing systems would be straightforward, requiring only minor modifications, and could be implemented using routine knowledge. For example, this would often require simple/trivial software modifications to the already existing software. In sum, a POSITA would have been motivated to combine Paul and Brown to arrive at a combination that discloses all recited limitations and renders obvious all Challenged Claims.

2. Independent Claim 1

85. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

- a) **[1.pre]: “A computer-readable medium storing instructions executable by a processor to perform operations for processing coupons across a network, the operations comprising:”**

(i) Ground 1

86. I understand that a preamble generally does not state a claim limitation. However, to the extent the preamble limits claim 1, it is my opinion that Paul discloses, or at least renders obvious, this limitation.

87. Paul discloses “a system and method for real-time validation and redemption of paper and electronic coupons; electronic coupon distribution; electronic clearing and reporting of paper and electronic coupon redemptions; and an “Universal Club Card” that combines coupon scanning, coupon redemption, coupon distribution, loyalty cards, club cards, gift cards, frequent shopper programs, store credits and many other retail store promotions into one efficient and convenient portable scanning device.” Ex-1004, Abstract. Specifically, Paul discloses a “coupon processing system [that] is scalable and capable of processing large volumes of data.” Ex-1004, ¶112.

88. Paul’s coupon processing system operates across a network. During coupon processing, in-store server 240 and central server 290 are in communication with each other. Ex-1004, Abstract, ¶41. Specifically, Paul discloses that “at least one physical or wireless communication link 295 is established between in-store server 240 and central server 290. This link 295 may be through the Internet or

through a private network.” Ex-1004, ¶41. Paul further explains that a “‘link’ is broadly defined as one or more information-carrying mediums to establish a communication pathway. For instance, the information-carrying medium may support wireless communications (e.g., infrared ‘IR’, laser, radio frequency, cellular, satellite, etc.) or communications over physical medium such as electrical wire, optical fiber, cable, bus traces and the like.” Ex-1004, ¶28.

89. Paul’s coupon processing system is implemented by processors running distribution, integration, and redemption software. Ex-1004, ¶¶26, 57, 83. Paul explains that “certain terminology is used to describe features of the invention. For example, ‘software’ may be code or a series of instructions adapted as firmware or configured as an operating system, a program, a downloadable applet, a routine, or the like. The software can be stored in any type of machine readable medium and executed by a processing unit. Examples of ‘machine readable medium’ include a programmable electronic circuit, a semiconductor memory device including volatile memory (e.g., random access memory, etc.) or non-volatile memory (e.g., any type of read-only memory ‘ROM’, flash memory), a floppy diskette, an optical disk (e.g., compact disk or digital video disc ‘DVD’), a hard drive disk, tape, or the like. Examples of a ‘processing unit’ comprises a digital signal processor, a general microprocessor, a micro-controller, a state machine, an application specific integrated circuit, a state machine or the like.” Ex-1004, ¶26.

90. Thus, Paul discloses a software-implemented coupon processing system that operates across a network as required by this limitation.

(ii) Ground 2

91. To the extent that Paul does not disclose or render obvious this limitation, it is my opinion that Brown discloses this limitation. Thus, the combination of Paul and Brown as described in Section VIII.D.1 renders this limitation obvious.

92. Brown discloses “a system for facilitating the redemption of coupon units.” Ex-1005, ¶9. Brown also discloses “a novel method and system for facilitating purchase of products or items, where items may be purchased by redemption of virtual or electronic coupons maintained in an account.” Ex-1005, ¶42.

93. Brown explains that the “benefits network 116 is used for processing information entered at the POS terminals 102 that pertains to the redemption of electronic or virtual coupons maintained in a benefits account.” Ex-1005, ¶18. Brown explains that “virtual coupons” are maintained in a benefits account, and the system operates to redeem those coupons. Ex-1005, ¶18. The benefits account is stored at a database management system (DBMS) at a location remote from the POS terminals. Ex-1005, ¶19. The POS terminals 102 communicate with the DBMS over the retail and benefits networks. Ex-1005, ¶19.

94. Brown discloses that a “process that could be carried out by application programs within the system 100.” Ex-1005, ¶41. Brown also discloses that the “functionality implementing the [invention] is largely data and applications resident at the POS terminals 102, and at the DBMS 120, depending on the configuration of the various devices with the system 100.” Ex-1005, ¶38. Brown also discloses that the “DBMS 120 and database 122 may include any one of numerous forms of storage devices and storage media, such as solid state memory (RAM, ROM, PROM, and the like), magnetic memory, such as disc drives, tape storage, and the like, and/or optical memory, such as DVD.” Ex-1005, ¶19. A POSITA would have understood that the “application programs” implementing Brown’s coupon processing system are implemented by a processor running software (instructions executable by a processor) that is stored on a computer-readable medium.

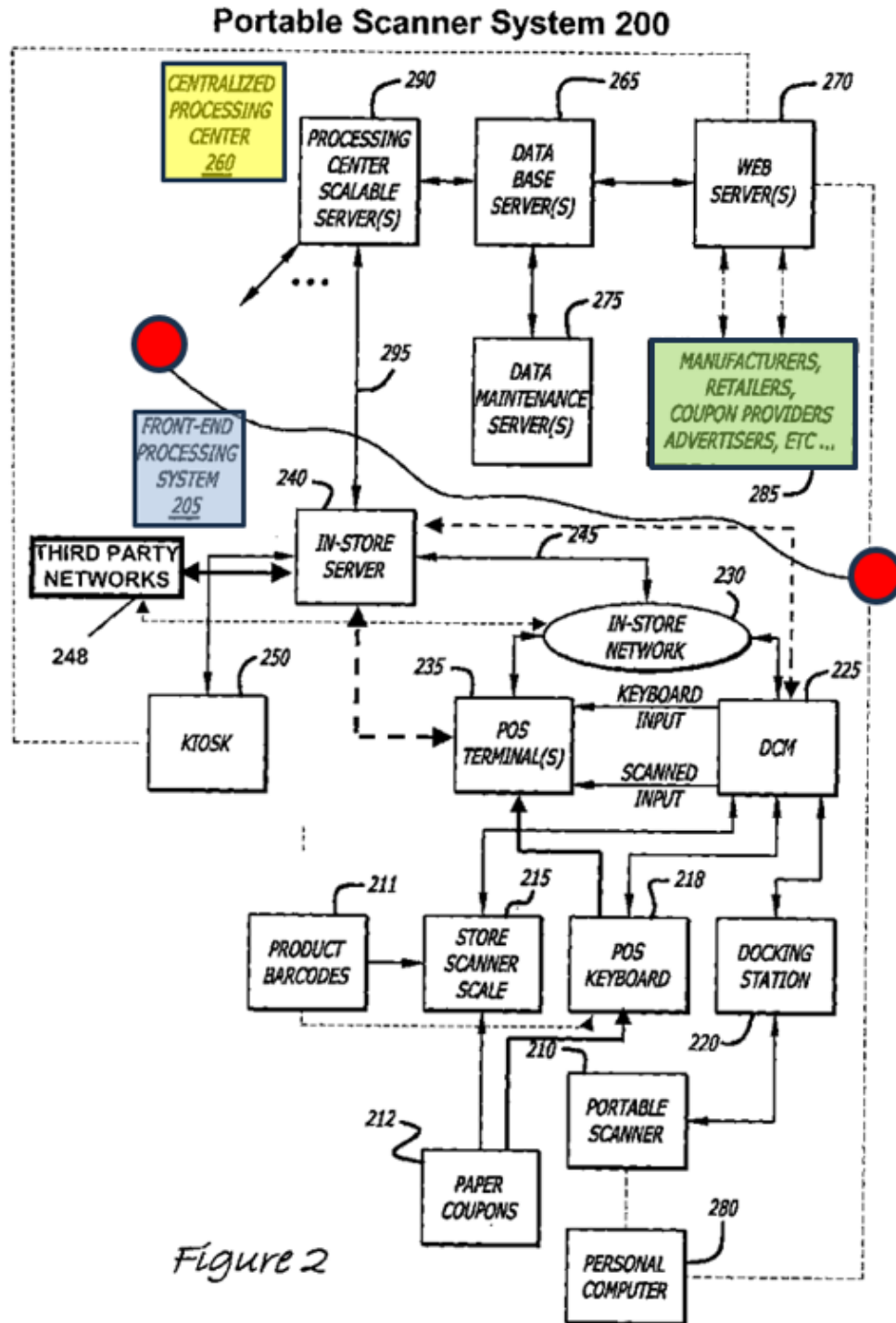
95. Thus, Brown discloses a software-implemented coupon processing system that operates across a network as required by this limitation, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

b) [1.1]: “receiving, at a coupon processing server, a unique account identifier from a first point of sale terminal via a network,”

(i) Ground 1

96. It is my opinion that Paul discloses, or at least renders obvious, this limitation.

97. As depicted in Figure 2, Paul discloses a system comprising a “front-end processing system 205 deployed within a store and adapted for communication with a centralized processing center 260.” Ex-1004, ¶32; FIG. 2 (highlighted).



98. The “centralized processing center 260 comprises central server (CSS) 290 that communicates with at least one database server 265 (“DBS”) and in-store server 240.” Ex-1004, ¶¶35, 69. A POSITA would have understood that the

centralized processing center 260, central server (CSS) 290, and/or database server (“DBS”) 265 operate as the recited “coupon processing server.” See Ex-1001, 9:47-51 (explaining that software “may be stored in computer-readable medium in a distributed fashion across two or more computing devices or as a single computing device. The computing devices may be one or more of the above mentioned servers.”). Thus, one or more servers or computing devices can carry out the coupon processing steps of the coupon processing server.

99. The front-end processing system is “situated at a store” and comprises “one or more POS terminals 235” operating within a “POS system” and an “in-store server 240 that communicates directly or indirectly with [the] POS terminal 235[.]” Ex-1004, ¶33. A POSITA would have understood that the POS terminal 235 is the point-of-sale terminal recited in this limitation because they both read a unique account identifier during a purchase transaction at a retail store and send it to a coupon processing server.

100. In Paul’s coupon processing system, each registered customer has been assigned a “unique ID number.” Ex-1004, ¶¶ 43, 115. Customers can be identified based on their unique ID number. Ex-1004, ¶¶ 43, 115. After a customer provides a unique ID number during checkout at a retail store, POS terminal 235 sends it to the centralized processing center 260 and “central server 290 [] identifies the customer through the unique ID number.” Ex-1004, ¶79, 82, 117. A POSITA

would have understood that the unique ID number is a unique account identifier as recited in this limitation because they both are used to identify specific customers making purchases at a retail store. After completion of the customer transaction, POS terminal 235 creates a “complete proof of purchase” of the actual redemption activity to update the customer files associated with the unique ID number. Ex-1004, ¶91.

101. During a purchase transaction at a POS terminal 235, integration and redemption software (“I/R software”) will identify the registered customer and access their customer files and customer account within the database server (DBS) located at the centralized processing center 260. Ex-1004, ¶86; *see* Ex-1004, ¶57 (“Data stored at DBS 265 includes customer account information.” and “Central server 290 retains proprietary redemption, clearing and distribution software.”). A POSITA would have understood that the unique ID numbers are received at the centralized processing center 260 from the POS terminal 235 in order to access customer accounts as recited in this limitation.

102. POS terminal 235 communicates with central server 290 via the in-store server 240. Ex-1004, ¶¶33, 41, 69. Central server 290 and in-store server 240 communicate over a “physical or wireless communication link 295 . . . through the Internet or through a private network.” Ex-1004, ¶41; *see* Ex-1004, ¶69 (“[C]entral server 290 features a two-way communication link with in-store server 240[.]”);

Ex-1004, ¶73 (“In-store server 240 communicate[s] with central server 290 through the Internet or high-speed transmission links such as T-1 or dedicated lines.”). A POSITA would have understood that the communication link 295 is a network as recited in this limitation because they both allowed for the transmission of data between devices at remote locations.

103. In sum, a POSITA would have understood that Paul discloses that the unique ID number (unique account identifier) is received at centralized processing center 260, central server (CSS) 290, and/or DBS 265 (coupon processing server) from the POS terminal 235 (point-of sale-terminal) over a communication link 295 (network) as recited in this limitation.

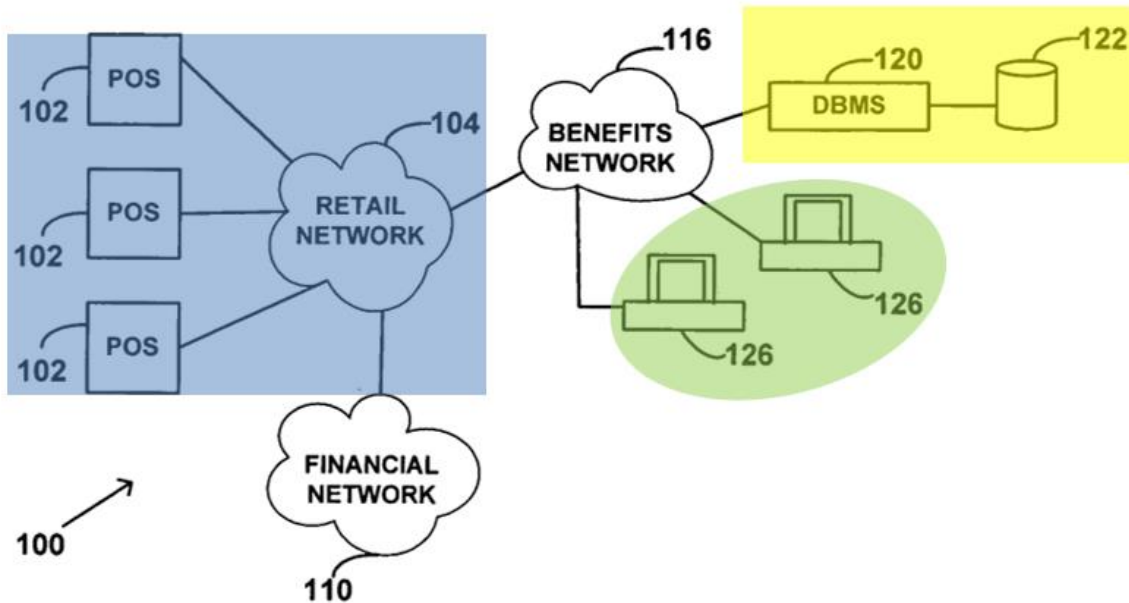
(ii) Ground 2

104. To the extent that Paul does not disclose or render obvious this limitation, it is my opinion that Brown discloses this limitation. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

105. Brown discloses that the “benefits network 116 links systems, terminals and databases operated by the program administrator, including a database management system or server (DBMS) 120 which manages an associated data store or database 122, and terminals 126.” Ex-1005, ¶19. Figure 1 portrays how the POS terminals 102 are connected to the database management system or server

(DBMS) 120 via the retail network 104 and benefits network 116. Ex-1005, FIG.

1.



106. Brown explains that the retail network 104 and benefits network 116 could be a single integrated network. Ex-1005, ¶21 (“While each of the networks 104, 110 and 116 is illustrated in FIG. 1 as a separate network, all could in fact be a single, integrated network.”). A POSITA would have understood that the retail network, benefits network, or a single combined network are a network per the claim limitation.

107. Brown discloses a benefits card that a “customer uses . . . to identify himself/herself.” Ex-1005, ¶18. The benefit card is “used to identify the participant . . . and provide information to the POS terminal 102.” Ex-1005, ¶24. The POS terminals 102 are “used for conducting retail and similar transactions . . . [and] may

be operated by a retail clerk when products to be purchased are presented by a customer at a checkout line.” Ex-1005, ¶16. The benefit card “may be embossed with the participant/customer name 152, an account number 154, and an expiration date 156.” Ex-1005, ¶24. The card number identifies the customer’s individual account. Ex-1005, ¶27.

108. Brown explains that participant information (such as a benefits account number) is read from a benefits card at a POS terminal 102 and transmitted to the DBMS 120 via the retail 104 and benefits 116 network. Ex-1005, ¶27-28. Brown also explains that program benefits information is entered at the POS terminal 102 (such as by reading a magnetic stripe on a benefits card) and then sent through the benefits network 116 to DBMS 120. Ex-1005, ¶39. Brown also explains that customer and account information is entered at a POS terminal 102 (such as by reading a magnetic stripe on a benefits card) during checkout and communicated through the retail network 104 to the benefits network 116. Ex-1005, ¶16, 19. The participant information, benefits account number, program benefits information, and/or customer and account information are all unique account identifiers per the claim limitation because they are used to identify a specific customer.

109. Thus, a POSITA would have understood that DBMS 120 is a coupon processing server per the claim limitation because it is a server that receives a unique account identifier (benefit card account number) from a point-of-sale

terminal (POS terminal 102) during checkout over a network (104/116). Alternatively, the benefits network and DBMS operate together as a coupon processing server.

110. Thus, Brown discloses receiving at a coupon processing server a unique account identifier from a point-of-sale terminal via a network, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

c) [1.2]: “where the coupon processing server is configured to communicate with a plurality of point of sale terminals,”

(i) Ground 1

111. It is my opinion that Paul discloses, or at least renders obvious, this limitation.

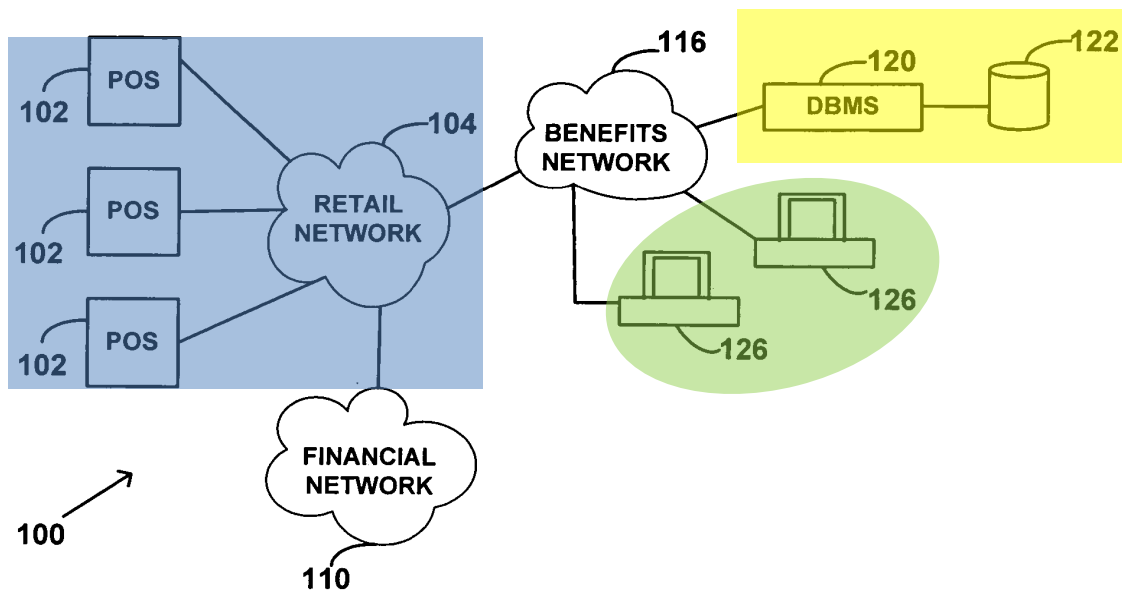
112. Paul discloses that the front-end processing system comprises “one or more POS terminals.” Ex-1004, ¶33. As explained above for limitation [1.1], the “front-end processing system 205 deployed within a store [is] adapted for communication with a centralized processing center 260.” Ex-1004, ¶32; FIG. 2. A POSITA would have understood that Paul’s “one or more POS terminals” in communication with centralized processing center 260 are the recited plurality of point-of-sale terminals in communication with a coupon processor sever.

113. Thus, Paul discloses a coupon processing server configured to communicate with a plurality of point-of sale-terminals as recited in this limitation.

(ii) Ground 2

114. To the extent that Paul does not disclose or render obvious this limitation, it is my opinion that Brown discloses this limitation. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

115. Brown discloses a coupon processing system including “a plurality of point-of-sale (POS) terminals 102 connected to a retail network 104 [which is] connected to a benefits network 116” and DBMS 120. Ex-1005, ¶15, FIG. 1. Figure 1 portrays the plurality of POS terminals 102. Ex-1005, FIG. 1.



116. A POSITA would have understood that Brown’s plurality of point-of-sale (POS) terminals 102 in communication with DBMS 120 are a plurality of

point-of-sale terminals in communication with a coupon processor sever (DBMS 120) as recited in this limitation.

117. Thus, Brown discloses a coupon processing server configured to communicate with a plurality of point of sale terminals, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

d) [1.3]: “where the unique account identifier was scanned at the first point-of-sale terminal which is located at a retail store and”

(i) Ground 1

118. It is my opinion that Paul discloses, or at least renders obvious, this limitation.

119. As explained above for limitation [1.1], Paul discloses a coupon processing server that receives a unique account identifier from a point-of-sale terminal via a network.

120. The front-end processing system 205 is “situated at a store” and comprises “one or more POS terminals 235.” Ex-1004, ¶33.

121. Paul explains that a scanner is a data input mechanism that can scan data objects, such as barcodes. Ex-1004, ¶34. Paul also explains that the term scanning “involves detection and identification of data objects [such as] a barcode [that] may be used to identify a . . . customer.” Ex-1004, ¶29. The POS terminals 235 receive scanned input from a store scanner/scale 215 via the Data Collection Module (DCM) 225. Ex-1004, ¶33, FIG. 2. Paul discloses that “DCM 225 act[s]

as a wedge between POS terminal 235 and its scanner/scale 215.” Ex-1004, ¶38 (emphasis added).

122. The unique ID number (unique account identifier) is provided by the customer at the POS terminal 235 via means such as docking of a portable scanner associated with a unique ID number, entering customer information via a POS keyboard, swiping a loyalty card, or other means. Ex-1004, ¶¶82, 86, 117, 129. Customers can also be identified through magnetic media or a barcode on a plastic card issued to the customer. Ex-1004, ¶127. Thus, Paul discloses that the store scanner/scale 215 scans barcodes or magnetic media containing a customer’s unique ID number and provides them to the POS terminals 235.

123. The ’133 patent discloses exactly the same scanning process—“a coupon card may be read by a card reader 102 at a retail store or other establishment. The coupon information from the coupon card may then be sent to the Point-of-Sale (POS) terminal.” Ex-1001, 3:22-27; *see also* 4:8-12 (“A unique account number may be assigned to the consumer coupon card on a magnetic ink character recognition strip (i.e., magstripe) on the back of the consumer coupon card.”), 4:31-34 (“[D]uring checkout, the cashier presses a coupon card function key on the POS terminal and the consumer may slide his or her coupon card through the card reader[.]”), 6:10-12 (“At the POS 602, the consumer may swipe his/her

coupon card through a card reader as would be done in a debit or credit card transaction.”).

124. Thus, a POSITA would have understood that a unique ID number (unique account identifier) that is scanned by the store scanner/scale 215 connected to the POS terminal 235 would be considered to have been “scanned” at point-of-sale terminal as required by this limitation.

125. Thus, Paul discloses a point-of-sale terminal located at a retail store that scans unique account identifiers as recited in this limitation.

126. To the extent that Paul does not explicitly disclose this limitation, it would have been obvious to a POSITA that a customer could be identified by scanning a unique account identifier on a coupon card at the point-of-sale terminal at a retail store, which is where the customer is attempting to make a purchase using a coupon available in their customer account. The portable scanning device in Paul is optional, and using a coupon card that is scanned would have provided the exact same functionality required to access a customer’s coupon account. A POSITA would have been motivated to use a coupon card because sometimes a docking station is not available, and would have had a reasonable expectation of success because other types of media were already being scanned (product barcodes, credit cards, etc.).

(ii) Ground 2

127. To the extent that Paul does not disclose or render obvious this limitation, it is my opinion that Brown discloses this limitation. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

128. As explained above for limitation [1.1], Brown discloses a coupon processing server that receives a unique account identifier from a point of sale terminal via a network. Brown discloses that the “POS terminals 102 may be located at one (or more) retail establishments (e.g., grocery stores).” Ex-1005, ¶15.

129. The unique account identifier is provided by the customer at the POS terminal 102 via a benefits card. Brown discloses that the POS terminal “may include a keyboard, a display and various peripheral devices or functions (e.g., magnetic stripe card reader, optical bar code reader, etc.).” Ex-1005, ¶16. Brown explains that the benefit card used to identify the participant has “information encoding features [that] may include a magnetic stripe 164, a bar code 166, a smart chip (not shown), and the like.” Ex-1005, ¶26. The benefits card “provide[s] information to the POS terminal” and is “used by a customer . . . when making purchases (redeeming virtual coupons) at one of the POS terminals 102.” Ex-1005, ¶¶23-24. The benefits account number is “read from the [benefit] card at the POS terminal 102.” Ex-1005, ¶28. A POSITA would have understood that the benefit

card account number (unique account identifier) was scanned at the POS terminal 102 (point-of-sale terminal) at a retail establishments (retail store) as recited in this limitation.

130. Thus, Brown discloses a point of sale terminal located at a retail store that scans unique account identifiers, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

e) [1.4]: “where the coupon processing server is at a location that is remote from the retail store;”

(i) Ground 1

131. It is my opinion that Paul discloses, or at least renders obvious, this limitation.

132. As explained above for limitations [1.2] and [1.3], Paul discloses a coupon processing server that communicates over a network with a plurality of point-of-sale terminals located at a retail store.

133. Paul further discloses that the “centralized processing center 260 [comprising the central server CSS 290] is physically located away from the store.” Ex-1004, ¶¶34-35. Paul further discloses that DBS 265 is located at a centralized site. Ex-1004, ¶57. The coupon processing system may use “several regional servers” to assist in communications between central server 290 and in-store server 240. The location and the number of regional servers depend on volume and growth needs.” Ex-1004, ¶112. A POSITA would have understood that the coupon

processing server (260/290/265) is remote from the retail store as recited in this limitation.

134. Thus, Paul discloses that the coupon processing server is located remotely from the retail store as recited in this limitation.

(ii) Ground 2

135. To the extent that Paul does not disclose or render obvious this limitation, it is my opinion that Brown discloses this limitation. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) this limitation obvious.

136. As explained above for limitations [1.2] and [1.3], Brown discloses a coupon processing server that communicates over a network with a plurality of point of sale terminals located at a retail store.

137. Brown further discloses that “while the POS terminals 102, DBMS 120 and database 122 are illustrated as separate devices or systems ***geographically distributed*** across various networks, they (and their functionality) could all be co-located at a single location[.]” Ex-1005, ¶22 (emphasis added). Thus, a POSITA would understand that by default, the retail stores (where the POS terminals 102 are located) are geographically distributed (i.e., located remotely) from the DBMS 120.

138. Thus, the coupon processing server is located remotely from the retail store, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

f) **[1.5]: “in response to receiving the unique account identifier, determining whether at least one valid coupon is associated with the unique account identifier in a database of accounts;”**

(i) **Ground 1**

139. It is my opinion that Paul discloses, or at least renders obvious, this limitation.

140. As explained above for limitation [1.1], Paul discloses a coupon processing server that receives a unique account identifier from a point-of-sale terminal via a network.

141. Paul discloses a “coupon processing system [that] stores [coupons] within a database associated with the customer. The stored contents of the database are accessible by a POS system at the retailer.” Ex-1004, ¶25. Specifically, “central server 290 possesses a detailed database and is capable of processing large volumes of data.” Ex-1004, ¶69. The central server enables customers to redeem unused electronic coupons available in their account. Ex-1004, ¶81.

142. Paul further discloses that “[a]ll coupon offers, customer information and transaction data is stored back at the centralized site on database server (DBS) 265.” Ex-1004, ¶57. “DBS 265 stores information about coupons and coupon

validity, such as customer account information, transaction history and profiles, complete coupon definitions and rules for redemption and promotion, manufacturer identifiers and descriptions, coupon classifications and detailed data on attempted coupon redemptions, whether successful or not, and coupon offers.” Ex-1004, ¶57. “DBS 265 [maintains] some or all of the following information [about coupon validity]: a) specific geographic regions, such as zip codes, city, county or states where the coupon is valid; b) customer redemption limit during each visit (such as limit one coupon per customer); c) total customer redemption limit over a specific time period or during the term of the campaign (such as limit five per customer over 30 days) etc., and c) total promotion limit specified by the manufacturer for the duration of the campaign.” Ex-1004, ¶101. Paul further discloses that “coupon barcodes [can be retrieved] from a storage location on a server associated with a customer . . . that have been non-redeemed to date.” Ex-1004, Claim 4.

143. A POSITA would have understood that the database of accounts could be stored within the server itself (central server 290 and/or DBS 265) or across multiple devices/servers. See Ex-1001, 3:39-41 (“Associated with the server may be a centralized database 116 that is incorporated within the server or may be a stand alone device or storage system.”).

144. Although the ‘133 patent does not define “valid coupon,” it discloses that a “determination may be made as to whether there are **active** coupons **available**

on the coupon card 918.” Ex-1001, 9:16-17 (emphasis added). Further, “the coupon processing server may send the first several (e.g., eleven) digits/alphanumeric characters of the **available** coupon codes to the POS terminal via the retail server and network 610.” Ex-1001, 6:29-33 (emphasis added). Also, “[f]or **active** coupons, [] the coupon code [] may be transmitted back to the POS terminal 824 in a message package[.]” Ex-1001, 9:19-24 (emphasis added); *see also* Ex-1001, 4:40-46 (“**[A]ctive** coupon codes [] assigned to the card may be transmitted back to the POS[.]”) (emphasis added). Thus, a POSITA would have understood that a valid coupon is one that is active and available.

145. Paul discloses that I/R software stored at central server CSS 290 can determine whether coupons are valid. Ex-1004, ¶83 (“Collectively, the integration software and the redemption software are referred to as ‘integration and redemption software’ or ‘I/R software.’”). Paul further discloses that once a customer has provided identification information, the central server 290 will identify the customer and access customer files. Ex-1004, ¶129. After identifying the customer, software will access the customer’s account to identify **applicable** coupons saved in their account within DBS 265. Ex-1004, ¶86. Paul further discloses that “coupon barcodes [can be retrieved] from a storage location on a server associated with a customer . . . that have been **non-redeemed** to date.” Ex-1004, Claim 4. A POSITA would have understood that **applicable** coupons saved

in a customer's account that are **non-redeemed** would be considered active and available (i.e., valid) as recited in this limitation. Paul also discloses that "POS system may receive validated CBCs from [] central server 290 for further processing." Ex-1004, ¶59.

146. Paul also discloses that "targeted coupons for a particular customer may be selected by the distribution software in real-time while the registered customer is waiting at the check out lane or at any prior time and saved in registered customer's account. The selected coupons may be saved in customer's account in the database server and downloaded to an applicable in-store server (block 450)." Ex-1004, ¶79. Thus, a POSITA would understand that, at the POS terminal during checkout, the customer has real-time access to their coupons saved in their customer accounts in DBS 265.

147. A POSITA would have understood that a coupon processing server (central server 290 and/or DBS 265) determines whether a valid coupon (applicable and non-redeemed) is associated with a unique account identifier (unique ID number) in customer files in a database of accounts (central server 290 and/or DBS 265) after receiving the unique account identifier and identifying the customer. Thus, Paul discloses that in response to receiving a unique account identifier for a customer, determining whether there is a valid coupon for that customer in a database of customer accounts as recited in this limitation.

148. To the extent Paul does not explicitly disclose determining whether there is a valid coupon, it would have been obvious to a POSITA to check whether there is a valid coupon before sending any coupons to the point-of-sale terminal. A POSITA would have been motivated to create a database of accounts that associates coupons with customers based on their unique account identifier and to determine whether any associated coupons are valid before sending them to the point-of-sale terminals so as to avoid sending invalid coupons leading to a waste of resources or improper coupon redemptions. A POSITA would have had a reasonable expectation of success because the capability of checking whether a coupon is valid (for example, whether it is expired or already used) already existed and would have involved a simple database query.

(ii) Ground 2

149. To the extent that Paul does not disclose or render obvious this limitation, it is my opinion that Brown discloses this limitation. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

150. As explained above for limitation [1.1], Paul discloses a coupon processing server that receives a unique account identifier from a point of sale terminal via a network.

151. Brown further discloses that the “benefits network 116 is used for processing information entered at the POS terminals 102 that pertains to the redemption of electronic or virtual coupons maintained in a benefits account” that has been credited with “virtual coupons.” Ex-1005, ¶¶6, 8, 18.

152. The “database management system or server (DBMS) 120 [] manages an associated data store or database 122.” Ex-1005, ¶19. As shown in Figure 4, “database table 410 within the database 122 . . . is relational, i.e., relating to each participant account (identified by account number or ID)” the virtual coupons in the account. Ex-1005, ¶35. The virtual coupons contain information such as the specific products which may be purchased (product ID), and the dates (“start date” and “end date”) during which the purchase of the specified product is eligible under the program, and the number of products (units) that may be purchased. Ex-1005, ¶35, FIG. 4.

153. Upon receiving program account information (e.g., account number on the benefit card 150), DBMS 120 uses database 122 to “confirm that the account is present and active (step 522) by comparing the account number against account numbers or IDs in table 410, and may determine whether there are currently valid coupons in the account (e.g., the transaction date matches the redemption dates for any coupons), step 526.” Ex-1005, ¶39. After the benefits account number is read from the benefit card at the POS terminal 102 and “transmitted through retail

network 104 and benefits network 116 to DBMS 120”, in response to receiving the benefits account number, “DBMS 120 accesses database tables in database 122 that have the participant’s account information,” such as the virtual coupons maintained in the benefit account. Ex-1005, ¶28. A POSITA would have understood that DBMS 120 (coupon processing server) determines whether database 122 with database table 410 (database of accounts) has any valid coupons associated with an account number or ID (unique account identifier) after receiving it as recited in this limitation.

154. Thus, Brown discloses that in response to receiving a unique account identifier for a customer, determining whether there is a valid coupon associated with the customer’s unique account identifier in a database of customer accounts, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

g) [1.6]: “in response to determining that at least one valid coupon is associated with the unique account identifier in the database of accounts, transmitting, from the coupon processing server, an indication of the at least one valid coupon to the first point of sale terminal via the network wherein the indication includes the at least one valid coupon;”

(i) Ground 1

155. It is my opinion that Paul discloses, or at least renders obvious, this limitation.

156. As explained above for limitations [1.2] and [1.3], Paul discloses a coupon processing server that communicates over a network with a plurality of point of sale terminals located at a retail store.

157. As explained above for limitation [1.5], Paul discloses that in response to receiving a unique account identifier for a customer, determining whether there is a valid coupon for that customer in a database of customer accounts.

158. The '133 patent states “active coupon codes [] assigned to the card may be transmitted back to the POS for validation against purchases 922 as part of a **message package**.”¹ Ex-1001, 9:19-24 (emphasis added); *see also* Ex-1001, 6:20-24 (“Any coupon codes which have not expired or were not previously redeemed may be transmitted back to the POS terminal for normal validation 608 as part of a message.”). The '133 patent also discloses that “[u]sing the real time communication network in the store, a **network message** may be sent 604 to the centralized database containing the unique coupon card account number[.]” Ex-

¹ The term “indication” is used in the following limitations recited in claims 1, 3, 5-6, 11, 13, 15-17, 19- 21, 25, 27-29, 30, 32-33, and 35: “an *indication* of the at least one valid coupon,” “an *indication* of at least one redeemed coupon,” and “an *indication* that the at least one redeemed coupon was redeemed against a purchased transaction.” My analysis here is incorporated into my analysis for these claims.

1001, 6:13-16 (emphasis added). Further, “the POS terminal may send back a **network message** to the coupon processing server centralized database indicating which coupons were successfully redeemed.” Ex-1001, 6:24-28 (emphasis added); *see also* Ex-1001, 7:54-58 (disclosing receiving a network message that a particular coupon has been redeemed). Thus, a POSITA would have understood the claimed “indication” to be a message package or network message.

159. In response to determining that a valid coupon is associated with a customer account in DBS 265, the “I/R software will retrieve CBCs [i.e., coupon barcodes] saved in customer account within . . . DBS 265 and transmit the barcodes to . . . POS terminal.” Ex-1004, ¶86. Paul also discloses that the POS terminal may receive validated CBCs [i.e., coupon barcodes] from central server 290. Ex-1004, ¶¶59, 71. Paul also discloses that at checkout, “software will access the customer’s account for applicable coupons saved in their account . . . [and] the customer will receive these targeted coupon offers.” Ex-1004, ¶79, 82, 117. A POSITA would have understood that these coupons are sent as a message package or network message. Since the indication of the at least one valid coupon includes the at least one valid coupon per this limitation, the valid coupon would be sent in the message packet (i.e., indication).

160. Thus, a POSITA would have understood that in response to determining there is a valid coupon in a customer account, central server 290 and/or

DBS 265 (coupon processing server) transmits CBCs/targeted coupon offers (valid coupons) to POS terminal 235 in a message package (indication) over a network as recited in this limitation.

(ii) Ground 2

161. To the extent that Paul does not disclose or render obvious this limitation, it is my opinion that Brown discloses this limitation. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

162. As explained for [1.1], Brown discloses a coupon processing server that receives a unique account identifier from a point-of-sale terminal via a network.

163. As explained above for limitations [1.2] and [1.3], Brown discloses a coupon processing server that communicates over a network with a plurality of point of sale terminals located at a retail store.

164. As explained for limitation [1.5], Brown discloses determining whether a customer has a valid coupon associated with a unique account identifier in a database of accounts in response to receiving the unique account identifier.

165. Further, Brown discloses that “[i]f the account is active and has at least one valid coupon, then the information in screen 310 seen in FIG. 3 is displayed at POS terminal 102, step 536, in order for the customer to see which products are eligible. The customer elects whether to have the eligible products purchased

through redemption of coupons in the account.” Ex-1005, ¶40. After the DBMS 120 accesses the database tables in database 122 containing the participant's account information and available coupons, the “customer is then informed at the POS terminal 102 whether specific products are eligible for purchase using the [virtual coupons in the benefit] account. Ex-1005, ¶28.

166. Brown further explains that “the customer (whose has been identified by accessing database 122 as a participant in the program having coupons or credits in the account) is asked through use of the display (at display line 340)” which coupons to redeem to purchase eligible products. Ex-1005, ¶29. Figure 3 illustrates “a screen 310 that could be displayed at one of the POS terminals 102” informing the customer of eligible products for purchase with the valid coupon. Ex-1005, ¶¶29, 40.

167. A POSITA would have understood that a message package or network message (indication of the at least one valid coupon) is sent to the POS terminal 102 in order to present coupon information and the valid coupon to the customer. Also, the message (indication) must include the valid coupon itself so that the customer can be informed at the POS terminal 102 about the valid coupon and choose to redeem it for eligible products.

168. Thus, Brown discloses that when there has been a determination that there is at least one associated valid coupon in the customer's benefit account,

sending an indication of the at least one valid coupon (including the valid coupon) to the point of sale terminal for display on a screen so that the customer can select a valid coupon to use during a purchase, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

h) [1.7]: “in response to receiving, at the coupon processing server from the first point of sale terminal, an indication of at least one redeemed coupon,”

(i) Ground 1

169. It is my opinion that Paul discloses, or at least renders obvious, this limitation.

170. The '133 patent discloses sending a “network message that a particular coupon has been redeemed.” Ex-1001, 7:54-58. A POSITA would have understood that a network message and message package are the same thing, and that this network message is an indication of at least one redeemed coupon.

171. Paul explains that “actual [coupon] redemption activity” originates with the POS terminal after validation of the coupon and completion of a customer purchase transaction. Ex-1004, ¶91. Paul discloses that the I/R software will generate “a detailed ‘proof of purchase’ for every coupon redemption transaction which may include some or all of the following: date stamp, time stamp, retail store location, POS terminal location, product(s) purchased for every coupon redeemed, original selling price of product(s) per POS system, face value of coupon redeemed,

additional discounts offered by retailer's POS system 230 such as double manufacturer's coupons, net price paid by the customer and the customer who redeemed the coupons" and then "transmit coupon redemption data along with 'proof of purchase' to central server 290 either in real time or on a periodic basis." Ex-1004, ¶107. Thus, a POSITA would have understood that the "coupon redemption data" and/or "proof of purchase" are sent in a network/message package and are thus an "indication of at least one redeemed coupon" as recited in this limitation.

172. Thus, a POSITA would have understood that central server 290 and/or DBS 265 (coupon processing server) receive coupon redemption data and/or proof of purchase (indication of at least one redeemed coupon) from the POS terminal 235 as recited in this limitation.

(ii) Ground 2

173. To the extent that Paul does not disclose or render obvious this limitation, it is my opinion that Brown discloses this limitation. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

174. Brown discloses that a coupon processing server (DBMS 120) receives an indication of at least one redeemed coupon from the point of sale terminal (POS terminals 102). Specifically, Brown discloses that a customer can redeem a virtual

coupon at a POS terminal during a purchase transaction. Ex-1005, ¶¶16, 28-29, 40. The “POS terminals may be operated by a retail clerk when products to be purchased are presented by a customer at a checkout line” in a retail establishment. Ex-1005, ¶16. After receiving the valid coupons, there is a determination as to whether any of the products are eligible (i.e., whether the coupon should be validated at the POS terminal 102). Ex-1005, ¶39 (“Next, DBMS 120 determines at step 528 which if any of the products being purchased are eligible under the program by comparing products purchased against the product numbers or IDs in table 410.”). After the customer is informed of the eligible products for the valid virtual coupons in their account, the customer can decide whether to pay for the eligible products “using the benefits account (i.e., debiting purchases against the virtual coupons maintained in the account).” Ex-1005, ¶¶28, 40. If the customer decides to purchase eligible products using the benefits account, “the account is debited (the applicable coupons are redeemed).” Ex-1005, ¶29, 40.

175. Brown discloses that information about the discounts “may be stored in database 122 for various purposes.” Ex-1005, ¶32. “[D]ata related to the transaction can also be stored in [database 122] in relation to redeemed coupons (date of purchase, other food products being purchased at the same time, the extent of discounts that participants are obtaining, etc.).” Ex-1005, ¶34. When the “account is debited” and “applicable coupons are redeemed” during a purchase at

a POS terminal 102, the database 122 must be updated to reflect the coupon redemption. Thus, a POSITA would have understood that for coupon redemption data to be stored in database 122, it must be transmitted via a message package (i.e., indication) from the POS terminal 102 to the DBMS 120, which “manages [] database 122.” Ex-1005, ¶19.

176. Brown’s Claim 10 provides another example of DBMS 120 receiving an indication of at least one redeemed coupon from POS terminal 102. Brown’s Claim 10 covers “a database management system [DBMS 120] for managing the database [122] and receiving data from the terminals [102]” where the “database system [DBMS 120] debits a virtual coupon from the account upon purchase of a specified product[.]” Ex-1005, Claim 10. In other words, DBMS 120 receives message packages (i.e., indications) from the POS terminals 102 upon a customer’s purchase of a specified product indicating that there was a redeemed coupon so that DBMS 120 can debit the virtual coupon from the customer’s account.

177. Further, the discount data “can also be used for many purposes useful to the program administrator and its participants, such as determining the coupon use habits of participants.” Ex-1005, ¶33. Also, “other data related to the transaction can also be stored in relation to redeemed coupons (date of purchase, other food products being purchased at the same time, the extent of discounts that participants are obtaining, etc.).” Ex-1005, ¶34. For this data to be stored in

database 122, it must be transmitted from the POS terminal 102 to the DBMS 120, which “manages an associated data store or database 122.” Ex-1005, ¶19. A POSITA would have understood that when the “account is debited” and “applicable coupons are redeemed” during a purchase at a POS terminal 102, DBMS 120 (coupon processing server) would receive a message package indicating that the coupon was redeemed (indication of at least one redeemed coupon) from POS terminal 102 as recited in this limitation.

178. Thus, Brown discloses receiving an indication of at least one redeemed coupon (message) at the coupon processing server (DBMS) from the point-of-sale terminal (POS 102) as recited in this limitation, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

i) [1.7.a]: “updating the database of accounts and”

(i) Ground 1

179. It is my opinion that Paul discloses, or at least renders obvious, this limitation.

180. As explained above for limitation [1.7], Paul discloses that “the coupon processing server [receives] from the first point of sale terminal, an indication of at least one redeemed coupon.”

181. As explained above for limitation [1.5], Paul discloses a “database of accounts” that stores coupon information for specific customers.

182. Paul discloses that customer files and accounts stored in a database can be updated to reflect account activity, such as redeeming coupon. A POSITA would have understood that the database storing the customer files and accounts is a “database of accounts” that can be updated “in response to receiving . . . an indication of at least one redeemed coupon.”

183. Specifically, Paul discloses that in response to receiving the “indication of at least one redeemed coupon” (coupon redemption data and/or proof of purchase), the “I/R software will update customer files in . . . central server 290 for actual redemption data and proof of purchase (blocks 580 & 585).” Ex-1004, ¶91. Central server has access to each registered customer’s account and can update their accounts based on account activity, including redeemed and unused coupons. Ex-1004, ¶80; *see also* Ex-1004, ¶131 (explaining that central server 290 will receive account activity and update customer files maintained in its database). Paul also discloses that DBS 265 can receive customer account activity and update customer files in its database. Ex-1004, ¶¶121, 132.

184. Thus, a POSITA would have understood that the database of accounts is updated in response to receiving an indication of at least one redeemed coupon (described in [1.7] above) as recited in this limitation.

185. To the extent that Paul does not explicitly disclose this limitation, it would have been obvious to a POSITA that the database must be updated in order

for the system to operate as intended and that such updating would be a routine software implementation, so there is both a motivation to do so and expectation of success.

(ii) Ground 2

186. To the extent that Paul does not disclose or render obvious this limitation, it is my opinion that Brown discloses this limitation. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

187. As explained for [1.5], Brown discloses a “database of accounts” that stores coupon information for specific customers and determining whether a customer has a valid coupon associated with a unique account identifier in a database of accounts in response to receiving the unique account identifier.

188. As explained for [1.7], Brown discloses that the coupon processing server receives an indication of at least one redeemed coupon from the point-of-sale terminal.

189. Brown discloses that database table 410 (within the database 122) “may be updated as needed.” Ex-1005, ¶¶35, 37. Database table 410 in database 122 link the customer’s benefits account number with available virtual coupons in the account. Ex-1005, ¶¶28, 35. A POSITA would have understood that updating

database table 410 (within the database 122) would constitute “updating a database of accounts.”

190. A POSITA would have also understood that database 122 is updated in response to receiving an indication of at least one redeemed coupon. Database tables 410 in database 122 have a participant’s account information and also information about available virtual coupons in the account. Ex-1005, ¶¶28, 35. When a coupon is redeemed, the account information in the database 122 must be updated to reflect that the coupon was redeemed. This redemption process is further explained above for limitation [1.7]. Thus, a POSITA would have understood that redeeming a coupon goes hand in hand with updating a database of accounts, and that the database 122 would be updated upon receiving an indication of at least one redeemed coupon (described in [1.7] above).

191. Thus, Brown discloses updating a database of accounts as recited in this limitation, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

- j) **[1.7.b]: “transmitting, from the coupon processing server to a manufacturer associated with the at least one redeemed coupon, an indication that the at least one redeemed coupon was redeemed against a purchased transaction where the at least one redeemed coupon is at least one of the at least one valid coupon.”**

(i) Ground 1

192. It is my opinion that Paul discloses, or at least renders obvious, this limitation.

193. As explained above for limitation [1.7], Paul discloses that “the coupon processing server [receives] from the first point of sale terminal, an indication of at least one redeemed coupon.”

194. Paul discloses that after a purchase transaction where a coupon is redeemed, central server 290 can provide a “complete electronic proof of purchase” comprising: “a) date and time stamp; b) store and aisle location where the coupon was redeemed; c) product/s purchased by the customer for every paper and electronic coupon redeemed; d) original product price, face value of coupon redeemed, additional discounts, such as double coupons, provided by retailers and the net amount paid by customer for the product/s purchased; and e) the customer name, contact information and/or ID number of the customer who redeemed the coupon.” Ex-1004, ¶70.

195. Paul also discloses that central server 290 can generate redemption reports and/or settlement reports for each manufacturer and/or coupon provider.

Ex-1004, ¶69, 111-14. Specifically, “[c]entral server 290 can generate reports to be provided to the manufacturers, retailers and coupon providers based on usage according to products sold, customers, store locations or the like.”), 111 (“Redemption reports generated from central server 290 provide detailed coupon redemption data including date and time stamp, store number and aisle location, product purchased for every coupon redeemed, customer ID, manufacturer code, family code, coupon campaign code, zip code, region etc.”), 112 (“Central server 290 can generate any kind of standard or custom reports as requested by manufacturers, retailers and marketers.”). The settlement reports would include information such as: “(a) face value of paper & electronic coupons redeemed, sorted by product, product line, retail store, zip code, region, coupon campaign code (if any) etc.; (b) electronic coupons distributed, electronic coupons redeemed and electronic coupon redemption fee; (c) coupon handling, processing and other clearing fees; (d) the net amount owed by manufacturer to retailer; and (e) detailed proof of purchase including date and time stamp, store location, aisle location, product(s) purchased for the coupon, product selling price per POS, face value of coupon, additional discounts offered by retailer and the net amount paid by customer; (f) customer ID number, unique Portable Scanner ID number, customer name, address, phone number and further information as to who redeemed the coupon.” Ex-1004, ¶114.

196. Thus, a POSITA would have understood that Paul's redemption reports and/or settlement reports are "an indication that the at least one redeemed coupon was redeemed against a purchased transaction" that is transmitted to the manufacturer associated with the redeemed coupon as recited in this limitation. A POSITA would have further understood the redeemed coupon is the valid coupon because Paul discloses that only valid coupons are sent to the POS terminal 235 to be redeemed.

197. Thus, Paul discloses that in response to receiving an indication of at least one redeemed coupon (coupon redemption data and/or proof of purchase), the coupon processing server (central server 290) transmits to the manufacturer associated with the at least one redeemed coupon (at least one of the at least one valid coupon) an indication that the at least one redeemed coupon was redeemed against a purchased transaction (redemption and/or settlement reports) as recited in this limitation.

(ii) Ground 2

198. To the extent that Paul does not disclose or render obvious this limitation, it is my opinion that Brown discloses this limitation. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

199. As explained above for limitation [1.7], Brown discloses that the coupon processing server receives an indication of at least one redeemed coupon from the point of sale terminal.

200. Although Brown does not explicitly disclose transmitting “an indication that the at least one redeemed coupon was redeemed against a purchased transaction” to a “manufacturer associated with the at least one redeemed coupon,” doing so would have been obvious to a POSITA. Brown discloses that a “program administrator” manages the benefit program (virtual coupons). Ex-1005, ¶15. Brown discloses that “data [about coupons redeemed during purchases] can also be used for many purposes useful to the program administrator and its participants, such as determining the coupon use habits of participants, encouraging participants to take advantage of discounts by permitting the discount (or a portion thereof) to be credited to the participant to use for other (eligible or non-eligible) product purchases, etc.” Ex-1005, ¶¶32-34. Brown further discloses that DBMS 120 can be accessed by administrative staff using workstation terminals 126. Ex-1005, ¶19. Because the collected data about coupons redeemed during purchases (“an indication that the at least one redeemed coupon was redeemed against a purchased transaction”) is useful to the program administrator, such information would be transmitted from DBMS to the administrative staff at workstation terminals 126.

201. A POSITA would have understood that, as for the program administrator in Brown, such data about the redemption of a valid coupon would be useful for a manufacturer of the products purchased using the coupon. Brown's "program administrator" is analogous to a manufacturer, and a POSITA would have been motivated to send data about the redemption of a valid coupon to a manufacturer because, as for the program administrator in Brown, the data would be useful for a manufacturer of the products purchased using the coupon in order to track customer purchasing habits and adjust marketing practices. A POSITA would have been A POSITA would have had a reasonable expectation of success because sending data to manufacturers would be accomplished in the same way as sending it to benefit administrators. Thus, it would have been obvious to transmit the indication that the at least one redeemed coupon was redeemed against a purchased transaction from the DBMS 120 to the manufacturer associated with the at least one redeemed coupon as recited in this limitation. A POSITA would have further understood the redeemed coupon is the valid coupon because Brown discloses that only valid coupons are sent to the POS terminal 102 to be redeemed.

202. Thus, Brown renders obvious this limitation, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

3. Claim 2: “The computer-readable medium of claim 1, where a valid coupon comprises a first coupon code portion and a second coupon code portion.”

203. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**). All evidence and opinions for claim 1 above is incorporated by reference here.²

(i) Ground 1

204. It is my opinion that Paul discloses, or at least renders obvious, this claim.

205. As explained above for limitation [1.5], Paul discloses that in response to receiving a unique account identifier for a customer, determining whether there is a valid coupon for that customer in a database of customer accounts.

206. The '133 patent described a “coupon code format” with a first portion and a second “Extended Portion.” Ex-1001, 7:34–59, FIG. 7. “Each coupon may have a code. Each coupon code may include a base portion and an extended

² For all dependent claims throughout my Declaration, all evidence and opinions for their associated independent claims and dependent claims (both appearing before and after) are incorporated by reference even if not explicitly stated.

portion.” Ex-1001, 6:64–66. “A first portion of the coupon code may be GS1 US code, formerly known as the Universal Product Code (UPC), shown, in FIG. 7, to include a Number System Code, a manufacture number, a family code, a value code, and a check digit.” Ex-1001, 7:34–59. “A second portion of the coupon code may be the ‘Extended Portion,’ which includes information such as Manufacture Offer Code (MOC), Expiration Dates, Household Identifier, and associated application codes, and may correspond to the GS1, or European Article Numbering (EAN-128), format. The Extended Portion, as shown in FIG. 7, may include an application identifier, a product number system code (NSC), a manufacture offer code (MOC), an expiration date, another application identifier, and a household identifier.” Ex-1001, 7:34–59.

207. Likewise, Figure 1 of Paul portrays an “exemplary embodiment of fields collectively forming a coupon barcode.” Ex-1004, ¶12. The coupon depicted in Figure 1 has two coupon code portions – the “Coupon Bar Code” (“CBC”) portion and the “Optional Extension Codes” portion. Ex-1004, ¶¶12, 30-31, FIG. 1.

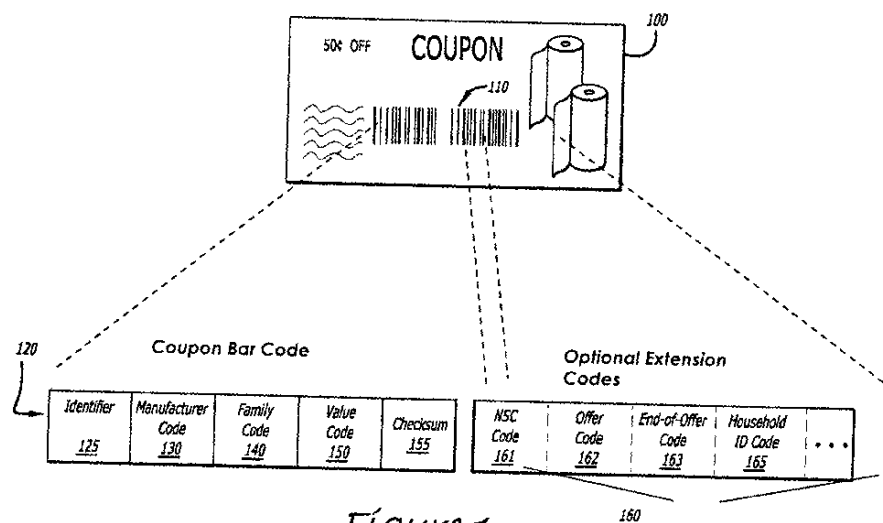


Figure 1

208. Although Paul Figure 1 depicts a paper coupon, Paul contemplates that such a coupon barcode can be stored as an electronic coupon in memory. Ex-1004, ¶¶31, 86 (“The I/R software will retrieve CBCs saved in customer account within [] DBS 265 and transmit the barcodes to [] POS terminal 235, in-store server 240 or central server 290 (block 520).”), 98 (“The I/R software receives a CBC either from a paper coupon or an electronic coupon.”), 111 (“The redemption and clearing software is designed to capture CBC from both paper and electronic coupons[.]”), Claim 4.

209. Paul’s CBC portion comprises: “(1) an identifier 125 of the type of barcode. As an illustrative example, a single digit ‘5’ may be used to identify a UPC barcode whereas two digits ‘99’ may be used to identify an EAN-99 (in-store) barcode; (2) a manufacturer code 130 (e.g., 5-digits); (3) a family code 140 (e.g.,

3-digits) to identify a specific group of products; (4) a value code 150 (e.g., 2-digits) that specifies a monetary value or credit (directly or via a determined code value) and multiple quantity offers; and (5) a checksum 155 (e.g., a 1-digit check digit calculated from all the previous fields that is used by scanners to ensure that the barcode was successfully read).” Ex-1004, ¶30. Paul’s Optional Extension Codes “provide additional information or expand current code fields.” Paul at 31. “For example, there are five formats for the extension code. Different application identifiers are used to identify the formats. The following field elements may be optionally specified: (i) a Number System Character (NSC) code 161 (e.g. 1-digit) used to distinguish manufacturers with the same 5-digit manufacturer code but different NSCs; (ii) an offer code 162 (e.g., 5-digits) that may be used by coupon issuers or clearing houses for their own use; (iii) end-of-offer code 163 (e.g., 2-digits) associated with expiration date of the coupon; and/or (iv) a household identifier code 165 (e.g., 8-digits).” Ex-1004, ¶31.

210. Thus, a POSITA would have understood that the valid coupon in Paul has a first coupon code portion (CBC) and a second coupon code portion (Optional Extension Codes) as described in the ’133 patent and recited in this limitation.

(ii) Ground 2

211. To the extent that Paul does not disclose or render obvious this claim, it is my opinion that Brown discloses this claim. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

212. As explained above for limitation [1.5], Brown discloses that in response to receiving a unique account identifier for a customer, determining whether there is a valid coupon for that customer in a database of customer accounts.

213. Figure 4 depicts a “simplified form the content of a database table 410 within the database 122 (connected to the benefits network 116) and used in conjunction with POS terminal 102 (and screen 310 in FIG. 3) for facilitating the purchase of program eligible products” using virtual coupons. Ex-1005, ¶35, FIG. 4.

410

412

ACCOUNT ID	PRODUCT ID	START DATE	END DATE	UNITS	OTHER
1234567	8475238	010105	011505	3	XXXXX
	8475239	010105	011505	1	XXXXX
	8475240	011505	013005	1	XXXXX
1234568	8475238	010105	011505	3	XXXXX
	8475250	010105	011505	2	XXXXX
	8475251	011505	013005	2	XXXXX
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

214. “The database 410 is relational, i.e., relating to each participant account (identified by account number or ID) the specific products which may be purchased, and the dates (“start date” and “end date”) during which the purchase of the specified product is eligible under the program, and the number of products (units) that may be purchased.” Ex-1005, ¶35. “The product ID, start and end dates, and unit information thus represent a virtual coupon in the account.” Ex-1005, ¶35. “While not specifically shown, other information may also be provided in connection with each account, such as a PIN (in the event required for accessing the account), participant name, address, related accounts (the use of which will be described later), and any other personal information of the participant useful in

managing the account.” Ex-1005, ¶36. A POSITA would have understood that the “product ID, start and end dates, and unit information” are the first coupon code portion and the “other information” shown in the “Other” column in Figure 4 is the optional second coupon code portion of the valid coupon, which is stored in a database of accounts (database 122).

215. Thus, Brown discloses a valid coupon having first and second coupon code portions as recited in this limitation, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this limitation obvious.

4. Claim 3: “The computer-readable medium of claim 2, where the indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion and the indication that the at least one redeemed coupon was redeemed comprises the second coupon code portion.”

216. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

217. It is my opinion that Paul discloses, or at least renders obvious, this claim. To the extent that Paul does not disclose or render obvious this claim, it is my opinion that Brown discloses this claim. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

218. As explained above for Dependent Claim 2, Paul discloses a valid coupon that has first and second portions (the “Coupon Bar Code” (“CBC ”) portion and the “Optional Extension Codes” portion).

219. The ’133 patent contemplates sending the first portion to the point-of-sale terminal, and upon receiving the indication of at least one redeemed coupon, retrieving the second portion (Extended Portion) and sending it to the manufacturer as an indication that the at least one coupon was redeemed. Ex-1001, 7:60–8:65. The Extended Portion can include a household identifier. Ex-1001, FIG. 7. Manufacturers may track results at the individual household level by assigning unique numbers to the extended portion of the coupon code’s application identifier. Ex-1001, 10:37–42 (“Manufacturers may track results at the individual household level by assigning unique numbers to the extended portion[.]”).

220. In Paul, redemption reports and/or settlement reports (indications that the at least one coupon was redeemed) are sent to the manufacturer. Ex-1004, ¶¶69–70, 111–114, 133. These reports include, among other things, family codes and household ID code 165. Ex-1004, FIG. 1, ¶111 (“Redemption reports generated from central server 290 provide detailed coupon redemption data including date and time stamp, store number and aisle location, product purchased for every coupon redeemed, customer ID, manufacturer code, family code, coupon campaign code, zip code, region etc.”). Thus, like the ’133 patent, Paul discloses a valid

coupon with two coupon code portions—an indication of the at least one valid coupon (CBC) and an indication that the at least one redeemed coupon was redeemed (household ID code).

221. Alternatively, the '133 patent contemplates that the second portion sent to the manufacturer could be “the triggering UPC code of the corresponding product purchased as well as identification of the retailer and POS terminal and time of purchase.” Ex-1001, 8:50–55. Paul discloses that the redemption reports and/or settlement reports sent to the manufacturer also contain this information (for example, product purchased for every coupon redeemed). Ex-1004, ¶¶69-70, 111-114, 133; limitation [1.7.b] above.

222. Thus, a POSITA would have understood that Paul discloses a valid coupon with first and second portions as described by the '133 patent that meet this limitation.

5. Claim 4: “The computer-readable medium of claim 2, where the first coupon code portion comprises one of: a GS1 EAN/UPC Type 5 barcode, a GS1 128 barcode, and a GS1 Databar barcode and where the second coupon code portion comprises a manufacture offer code.”

223. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

224. It is my opinion that Paul discloses, or at least renders obvious, this claim. To the extent that Paul does not disclose or render obvious this claim, it is my opinion that Brown discloses this claim. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

225. As explained above for Dependent Claim 2, Paul discloses a valid coupon that has a first coupon code portion and a second coupon code portion.

226. Paul discloses that the coupon depicted in Figure 1 “**may be** a fixed format **such as** a 12-digit UPC or a 13-digit EAN-99”—meaning those formats are purely exemplary. Ex-1004, ¶30 (emphasis added). Paul also discloses that “commonly accepted barcode formats [include] Universal Product Code (UPC), EAN, Code 39, **Code 128**, etc.” Ex-1004, ¶29 (emphasis added); *see also* Ex-1001, 1:16–20 (“[C]oupons are universally accepted [and] follow GS1 (including [UCC]) guidelines[.]”). A POSITA would have understood that the first coupon code portion of the valid coupon in Figure 1 could be any of the “commonly accepted barcode formats,” which includes Code 128 (also known as GS1 128), as recited in this limitation.

227. Paul further discloses that the second coupon code portion (the “Optional Extension Codes”) includes an offer code 162, which is “used by coupon issuers or clearing houses for their own use.” Ex-1004, ¶31. A POSITA would have understood that the coupon issuers are typically manufacturers. Thus, a

POSITA would have understood that Paul's second coupon code portion, which includes offer code 162, comprises a manufacture offer code as recited in this limitation.

6. **Claim 5: “The computer-readable medium of claim 1, where the indication of at least one redeemed coupon further comprises purchase transaction information, where the purchase transaction information comprises at least one of an identification of a product purchased, a time of the purchase transaction and a location of the purchase transaction.”**

228. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

229. It is my opinion that Paul discloses, or at least renders obvious, this claim.

230. As explained above for limitation [1.7], Paul discloses that the point of sale terminal sends the coupon processing server an indication of at least one redeemed coupon. The indication of at least one redeemed coupon is the “coupon redemption data” and/or “proof of purchase.”

231. Paul discloses that the “proof of purchase” “may include some or all of the following: date stamp, *time stamp*, *retail store location*, POS terminal location, *product(s) purchased for every coupon redeemed*, original selling price of

product(s) per POS system, face value of coupon redeemed, additional discounts offered by retailer's POS system 230 such as double manufacturer's coupons, net price paid by the customer and the customer who redeemed the coupons." Ex-1004, ¶107 (emphasis added). Paul discloses that " coupon redemption data [includes] **date and time stamp**, store number and aisle location, **product purchased for every coupon redeemed**, customer ID, manufacturer code, family code, coupon campaign code, **zip code, region** etc." Ex-1004, ¶111 (emphasis added).

232. Thus, a POSITA would have understood that both the "coupon redemption data" and "proof of purchase" (indications of at least one redeemed coupon) in Paul comprise purchase transaction information including "identification of a product purchased, a time of the purchase transaction and a location of the purchase transaction" as recited in the claim.

(ii) Ground 2

233. To the extent that Paul does not disclose or render obvious this claim, it is my opinion that Brown discloses this claim. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

234. As explained above for limitation [1.7], Brown discloses that when "applicable coupons are redeemed" during a purchase at a POS terminal, an

indication of at least one redeemed coupon is sent to the coupon processing server (DBMS 120) and the “account is debited.”

235. Brown discloses that virtual coupons are stored in a database 122 with a database table 410. Ex-1005, ¶¶28, 35, FIG. 4. In Figure 4, the database table 410 shows the data that is associated with each coupon, such as Product ID. Ex-1005, FIG. 4. A POSITA would have understood that information about the product purchased must be sent in the indication so that the virtual coupon can be debited for the correct product, as the virtual coupons are stored in the database based on Product ID. Ex-1005, FIG. 4. Information about the product purchased is required so that the account can be debited correctly.

236. Also, the indication of at least one redeemed coupon can include “other data related to the transaction [such as] (date of purchase, other food products being purchased at the same time, the extent of discounts that participants are obtaining, etc.).” Ex-1005, ¶34. A POSITA would have understood that the “date of purchase” is equivalent to a “time of the purchased transaction.” Alternatively, it would have been obvious to a POSITA to send the time of purchase in addition to the date of purchase because sending a time along with a date would be a trivial modification. A POSITA would have been motivated to do so because time of purchase would be useful information to assess customer purchasing habits, just like the date. Further, a POSITA would have had a reasonable expectation of

success because the system already had the capability to send the date, and sending the time would be a trivial modification.

237. Thus, the indication of at least one redeemed coupon comprises purchase transaction information as required by the claim, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

7. Claim 6: “The computer-readable medium of claim 5, where the indication that the at least one redeemed coupon was redeemed further comprises the purchase transaction information.”

238. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

239. It is my opinion that Paul discloses, or at least renders obvious, this claim.

240. As explained above for limitation [1.7.b], Paul discloses transmitting an “indication that the at least one redeemed coupon was redeemed” from the coupon processing server to a manufacturer associated with the at least one redeemed coupon. Paul’s redemption reports and/or settlement reports (described in detail above) are “an indication that the at least one redeemed coupon was redeemed” and they comprise purchase transaction information.

241. As one example, the settlement reports include information such as: “(a) face value of paper & electronic coupons redeemed, sorted by product, product line, retail store, zip code, region, coupon campaign code (if any) etc.; (b) electronic coupons distributed, electronic coupons redeemed and electronic coupon redemption fee; (c) coupon handling, processing and other clearing fees; (d) the net amount owed by manufacturer to retailer; and (e) detailed proof of purchase including date and time stamp, store location, aisle location, product(s) purchased for the coupon, product selling price per POS, face value of coupon, additional discounts offered by retailer and the net amount paid by customer; (f) customer ID number, unique Portable Scanner ID number, customer name, address, phone number and further information as to who redeemed the coupon.” Ex-1004, ¶114.

242. Thus, a POSITA would have understood that this information in the settlement reports (indication that the at least one redeemed coupon was redeemed) comprise purchase transaction information as required by this claim.

(ii) Ground 2

243. To the extent that Paul does not disclose or render obvious this claim, it is my opinion that Brown discloses this claim. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

Per [1.7.b], Brown discloses sending an indication that the at least one redeemed coupon was redeemed to benefits administrators overseeing the benefits program, and it would have been obvious to send it to a manufacturer as well.

244. Brown further discloses that “data [about coupons redeemed during purchases] can also be used for many purposes useful to the program administrator and its participants[.]” Ex-1005, ¶¶32-34. Thus, a POSITA would have understood that the indication that the at least one redeemed coupon was redeemed included data consisting of purchase transaction information (data about coupons redeemed during purchases, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

8. Claim 7: “The computer-readable medium of claim 1, where the operations further comprise monitoring at least volume and traffic of redeemed coupons to identify abnormalities and to prevent coupon counterfeiting.”

245. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

246. It is my opinion that Paul discloses, or at least renders obvious, this claim. To the extent that Paul does not disclose or render obvious this claim, it is my opinion that Brown discloses this claim. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

247. As explained for [1.7] above, Paul discloses that the coupon processing server receives an indication of at least one redeemed coupon (coupon redemption data and/or proof of purchase) from the point-of-sale terminal.

248. Paul discloses that the coupon redemption data and/or proof of purchase contain extensive information about purchase transactions and redeemed coupons. Ex-1004, ¶¶69-70, 107, 114; limitation [1.7.b]; Claim 5. Paul further discloses “monitor[ing] coupon redemption activity by each registered customer and enforce[ing] the pre-set rules of redemption.” Ex-1004, ¶81 (“This will also enable the in-store server in each retail store to monitor coupon redemption activity by each registered customer and enforce the pre-set rules of redemption.”). In other words, if a customer tries to use a coupon more than once, the coupon processing system identifies the abnormality and stops the customer from redeeming the coupon, thereby preventing coupon fraud and/or counterfeiting. Thus, a POSITA would have understood that Paul’s monitoring coupon redemption activity to enforce redemption rules satisfies this claim limitation.

249. To the extent that the claim requires that specifically the coupon processing server monitor at least volume and traffic of redeemed coupons to identify abnormalities and to prevent coupon counterfeiting, and if Paul does not disclose that, a POSITA would have found it obvious to use the extensive information available about purchase transactions and redeemed coupons to do

such monitoring by the coupon processing server. A POSITA would have been motivated to do so to prevent fraud and coupon counterfeiting across the entire retail network, not at a single store. A POSITA would have had a reasonable expectation of success because Paul's system already had the ability to enforce pre-set rules of redemption, which could be easily modified to more broadly monitor volume and traffic for abnormalities. In fact, Paul contemplates various configurations of the POS system and servers. Ex-1004, ¶93 ("Multiple configurations and flow of information can be easily designed for real-time validation and redemption of coupons using the POS system, the in-store server and central server.").

9. **Claim 8: "The computer-readable medium of claim 1, where determining whether at least one valid coupon is associated with the unique account identifier in the database of accounts comprises: determining whether at least one associated coupon is associated with the unique account identifier in the database of accounts, and for each associated coupon of the at least one associated coupon, determining whether the associated coupon has been previously redeemed and determining whether the associated coupon has expired, where the associated coupon is determined to be a valid coupon in response to both determining that the associated coupon has not been previously redeemed and determining that the associated coupon has not expired."**

250. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) **Ground 1**

251. It is my opinion that Paul discloses, or at least renders obvious, this claim.

252. As explained above for limitation [1.5], Paul discloses that in response to receiving a unique account identifier for a customer, determining whether there is a valid coupon for that customer in a database of customer accounts.

253. Paul discloses that in response to identifying a registered customer (i.e. receiving the unique account number), the I/R software accesses customer files and retrieves applicable CBCs ***saved*** in his/her customer account within the DBS 265. Ex-1004, ¶¶82, 86. A POSITA would have understood that a coupon that is “saved” in a customer’s account would be a coupon that is associated with the customer’s unique account identifier (i.e. an “associated coupon”).

254. Paul states that “[m]ultiple methods, logic and alternate information flow can easily be developed within the software program for [] verifying that the coupon presented is a valid coupon[.]” Ex-1004, ¶97. Paul describes a process of reviewing a database of coupon definitions to determine if an electronic coupon is valid. Ex-1004, ¶¶98-100. “Based on the coupon definition in the database, the coupon is verified to be in effect, ***not expired***, and valid for the store and/or region.” Ex-1004, ¶100 (emphasis added). Coupon definitions include “the complete CBC as shown in an electronic coupon or printed in a Free Standing Insert (FSI), face

value of coupon, **expiration date**, terms and conditions of coupon offer such as **limit two per purchase, five per family** etc., and any other terms and conditions printed on the coupon.” Ex-1004, ¶100 (emphasis added).

255. Paul also explains that DBS 265 “maintain[s] some or all of the following information: a) specific geographic regions, such as zip codes, city, county or states where the coupon is valid; b) **customer redemption limit** during each visit (such as limit one coupon per customer); c) total customer redemption limit over a specific time period or during the term of the campaign (such as limit five per customer over 30 days) etc., and c) total promotion limit specified by the manufacturer for the duration of the campaign.” Ex-1004, ¶101 (emphasis added). A POSITA would have understood that this information about coupon expiration dates and redemption limits in the database of coupon definitions and DBS 265 is used to determine “[i]f the coupon is valid[.]” Ex-1004, ¶102.

256. Further, “central server 290 will limit the customer to pre-set **redemption limits** per instructions received from coupon issuer.” Ex-1004, ¶103 (emphasis added). “In other words, if the coupon condition states ‘limit two per purchase or limit five per family’, I/R software will limit redemption of both paper and electronic coupons to pre-set redemption limits.” Ex-1004, ¶103. Necessarily, redemption limits are enforced by checking whether a coupon has already been redeemed. Thus, a POSITA would have understood that by limiting the customer

to pre-set redemption limits, the central server would check whether the coupon had already been redeemed.

257. Further, “in-store server will communicate with the central server periodically and update the account activity of the registered customer, including redeemed and unused coupons in each registered customer’s account.” Ex-1004, ¶80. In other words, central server tracks which coupons have been redeemed and which are unused. “This will enable the registered customers to visit any store within that region that has deployed the portable scanner system and to redeem unused electronic coupons available in their account.” Ex-1004, ¶81.

258. Also, there are systems in place to “automatically delete valid barcodes [] so that the customer cannot use the same coupon again” and to “automatically delete expired coupons immediately or after a certain time period has elapsed.” Ex-1004, ¶51. Thus, Paul’s system has the ability to check whether a coupon was already redeemed or expired.

259. Thus, Paul discloses a system that checks whether an associated coupon is expired or already redeemed to determine whether it is a valid coupon as required by the claim.

260. To the extent that Paul does not explicitly disclose this limitation, it would have been obvious to a POSITA to check whether a coupon was expired or had been previously redeemed when making a determination that a coupon is valid

so that expired/used coupons are not sent to the customer and the manufacturer and/or retailer are not responsible for the expense of the customer receiving the benefit of an expired coupon or using a coupon more than the redemption limit. A POSITA would have had a reasonable expectation of success because Paul already disclosed the ability to check expiration dates in coupon definition databases and enforce pre-set redemption limits. Checking expiration dates and redemptions limits before sending a coupon to a customer would have been a trivial modification of the location and/or order of software operations. To the extent that Paul does not explicitly disclose that the coupon validity determination takes place at the coupon processing server, it would have been obvious to a POSA that the database of coupon definitions could be stored in DBS 265 and used by the central server 290 to determine coupon validity before sending the coupon to the POS terminal. A POSITA would have been motivated to do so because centralizing data avoids redundancies in the system, and would have expected success because processing centralized data was well-known in the art.

(ii) Ground 2

261. To the extent that Paul does not disclose or render obvious this claim, it is my opinion that Brown discloses this claim. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

262. As explained above for limitation [1.5], Brown discloses determining whether a customer has a valid coupon associated with a unique account identifier in a database of accounts in response to receiving the unique account identifier.

263. After “benefits information is entered at the POS terminal[,] transaction data [] is sent through benefits network 116 to the DBMS 120, so that the database 122 may confirm that the account is present and active [] and may determine whether there are currently valid coupons in the account (e.g., the transaction date matches the redemption dates for any coupons)[.]” Ex-1005, ¶39. In Figure 4, for each coupon, the database provides a start date and end date (i.e., an expiration date) and the number of units available. Ex-1005, FIG. 4. If the transaction date is after the end date, the coupon is expired. If the number of units available is zero, then the coupon was previously redeemed.

264. Thus, a POSITA would have understood that a coupon is determined to be valid as required by the claim when the transaction date is before the end date (the coupon is not expired) and the number of units is not zero (it has not been previously redeemed), and the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

10. Claim 9: “The computer-readable medium of claim 1, where updating the database of accounts comprises deactivating the at least one redeemed coupon.”

265. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

266. It is my opinion that Paul discloses, or at least renders obvious, this claim.

267. As explained above for limitation [1.5], Paul discloses a database of accounts that stores coupon information for specific customers.

268. As explained above for limitations [1.7] and [1.7.a], Paul discloses that the database of accounts is updated in response to receiving an indication of at least one redeemed coupon. As one example, Paul discloses that in response to receiving the “indication of at least one redeemed coupon” (coupon redemption data and/or proof of purchase), the ““I/R software will **update** customer files in . . . central server 290 for **actual redemption data** and proof of purchase[.]” Ex-1004, ¶91 (emphasis added).

269. As explained above for Dependent Claim 8, Paul discloses determining whether a coupon is valid by determining whether it has previously been redeemed.

Paul's coupon processing system does this by tracking customer redemption information to determine whether a customer has met the pre-set redemption limits. Ex-1004, ¶103. When a customer has met the pre-set redemption limits, the coupon is no longer considered valid. A POSITA would have understood such a coupon to be "deactivated" because it can no longer be used by the customer. Further information about tracking coupon redemptions is provided above for Dependent Claim 8, which is incorporated here by reference.

270. Also, Paul discloses that "[a]ll **unused** coupons will be available [from central server 290] for redemption by the customer during subsequent visits to any retail store that has deployed a portable scanner system that communicates with other systems at different locations." Ex-1004, ¶68 (emphasis added).

271. Thus, after receiving the indication of at least one redeemed coupon" (coupon redemption data and/or proof of purchase), the customer files are updated in the database to reflect the redemption and any coupons that have met their pre-set redemption limits are deactivated to the customer.

(ii) Ground 2

272. To the extent that Paul does not disclose or render obvious this claim, it is my opinion that Brown discloses this claim. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

273. As explained above for limitations [1.7] and [1.7.a], Brown discloses that the database of accounts is updated in response to receiving an indication of at least one redeemed coupon.

274. Brown discloses that if the customer decides to purchase eligible products using a valid coupon, “the account is debited (the applicable coupons are redeemed).” Ex-1005, ¶¶28-29, 40. The database 122 would be updated to reflect that the coupon was redeemed by the customer. Ex-1005, ¶¶35, 37. Per Figure 4, the number of units available would necessarily decreased when a coupon is debited. Ex-1005, FIG. 4.

275. Thus, a POSITA would have understood that the coupon has been deactivated because a customer can no longer use it, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

11. Claim 10: “The computer-readable medium of claim 1, where the operations further comprise, in response to determining that no valid coupons are associated with the unique account identifier in the database of accounts, transmitting, from the coupon processing server, a ‘no coupons available’ message to the first point of sale terminal via the network.”

276. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

277. It is my opinion that Paul discloses, or at least renders obvious, this claim.

278. As explained above for limitation [1.5], Paul discloses that in response to receiving a unique account identifier for a customer, determining whether there is a valid coupon for that customer in a database of customer accounts.

279. As explained above for limitation [1.6], Paul discloses sending the valid coupon from the coupon processing server to the POS terminal. Specifically, at checkout, “software will access the customer’s account for applicable coupons saved in their account . . . [and] the customer will receive these targeted coupon offers.” Ex-1004, ¶¶79, 82, 117.

280. If there are no valid coupons, a POSITA would have understood that the customer would not receive any coupon offers. Although Paul does not explicitly say that a message indicating as such is sent to the POS terminal, it would have been obvious to a POSITA to send such a message. Sending such messages indicating that the requested data is not available was well known in the art, such as in Brown Claim 10 (**Ground 2**) described below.

281. Also, Paul discloses other instances where an “event to notify customer” of downloaded data or connection problems is performed or a “customer is prompted” to take action after failed attempts to connect. Ex-1004, FIG. 8. Also,

in instances where “product purchases do [not] meet coupon definitions, terms, and conditions of coupon offer,” a coupon is rejected and the reason for rejection is transmitted to POS terminal. Ex-1004, FIG. 10. “For any coupons rejected, abbreviated messages are sent to the appropriate POS terminal 235 to display on the terminal and also printed on register receipt. A list of rejection codes and the corresponding abbreviations and explanations will be maintained within in-store server 240 and central server 290. Detailed transaction record explaining the reason for rejection are written to a local file within in-store server 240 for transmission back to central server 290 during next transmission link.” Ex-1004, ¶104; *see also* Ex-1004, ¶92 (“If product purchases do not meet the terms and conditions of coupon offer, coupon will be rejected and the reasons for rejection will be sent to POS terminal 235.”). A POSITA would have understood that these notifications and prompts could instead be about no coupons being available. And like the “reason for rejection” being sent to the POS terminal, a “no coupons available” message could likewise be sent in Paul’s system.

282. Thus, like the notifications, customer prompts, reasons for rejection, and/or abbreviated messages being sent to the POS terminal 235, a POSITA would have found it obvious to likewise send a “no coupons available” message when no valid coupons are available. A POSITA would have been motivated to send such a message because otherwise the POS terminal 235 might assume that there was a

network connection error upon receiving no valid coupons in response to sending the unique account identifier to the coupon processing server. Sending a “no coupons available” message would prevent unnecessary attempts to troubleshoot the POS terminal 235 and/or network connection. A POSITA would have had a reasonable expectation of success because sending such a message would be a trivial modification to the coupon processing server and it was disclosed in the art, such as in Brown Claim 10 (**Ground 2**) below.

(ii) Ground 2

283. To the extent that Paul does not disclose or render obvious this claim, it is my opinion that Brown discloses this claim. Thus, the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

284. As explained above for limitation [1.5], Brown discloses determining whether a customer has a valid coupon associated with a unique account identifier in a database of accounts.

285. As explained above for limitation [1.6], Brown discloses a coupon processing server that transmits indications of valid coupons found in a customer’s account to a point of sale terminal for redemption.

286. Brown also discloses that “[i]f the [customer’s] account is not active or there are no currently valid coupons, information to that effect is displayed at the terminal 102[.]” Ex-1005, ¶39. Upon finding no valid coupons in the account, a

POSITA would have understood that the coupon processing server (DBS 265) sending information to the effect of there being no currently valid coupons is sending a “no coupons available” message to the point of sale terminal for display to the customer as required by this claim, and the combination of Paul and Brown (as described in Section VIII.D.1) renders this claim obvious.

12. Independent Claim 11

287. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

- a) **[11.pre]: “A computer-readable medium storing instructions executable by a processor to perform operations for processing coupons across a network, the operations comprising:”**

(i) Ground 1

288. To the extent the preamble is limiting, for the same reasons as [1.pre], Paul discloses/renders obvious this limitation.

(ii) Ground 2

289. To the extent the preamble is limiting, for the same reasons as [1.pre], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

b) [11.1]: “scanning, at a point-of-sale terminal located at a retail store, a unique account identifier;”

(i) Ground 1

290. For the same reasons as [1.3], Paul discloses/renders obvious this limitation.

(ii) Ground 2

291. For the same reasons as [1.3], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

c) [11.2]: “during a purchase transaction, transmitting, from the point of sale terminal, the unique account identifier to a coupon processing server via a network,”

(i) Ground 1

292. For the same reasons as [1.1], Paul discloses/renders obvious this limitation. Specifically, this limitation and [1.1] are describing reciprocal actions. If the coupon processor *receives* the unique account identifier from the point-of-sale terminal, then accordingly the point-of-sale terminal *transmits* the unique account identifier to the coupon processing server.

(ii) Ground 2

293. For the same reasons as [1.1], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. This limitation and [1.1] are describing reciprocal actions as explained in **Ground 1 [11.2]**.

- d) **[11.3]: “where the coupon processing server is configured to communicate with a plurality of point of sale terminals and”**

(i) Ground 1

294. For the same reasons as [1.2], Paul discloses/renders obvious this limitation.

(ii) Ground 2

295. For the same reasons as [1.2], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- e) **[11.4]: “where the coupon processing server is at a location that is remote from the retail store;”**

(i) Ground 1

296. For the same reasons as [1.4], Paul discloses/renders obvious this limitation.

(ii) Ground 2

297. For the same reasons as [1.4], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- f) **[11.5]: “in response to transmitting the unique account identifier, receiving, at the point of sale terminal, an indication of whether at least one valid coupon is associated with the unique account identifier from the coupon processing server via the network, where a valid coupon is a coupon that has been validated by the coupon processing server and the indication includes the at least one valid coupon;”**

(i) Ground 1

298. For the same reasons as [1.5] and [1.6], Paul discloses/rendered obvious this limitation. This limitation and limitations [1.5]/[1.6] are describing reciprocal actions taken by the coupon processing server and point-of-sale terminal as explained in [11.2]. A POSITA would have understood that Paul’s “an indication of the at least one valid coupon” in [1.6] satisfies the “indication of whether at least one valid coupon is associated with the unique account identifier” limitation because these indications are both intended to inform the point-of-sale terminal that the customer has a valid coupon in their account.

299. Specifically, the ’133 patent discloses that various types of “coupon related information” can be sent between the point-of-sale terminal and coupon processing server. Ex-1001, 7:60–8:6. In one example, “second coupon related information” is returned from the coupon processing server to the point-of-sale terminal, and it includes the valid coupons “in a message package that identifies the retailer and the POS terminal.” Ex-1001, 8:40–46. A POSITA would have understood that the “second coupon related information” is an “an indication of

whether at least one valid coupon is associated with the unique account identifier” because it is a message intended to inform the point-of-sale terminal that there are valid coupons associated with the account number in the database. A different type of message (a “no coupons available” message) would be sent if that were not true. Ex-1001, 9:17–19. Thus, Paul’s indication (message) in [1.6] likewise accomplishes the goal of informing the point-of-sale terminal that there is a valid coupon in the customer account.

(ii) Ground 2

300. For the same reasons as [1.5] and [1.6], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Per the explanation for **Ground 1 [11.5]**, this limitation and limitations [1.5]/[1.6] are describing reciprocal actions taken by the coupon processing server and point-of-sale terminal.

301. For the same reasons in **Ground 1 [11.5]** this limitation is obvious. Specifically, Brown’s indication (message) in [1.6] also accomplishes the goal of informing the point-of-sale terminal that there is a valid coupon in the customer account.

- g) **[11.6]: “in response to receiving the indication that the at least one valid coupon is associated with the unique account identifier, the point of sale terminal completing the purchase transaction by validation of the at least one valid coupon against the purchased transaction; and”**

(i) Ground 1

302. For the same reasons as [1.7], Paul discloses/renders obvious this limitation. Further, “validation” of a coupon at a point-of-sale terminal can also refer to determining whether the coupon can be applied to/matches any of the products the customer wants to purchase. Ex-1001, 4:46-49 (“[T]he POS terminal may begin a validation process to validate each coupon code against products purchased by the consumer for any coupon code redeemed[.]”). A POSITA would have understood that to complete a purchase transaction, the POS terminal must determine whether the coupon matches the products purchased by validation of the coupon against the purchase transaction per the ’133 patent. Paul discloses this matching process. Ex-1004, ¶98 (“The I/R software verifies that the PBC from customer purchases match the applicable PBC for the corresponding coupon.”).

(ii) Ground 2

303. For the same reasons as [1.7], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, “validation” of a coupon at a point-of-sale terminal can also refer to determining whether the coupon can be applied to/matches any of the products the customer wants to purchase. Ex-1001, 4:46-49 (“[T]he POS terminal may begin a validation

process to validate each coupon code against products purchased by the consumer for any coupon code redeemed[.]”). A POSITA would have understood that to complete a purchase transaction, the POS terminal must determine whether the coupon matches the products purchased by validation of the coupon against the purchase transaction per the ’133 patent. Brown discloses this matching process. Ex-1004, ¶29 (describing that eligible products are determined when “various products have been presented (and their product IDs read) at the POS terminal 102[.]”).

- h) [11.7]: “in response to the purchase transaction comprising a redemption of at least one of the at least one valid coupon, transmitting, from the point of sale terminal to the coupon processing server, an indication of the at least one redeemed coupon.”**

(i) Ground 1

304. For the same reasons as [1.7], Paul discloses/renders obvious this limitation. This limitation and [1.7] are describing reciprocal actions taken by the coupon processing server and the point-of-sale terminal as explained in [11.2].

(ii) Ground 2

305. For the same reasons as [1.7], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Per the explanation for **Ground 1 [11.7]**, this limitation and [1.7] are describing reciprocal actions taken by the coupon processing server and the point-of-sale terminal, and for the same reasons this limitation is obvious.

13. Claim 12: “The computer-readable medium of claim 11, where a valid coupon comprises a first coupon code portion and a second coupon code portion.”

306. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

307. For the same reasons as Claim 2, Paul discloses/renders obvious this claim.

(ii) Ground 2

308. For the same reasons as Claim 2, Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

14. Claim 13: “The computer-readable medium of claim 12, where an indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion.”

309. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

310. For the same reasons as Claim 3, Paul discloses/renders obvious this claim.

(ii) **Ground 2**

311. For the same reasons as Claim 3, Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

- 15. Claim 14: “The computer-readable medium of claim 12, where the first coupon code portion comprises one of: a GS1 EAN/UPC Type 5 barcode, a GS1 128 barcode, and a GS1 Databar barcode and where the second coupon code portion comprises a manufacture offer code.”**

312. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) **Ground 1**

313. For the same reasons as Claim 4, Paul discloses/renders obvious this claim.

(ii) **Ground 2**

314. For the same reasons as Claim 4, Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

- 16. Claim 15: “The computer-readable medium of claim 11, where, when at least one valid coupon is associated with the unique account identifier, the indication of whether at least one valid coupon is associated with the unique account identifier comprises an indication of the at least one valid coupon.”**

315. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not

render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

316. For the same reasons as [1.6]/[11.5], Paul discloses/render obvious this claim.

317. Specifically, a POSITA would have understood that the “indication of the at least one valid coupon” is contained within the “indication of whether at least one valid coupon is associated with the unique account identifier” recited in this limitation because the “indication of the at least one valid coupon” is intended to inform the point-of-sale terminal that a valid coupon has actually been provided, whereas the “indication of whether at least one valid coupon is associated with the unique account identifier” is intended to inform the point-of-sale terminal that a valid coupon exists in the database. The various indications are essentially nested layers of linked messages, with the top layer informing the point-of-sale terminal that a valid coupon exists in the database (“indication of whether at least one valid coupon is associated with the unique account identifier”), and the second layer informing the point-of-sale terminal that a valid coupon has been provided (“indication of the at least one valid coupon”), and the bottom layer is the “valid coupon” itself. Necessarily, if the point-of-sale terminal has a valid coupon, the valid coupon was provided and existed in the database as indicated in the upper

two message layers. Thus, Paul's indication (message) in [1.6]/[11.5] both informs the point-of-sale terminal that a valid coupon exists in the customer account and that a valid coupon has been provided by providing the valid coupon itself, and would thus satisfy the recited limitation.

(ii) Ground 2

318. For the same reasons as [1.6]/[11.5], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

319. Specifically, as explained in Claim 15 (**Ground 1**), Brown's indication (message) in [1.6]/[11.5] both informs the point-of-sale terminal that a valid coupon exists in the customer account and that a valid coupon has been provided by providing the valid coupon itself, and would thus satisfy the recited limitation.

17. Claim 16: "The computer-readable medium of claim 11, where the indication of at least one redeemed coupon further comprises purchase transaction information, where the purchase transaction information comprises at least one of: an identification of a product purchased, a time of the purchase transaction and a location of the purchase transaction."

320. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

321. For the same reasons as Claim 5, Paul discloses/renders obvious this claim.

(ii) Ground 2

322. For the same reasons as Claim 5, Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

18. Independent Claim 17

- a) **[17.pre]: “An apparatus, comprising a processor and a memory storing software, the processor is configured to, when executing the software, cause the apparatus to perform operations, the operations comprising:”**

323. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

324. To the extent the preamble is limiting, for the same reasons as [1.pre], Paul discloses/renders obvious this limitation. Further, a POSITA would understand that the claimed apparatus is a coupon processing server because it performs the operations attributed to a coupon processing server in the '133 patent specification.

(ii) Ground 2

325. For the same reasons as [1.pre], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, a POSITA would understand that the claimed apparatus is a coupon processing server because it performs the operations attributed to a coupon processing server in the '133 patent specification.

b) [17.1]: “to receive a unique account identifier from a first point of sale terminal via a network,”**(i) Ground 1**

326. For the same reasons as [1.1], Paul discloses/renders obvious this limitation.

(ii) Ground 2

327. For the same reasons as [1.1], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

c) [17.2]: “where the apparatus is configured to communicate with a plurality of point of sale terminals,”**(i) Ground 1**

328. For the same reasons as [1.2], Paul discloses/renders obvious this limitation.

(ii) Ground 2

329. For the same reasons as [1.2], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- d) **[17.3]: “where the unique account identifier was scanned at the first point-of-sale terminal which is located at a retail store and”**

(i) **Ground 1**

330. For the same reasons as [1.3], Paul discloses/renders obvious this limitation.

(ii) **Ground 2**

331. For the same reasons as [1.3], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- e) **[17.4]: “where the apparatus is at a location that is remote from the retail store;”**

(i) **Ground 1**

332. For the same reasons as [1.4], Paul discloses/renders obvious this limitation.

(ii) **Ground 2**

333. For the same reasons as [1.4], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- f) **[17.5]: “in response to receiving the unique account identifier, to determine whether at least one valid coupon is associated with the unique account identifier in a database of accounts;”**

(i) **Ground 1**

334. For the same reasons as [1.5] Paul discloses/renders obvious this limitation.

(ii) Ground 2

335. For the same reasons as [1.5], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- g) [17.6]: “in response to determining that at least one valid coupon is associated with the unique account identifier in the database of accounts, to transmit an indication of the at least one valid coupon to the first point of sale terminal via the network, wherein the indication includes the at least one valid coupon;”**

(i) Ground 1

336. For the same reasons as [1.6], Paul discloses/renders obvious this limitation.

(ii) Ground 2

337. For the same reasons as [1.6], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- h) [17.7]: “in response to receiving, from the first point of sale terminal, an indication of at least one redeemed coupon,”**

(i) Ground 1

338. For the same reasons as [1.7], Paul discloses/renders obvious this limitation.

(ii) Ground 2

339. For the same reasons as [1.7], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

i) [17.7.a]: “to update the database of accounts and”

(i) Ground 1

340. For the same reasons as [1.7.a], Paul discloses/renders obvious this limitation.

(ii) Ground 2

341. For the same reasons as [1.7.a], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

j) [17.7.b]: “to transmit, to a manufacturer associated with the at least one redeemed coupon, an indication that the at least one redeemed coupon was redeemed against a purchased transaction, where the at least one redeemed coupon is at least one of the at least one valid coupon.”

(i) Ground 1

342. For the same reasons as [1.7.b], Paul discloses/renders obvious this limitation.

(ii) Ground 2

343. For the same reasons as [1.7.b], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

19. Claim 18: “The apparatus of claim 17, where a valid coupon comprises a first coupon code portion and a second coupon code portion.”

344. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not

render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

345. For the same reasons as [2], Paul discloses/renders obvious this claim.

(ii) Ground 2

346. For the same reasons as [2], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

20. Claim 19: “The apparatus of claim 18, where the indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion and the indication that the at least one redeemed coupon was redeemed comprises the second coupon code portion.”

347. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

348. For the same reasons as [3], Paul discloses/renders obvious this claim.

(ii) Ground 2

349. For the same reasons as [3], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

- 21. Claim 20: “The apparatus of claim 17, where the indication of at least one redeemed coupon further comprises purchase transaction information, where the purchase transaction information comprises at least one of an identification of a product purchased, a time of the purchase transaction and a location of the purchase transaction.”**

350. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

351. For the same reasons as [5], Paul discloses/renders obvious this claim.

(ii) Ground 2

352. For the same reasons as [5], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

- 22. Claim 21: “The apparatus of claim 20, where the indication that the at least one redeemed coupon was redeemed further comprises the purchase transaction information.”**

353. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

354. For the same reasons as [6], Paul discloses/renders obvious this claim.

(ii) Ground 2

355. For the same reasons as [6], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

23. Claim 22: “The apparatus of claim 17, where the operations further comprise to monitor at least volume and traffic of redeemed coupons to identify abnormalities and to prevent coupon counterfeiting.”

356. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

357. For the same reasons as [7], Paul discloses/renders obvious this claim.

(ii) Ground 2

358. For the same reasons as [7], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

- 24. Claim 23: “The apparatus of claim 17, where, when determining whether at least one valid coupon is associated with the unique account identifier in the database of accounts, the operations further comprise: to determine whether at least one associated coupon is associated with the unique account identifier in the database of accounts, and for each associated coupon of the at least one associated coupon, to determine whether the associated coupon has been previously redeemed and to determine whether the associated coupon has expired, where the associated coupon is determined to be a valid coupon in response to both determining that the associated coupon has not been previously redeemed and determining that the associated coupon has not expired.”**

359. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

For the same reasons as [8], Paul discloses/renders obvious this claim.

(ii) Ground 2

360. For the same reasons as [8], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

- 25. Claim 24: “The apparatus of claim 17, where, when updating database of accounts, the operations further comprise to deactivate the at least one redeemed coupon.”**

361. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not

render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

362. For the same reasons as [9], Paul discloses/renders obvious this claim.

(ii) Ground 2

363. For the same reasons as [9], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

26. Independent Claim 25

- a) [25.pre]: “An apparatus, comprising a processor and a memory storing software, the processor is configured to, when executing the software, cause the apparatus to perform operations, the operations comprising:”

364. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

365. To the extent the preamble is limiting, for the same reasons as [1.pre]/[11.pre], Paul discloses/renders obvious this limitation. Further, a POSITA would have understood that the recited apparatus is a point-of-sale terminal because it performs the operations attributed to a point-of-sale terminal in the '133 patent specification.

(ii) Ground 2

366. For the same reasons as [1.pre]/[11.pre], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, a POSITA would have understood that the recited apparatus is a point-of-sale terminal because it performs the operations attributed to a point-of-sale terminal in the '133 patent specification.

b) [25.1]: “to scan a unique account identifier;”**(i) Ground 1**

367. For the same reasons as [1.3]/[11.1], Paul discloses/renderers obvious this limitation.

(ii) Ground 2

368. For the same reasons as [1.3]/[11.1], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

c) [25.2]: “during a purchase transaction, to transmit the unique account identifier to a coupon processing server via a network,”**(i) Ground 1**

369. For the same reasons as [1.1]/[11.2], Paul discloses/renderers obvious this limitation.

(ii) Ground 2

370. For the same reasons as [1.1]/[11.2], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- d) **[25.3]: “where the coupon processing server is configured to communicate with a plurality of point of sale terminals,”**

(i) Ground 1

371. For the same reasons as [1.2]/[11.3], Paul discloses/renders obvious this limitation.

(ii) Ground 2

372. For the same reasons as [1.2]/[11.3], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- e) **[25.4]: “where the apparatus is located at a retail store and where the coupon processing server is at a location that is remote from the retail store;”**

(i) Ground 1

373. For the same reasons as [1.3]/[1.4]/[11.1]/[11.4], Paul discloses/renders obvious this limitation.

(ii) Ground 2

374. For the same reasons as [1.3]/[1.4]/[11.1]/[11.4], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- f) **[25.5]: “in response to transmitting the unique account identifier, to receive an indication of whether at least one valid coupon is associated with the unique account identifier from the coupon processing server via the network, where a valid coupon is a coupon that has been validated by the coupon processing server and the indication includes the at least one valid coupon;”**

(i) Ground 1

375. For the same reasons as [1.5]/[1.6]/[11.5], Paul discloses/renders obvious this limitation.

(ii) Ground 2

376. For the same reasons as [1.5]/[1.6]/[11.5], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- g) **[25.6]: “in response to receiving at least one valid coupon at the point of sale terminal as an indication that at least one valid coupon is associated with the unique account identifier from the coupon processing server via the network, to complete the purchase transaction using the at least one valid coupon against the purchase transaction; and”**

(i) Ground 1

377. For the same reasons as [1.7]/[11.6], Paul discloses/renders obvious this limitation.

(ii) Ground 2

378. For the same reasons as [1.7]/[11.6], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- h) [25.7]: “in response to the purchase transaction comprising a redemption of at least one of the at least one valid coupon, to transmit, to the coupon processing server, an indication of the at least one redeemed coupon.”**

(i) Ground 1

379. For the same reasons as [1.7]/[11.7], Paul discloses/renderers obvious this limitation.

(ii) Ground 2

380. For the same reasons as [1.7]/[11.7], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- 27. Claim 26: “The apparatus of claim 25, where a valid coupon comprises a first coupon code portion and a second coupon code portion.”**

381. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

382. For the same reasons as [2]/[12], Paul discloses/renderers obvious this claim.

(ii) Ground 2

383. For the same reasons as [2]/[12], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

28. Claim 27: “The apparatus of claim 26, where an indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion.”

384. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

385. For the same reasons as [3]/[13], Paul discloses/renders obvious this claim.

(ii) Ground 2

386. For the same reasons as [3]/[13], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

29. Claim 28: “The apparatus of claim 25, where, when at least one valid coupon is associated with the unique account identifier, the indication of whether at least one valid coupon is associated with the unique account identifier comprises an indication of the at least one valid coupon.”

387. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

388. For the same reasons as [11.5]/[15], Paul discloses/renders obvious this claim.

(ii) Ground 2

389. For the same reasons as [11.5]/[15], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

30. Claim 29: “The apparatus of claim 25, where the indication of at least one redeemed coupon further comprises purchase transaction information, where the purchase transaction information comprises at least one of: an identification of a product purchased, a time of the purchase transaction and a location of the purchase transaction.”

390. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

391. For the same reasons as [5]/[16], Paul discloses/renders obvious this claim.

(ii) Ground 2

392. For the same reasons as [5]/[16], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

31. Independent Claim 30

393. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

a) [30.pre]: “An apparatus, comprising:”**(i) Ground 1**

394. To the extent the preamble is limiting, for the same reasons as [1.pre], Paul discloses/renders obvious this limitation. Further, a POSITA would understand that the claimed apparatus is a coupon processing server because it performs the operations attributed to a coupon processing server in the '133 patent specification.

(ii) Ground 2

395. For the same reasons as [1.pre], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, a POSITA would understand that the claimed apparatus is a coupon processing server because it performs the operations attributed to a coupon processing server in the '133 patent specification.

- b) **[30.1]: “an input interface configured for receiving a unique account identifier from a first point of sale terminal via a network,”**

(i) Ground 1

396. For the same reasons as [1.1], Paul discloses/renders obvious this limitation. Further, a POSITA would have understood that Paul discloses that the coupon processing server has an input interface as recited in this limitation. A POSITA would understand that all servers/devices have software run on processors that enable them to process data, make determinations, and communicate with other devices. The coupon processing server (CSS 290 and/or DBS 265) are located at the centralized processing center 260, which is connected to the front end processing system 205 with POS terminal 235 over a network 295. In order to communicate data between devices and/or over a network to process coupons, a POSITA would understand that the devices must have both input and output interfaces that can send and receive data. Without those interfaces, the system would not be operational.

(ii) Ground 2

397. For the same reasons as [1.1], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, Brown discloses that the coupon processing server has an input interface as recited in this limitation. A POSITA would understand that all servers/devices have software run on processors that enable them to process data, make determinations, and

communicate with other devices. The coupon processing server (DBMS 120) is connected to the point-of-sale terminal 102 over a network (104/116). In order to communicate data between devices and/or over a network to process coupons, a POSITA would understand that the devices must have both input and output interfaces that can send and receive data. Without those interfaces, the system would not be operational.

c) [30.2]: “where the apparatus is configured to communicate with a plurality of point of sale terminals,”

(i) Ground 1

398. For the same reasons as [1.2], Paul discloses/renders obvious this limitation.

(ii) Ground 2

399. For the same reasons as [1.2], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

d) [30.3]: “where the unique account identifier was scanned at the first point-of-sale terminal which is located at a retail store and”

(i) Ground 1

400. For the same reasons as [1.3], Paul discloses/renders obvious this limitation.

(ii) Ground 2

401. For the same reasons as [1.3], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- e) **[30.4]: “where the apparatus is at a location that is remote from the retail store;”**

(i) **Ground 1**

402. For the same reasons as [1.4], Paul discloses/renders obvious this limitation.

(ii) **Ground 2**

403. For the same reasons as [1.4], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- f) **[30.5]: “a processor configured for determining whether at least one valid coupon is associated with the unique account identifier in a database of accounts in response to receiving the unique account identifier;”**

(i) **Ground 1**

404. For the same reasons as [1.5], Paul discloses/renders obvious this limitation. Further, Paul discloses that the coupon processing server has a processor making the determination recited in the limitation. Ex-1004, ¶¶26 (“The software can be stored in any type of machine readable medium and executed by a **processing unit.**”) (emphasis added), 69 (“Central server 290 possesses a detailed database and is capable of **processing** large volumes of data.”) (emphasis added). Further, a POSITA would understand that all servers/devices have software run on processors that enable them to process data, make determinations, and communicate with other devices.

(ii) Ground 2

405. For the same reasons as [1.5], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, Brown discloses that the coupon processing server has a processor making the determination recited in the limitation. Ex-1005, ¶38 (“The functionality implementing the embodiments described in FIGS. 1 through 4 is largely data and **applications** resident at the POS terminals 102, and at the DBMS 120[.]”) (emphasis added). Further, a POSITA would understand that all servers/devices have software (or applications) that run on processors that enable them to process data, make determinations, and communicate with other devices.

- g) [30.6]: “an output interface configured for transmitting an indication of the at least one valid coupon to the first point of sale terminal via the network in response to determining that at least one valid coupon is associated with the unique account identifier in the database of accounts, wherein the indication includes the at least one valid coupon;”**

(i) Ground 1

406. For the same reasons as [1.6], Paul discloses/renderers obvious this limitation. Further, Paul discloses that the coupon processing server has an output interface as recited in the limitation. A POSITA would understand that all servers/devices have software run on processors that enable them to process data, make determinations, and communicate with other devices. The coupon processing server (CSS 290 and/or DBS 265) are located at the centralized

processing center 260, which is connected to the front end processing system 205 with POS terminal 235 over a network 295. In order to communicate data between devices and/or over a network to process coupons, a POSITA would understand that the devices must have both input and output interfaces that can send and receive data. Without those interfaces, the system would not be operational.

(ii) Ground 2

407. For the same reasons as [1.6], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, Brown discloses that the coupon processing server has an output interface as recited in the limitation. A POSITA would understand that all servers/devices have software run on processors that enable them to process data, make determinations, and communicate with other devices. The coupon processing server (DBMS 120) is connected to the point-of-sale terminal 102 over a network (104/116). In order to communicate data between devices and/or over a network to process coupons, a POSITA would understand that the devices must have both input and output interfaces that can send and receive data. Without those interfaces, the system would not be operational.

h) [30.7]: “a server configured for updating the database of accounts and”

(i) Ground 1

408. For the same reasons as [1.7]/[1.7.a], Paul discloses/renders obvious this limitation. Further, a POSITA would understand that the recited server is the coupon processing server because it performs the operations attributed to a coupon processing server in the '133 patent specification.

(ii) Ground 2

409. For the same reasons as [1.7]/[1.7.a], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, a POSITA would understand that the recited server is the coupon processing server because it performs the operations attributed to a coupon processing server in the '133 patent specification.

i) [30.8]: “an internet connection for transmitting, to a manufacturer associated with the at least one redeemed coupon, an indication that the at least one redeemed coupon was redeemed, in response to receiving, from the first point of sale terminal, an indication of at least one redeemed coupon against a purchased transaction, where the at least one redeemed coupon is at least one of the at least one valid coupon.”

(i) Ground 1

410. For the same reasons as [1.7]/[1.7.b], Paul discloses/renders obvious this limitation. Further, the recited internet connection is the network recited in [1.1]. Alternatively, the internet connection is provided by web server 270 shown

in Paul Figure 2. Ex-1004, ¶35, (“Database server (DBS) 265 communicates with one or more data maintenance clients (DMC) 275 and with one or more web servers 270. Web server 270 communicates over the Internet with manufacturers, retailers, coupon providers, and advertisers (285) as a coupon promotion mechanism.”).

(ii) Ground 2

411. For the same reasons as [1.7]/[1.7.b], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, the recited internet connection is the network recited in [1.1].

32. Claim 31: “The apparatus of claim 30, where a valid coupon comprises a first coupon code portion and a second coupon code portion.”

412. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

413. For the same reasons as [2], Paul discloses/renders obvious this claim.

(ii) Ground 2

414. For the same reasons as [2], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

33. Claim 32: “The apparatus of claim 31, where the indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion and the indication that the at least one redeemed coupon was redeemed comprises the second coupon code portion.”

415. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

416. For the same reasons as [3], Paul discloses/renders obvious this claim.

(ii) Ground 2

417. For the same reasons as [3], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

34. Independent Claim 33

418. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

a) [33.pre]: “An apparatus, comprising:”

(i) Ground 1

419. To the extent the preamble is limiting, for the same reasons as [1.pre]/[11.pre]/[25.pre], Paul discloses/renders obvious this limitation.

(ii) Ground 2

420. For the same reasons as [1.pre]/[11.pre]/[25.pre], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

b) [33.1]: “a first input interface configured for scanning a unique account identifier;”**(i) Ground 1**

421. For the same reasons as [1.3]/[11.1]/[25.1], Paul discloses/renders obvious this limitation. Further, the POS terminal has an input interface as recited in this limitation. Paul describes that various connections are made between the scanner/scale and 215 and POS terminal, including via a “scanner/scale port” on POS terminal 235. Ex-1004, ¶38. (“DCM 225 may also have the capability to act as a wedge between POS terminal 235 and its scanner/scale 215 and keyboard 218. Specifically, scanner/scale 215 and keyboard 218 of POS terminal 235 are connected directly to DCM 225, rather than to POS terminal 235. Proper connections are then made from DCM 225 back to POS terminal 235 including one connection to a scanner/scale port of POS terminal 235 and another connection to a keyboard port of POS terminal 235. Under this flow of information, all scanned or manually entered product barcodes (referred to as “PBCs”) and coupon barcodes (referred to as “CBCs”) can be intercepted by DCM 225 before being passed on to POS terminal 235 or sent to in-store network 230 or in-store server 240 for coupon validation, redemption and processing.”). A POSITA would understand this port

to be an input interface. Further, a POSITA would understand that all data gathering devices must have input interfaces to receive information.

(ii) Ground 2

422. For the same reasons as [1.3]/[11.1]/[25.1], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, the POS terminal has an input interface as recited in this limitation. Brown discloses that benefits account numbers are “read from the card at the POS terminal 102.” Ex-1005, ¶28, 19 (“customer and account information is entered (e.g., by reading a magnetic stripe on the benefits card at one of the POS terminals 102”), 39 (“program benefits information is entered at the POS terminal, such as by reading the magnetic stripe 164 on the card 150”). For the benefits account numbers to be read or entered, there must be a input interface on the POS terminal to receive the numbers. Further, a POSITA would understand that all data gathering devices must have input interfaces to receive information.

- c) **[33.2]: “an output interface configured for transmitting, during a purchase transaction, the unique account identifier to a coupon processing server via a network,”**

(i) Ground 1

423. For the same reasons as [1.1]/[11.2]/[25.2], Paul discloses/renders obvious this limitation. Further, the POS terminal has an output interface as recited in this limitation. A POSITA would understand that all servers/devices have software run on processors that enable them to process data, make determinations,

and communicate with other devices. The coupon processing server (CSS 290 and/or DBS 265) are located at the centralized processing center 260, which is connected to the front end processing system 205 with POS terminal 235 over a network 295. In order to communicate data between devices and/or over a network to process coupons, a POSITA would understand that the devices must have both input and output interfaces that can send and receive data. Without those interfaces, the system would not be operational.

(ii) Ground 2

424. For the same reasons as [1.1]/[11.2]/[25.2], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, the POS terminal has an output interface as recited in this limitation. A POSITA would understand that all servers/devices have software run on processors that enable them to process data, make determinations, and communicate with other devices. The coupon processing server (DBMS 120) is connected to the point-of-sale terminal 102 over a network (104/116). In order to communicate data between devices and/or over a network to process coupons, a POSITA would understand that the devices must have both input and output interfaces that can send and receive data. Without those interfaces, the system would not be operational.

- d) **[33.3]: “where the coupon processing server is configured to communicate with a plurality of point of sale terminals,”**

(i) Ground 1

425. For the same reasons as [1.2]/[11.3]/[25.3], Paul discloses/renders obvious this limitation.

(ii) Ground 2

426. For the same reasons as [1.2]/[11.3]/[25.3], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- e) **[33.4]: “where the apparatus is located at a retail store and where the coupon processing server is at a location that is remote from the retail store;”**

(i) Ground 1

427. For the same reasons as [1.3]/[1.4]/[11.1]/[11.4]/[25.4], Paul discloses/renders obvious this limitation.

(ii) Ground 2

428. For the same reasons as [1.3]/[1.4]/[11.1]/[11.4]/[25.4], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- f) **[33.5]: “a point of sale terminal configured for receiving an indication of whether at least one valid coupon is associated with the unique account identifier from the coupon processing server via the network in response to transmitting the unique account identifier, where a valid coupon is a coupon that has been validated by the coupon processing server and the indication includes the at least one valid coupon;”**

(i) Ground 1

429. For the same reasons as [1.5]/[1.6]/[11.5]/[25.5], Paul discloses/renders obvious this limitation.

(ii) Ground 2

430. For the same reasons as [1.5]/[1.6]/[11.5]/[25.5], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- g) **[33.6]: “the point of sale terminal configured for completing the purchase transaction using the at least one valid coupon against the purchase transaction in response to receiving the indication that at least one valid coupon is associated with the unique account identifier from the coupon processing server via the network; and”**

(i) Ground 1

431. For the same reasons as [1.7]/[11.6]/[25.6], Paul discloses/renders obvious this limitation.

(ii) Ground 2

432. For the same reasons as [1.7]/[11.6]/[25.6], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious.

- h) [33.7]: “the output interface configured for transmitting, to the coupon processing server, an indication of the at least one redeemed coupon in response to the purchase transaction comprising a redemption of at least one of the at least one valid coupon.”**

(i) Ground 1

433. For the same reasons as [1.7]/[11.7]/[25.7], Paul discloses/renders obvious this limitation. Further, the POS terminal has the recited output interface as disclosed for [33.2].

(ii) Ground 2

434. For the same reasons as [1.7]/[11.7]/[25.7], Brown discloses this limitation, and the combination of Paul and Brown renders this limitation obvious. Further, the POS terminal has the recited output interface as disclosed for [33.2].

- 35. Claim 34: “The apparatus of claim 33, where a valid coupon comprises a first coupon code portion and a second coupon code portion.”**

435. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

436. For the same reasons as [2]/[12]/[26], Paul discloses/renders obvious this claim.

(ii) Ground 2

437. For the same reasons as [2]/[12]/[26], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

36. Claim 35: “The apparatus of claim 34, where an indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion.”

438. For the reasons discussed below, it is my opinion that Paul renders obvious this claim (**Ground 1**). Alternatively, to the extent that Paul does not render obvious this claim, it is also my opinion that the combination of Paul and Brown renders it obvious (**Ground 2**).

(i) Ground 1

439. For the same reasons as [3]/[13]/[27], Paul discloses/renders obvious this claim.

(ii) Ground 2

440. For the same reasons as [3]/[13]/[27], Brown discloses this claim, and the combination of Paul and Brown renders this claim obvious.

E. Grounds 3 and 4: Claims 7 and 22 Are Obvious Over The Combination Of Paul And Jones or the Combination of Paul, Brown, and Jones

441. I have analyzed claims 7 and 22 of the '133 patent, and it is my opinion that each claim is obvious over the combination of Paul and Jones (**Ground 3**). Alternatively, the combination of Paul, Brown, and Jones (**Ground 4**) renders claims 7 and 22 obvious.

1. Motivation to Combine Paul and Jones

442. A POSITA would have been motivated to combine Paul and the coupon audit system of Jones because monitoring coupon redemption activity for abnormalities and fraud would have been beneficial for retailers and manufacturers to avoid the negative financial impact of improperly redeemed coupons. Specifically, Paul acknowledges that “retailers and manufacturers incur substantial annual costs due to fraud and redemption errors.” Ex-1004, ¶9. Thus, a POSITA seeking to implement a coupon processing system as taught by Paul would have been motivated to look for available coupon auditing systems, like in Jones, to find a way to further combat fraud. Paul and Jones disclose similar systems that both involve terminals located at retail stores in communication with remote servers. Jones provides a way to monitor widescale coupon redemption activity by various useful metrics, such as extremely high coupon activity, extremely fast total transaction times, non-normal variations in UPC distributions, and high frequency of manual overrides. Ex-1006, 10:31-58. Monitoring all of these metrics would enhance Paul’s system and provide a way to quickly alert retailers and manufactures of potential fraud. A POSITA would have had a reasonable expectation of success because coupon redemption activity was already monitored in Paul’s system to enforce pre-set redemption limits, and modifying the system in

Paul to monitor additional coupon redemption activity would be a trivial software implementation that a POSITA would have found routine and straightforward.

2. Motivation to Combine Paul, Brown, and Jones

443. As explained in Section VIII.D.1, a POSITA would have been motivated to combine Paul and Brown. Thus, for the same reasons that a POSITA would have been motivated to combine Paul and Jones, a POSITA would have been motivated to combine Paul and Brown with Jones and have a reasonable expectation of success.

3. Claim 7: “The computer-readable medium of claim 1, where the operations further comprise monitoring at least volume and traffic of redeemed coupons to identify abnormalities and to prevent coupon counterfeiting.”

444. As I explain above, claim 7 is obvious over Paul (**Ground 1**) or the combination of Paul and Brown (**Ground 2**). For the reasons discussed below, it is further my opinion that the combination of Paul and Jones renders obvious claim 7 (**Ground 3**). Alternatively, to the extent that the combination of Paul and Jones does not render obvious claim 7, it is also my opinion that the combination of Paul, Brown, and Jones renders obvious claim 7 (**Ground 4**).

a) Ground 3

445. As explained above, Paul discloses or renders obvious this claim. To the extent that Paul does not disclose or render obvious claim 7, the combination of Paul and Jones renders it obvious.

446. Jones describes a “system and method for conducting an electronic audit with respect to sales transactions, including those involving coupon redemption, based on the transaction data recorded by a POS terminal[.]” Ex-1006, 3:37-43. Jones also discloses an “automated system and method for electronically auditing point-of-sale transactions” at a retail store “on a real-time basis” that are transmitted to a remote “audit system processor.” Ex-1006, Abstract, 5:36–50. The electronic audit analyzes transaction data “collected on a real-time basis and transmitted in an expeditious manner to a central site for use by manufacturers during settlement.” Ex-1006, 3:45–49.

447. Each retail store 10 has an in-store audit system 40 that collects, processes, and stores retail sales transaction data, including coupon redemption. Ex-1006, 5:36-42. Audit system 40 transmits the data to audit system central processor 60 for further processing and use by manufacturers and retailers. Ex-1006, 5:47-51. Audit system central processor 60 can collect and analyze the data from each electronic audit system 40 located at retail stores and reports and prepare reports, such as a summary of coupon redeemed with statistically high exceptions flagged or a “[c]omparison of flagged stores with cashier habits, extremely high coupon activity, extremely fast total transaction times (sometimes indicative of fraudulent misredemptions), non-normal variations in UPC distributions, and high frequency of manual overrides.” Ex-1006, 10:31-58. “The system and method of

the present invention electronically audits and tracks the results of the retailer's efforts while monitoring and recording all POS transactions.” Ex-1006, 12:12–15.

448. Thus, a POSITA would have understood that the volume and traffic of redeemed coupons are monitored to identify abnormalities and to prevent coupon counterfeiting as recited in these claims.

b) Ground 4

449. As explained above, the combination of Paul and Brown renders obvious claim 7. To the extent that the combination of Paul and Brown does not render obvious claim 7, the combination of Paul, Brown, and Jones renders obvious claim 7 for the same reasons explained above for **Ground 3**.

4. Claim 22: “The apparatus of claim 17, where the operations further comprise to monitor at least volume and traffic of redeemed coupons to identify abnormalities and to prevent coupon counterfeiting.”

450. As I explain above, claim 22 is obvious over Paul (**Ground 1**) or the combination of Paul and Brown (**Ground 2**). For the reasons discussed below, it is further my opinion that the combination of Paul and Jones renders obvious claim 22 (**Ground 3**). Alternatively, to the extent that the combination of Paul and Jones does not render obvious claim 22, it is also my opinion that the combination of Paul, Brown, and Jones renders obvious claim 22 (**Ground 4**).

a) Ground 3

451. The combination of Paul and Jones renders obvious claim 22 for the same reasons that the combination renders obvious claim 7. *See, supra* VIII.E.3.

b) Ground 4

452. The combination of Paul, Brown, and Jones renders obvious claim 22 for the same reasons that the combination renders obvious claim 7. *See, supra* VIII.E.3.

IX. SECONDARY CONSIDERATIONS OF NON-OBVIOUSNESS

453. As I explained in Appendix C, I understand that an obviousness analysis includes consideration of “secondary” or “objective” evidence of non-obviousness, including things such as: (1) a long-felt but unmet need in the prior art that was satisfied by the claimed invention; (2) commercial success or the lack of commercial success of the claimed invention; (3) unexpected results achieved by the claimed invention; (4) praise of the claimed invention by others skilled in the art; (5) taking of licenses under the patent by others; (6) deliberate copying of the claimed invention; and (7) contemporaneous and independent invention by others.

454. I am not aware of any secondary considerations of non-obviousness raised by Patent Owner with respect to the Challenged Claims of the ’133 patent. As an example, I am not aware of any showing of a long-felt but unmet need

satisfied by the '133 patent. As I explained in my obviousness analysis above, any alleged “need” that would have been satisfied by the '133 patent had already been satisfied in light of Paul, Brown, and Jones. As another example, I am not aware of any commercial success of any coupon processing systems that is due to their practicing of the Challenged Claims of the '133 patent. I likewise am not aware of any evidence relating to the other “secondary” or “objective” considerations listed above. Accordingly, the consideration of “secondary” or “objective” evidence of nonobviousness does not change my opinion that claims 1-35 of the '133 patent would have been obvious to one of skill in the art.

X. CONCLUSION

455. Based on my review and above analysis of the prior art, it is my opinion that claims 1-35 of the '133 patent would have been obvious to one of skill in the art.

XI. RESERVATION OF RIGHTS

456. My opinions are based upon the information that I have considered to date. I am unaware of any evidence of secondary considerations with respect to the '133 patent that would render any of the challenged claims non-obvious. I reserve the right, however, to supplement my opinions in the future to respond to any arguments raised by the Patent Owner and to take into account new information that becomes available to me.

I, Todd C. Mowry, declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Executed on September 6, 2024.

By:



Todd C. Mowry

APPENDIX A: CURRICULUM VITAE

Todd C. Mowry

CURRICULUM VITAE

September, 2024

Contact Information

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Education

Ph.D. in Electrical Engineering, Stanford University, March 1994.

- Thesis: “Tolerating Latency Through Software-Controlled Data Prefetching.”
- Supervisors: Anoop Gupta and Monica Lam.

M.S. in Electrical Engineering, Stanford University, June 1989.

B.S. in Electrical Engineering with Highest Distinction, University of Virginia, May 1988.

Academic Appointments

7/08–Present: Professor, Computer Science Department (with a courtesy appointment in the Department of Electrical and Computer Engineering), Carnegie Mellon University.

8/09–6/10: Associate Department Head for Faculty, Computer Science Department

6/15–Present: Director of the Ph.D. program, Computer Science Department

7/97–6/08: Associate Professor, Computer Science Department (with a courtesy appointment in the Department of Electrical and Computer Engineering), Carnegie Mellon University.

12/93–6/97: Assistant Professor, Department of Electrical and Computer Engineering (with a courtesy appointment in the Department of Computer Science), University of Toronto.

9/89–11/93: Graduate Research Assistant, Stanford University.

Honors and Awards

- ASPLOS Influential Paper Award, 2022 (for “Design and Evaluation of a Compiler Algorithm for Prefetching,” from ASPLOS 1992).
- Best Paper Runner-Up Award, VLDB conference, 2018.
- ACM Fellow, for contributions to software prefetching and thread-level speculation, 2016.
- SCS Doctoral Dissertation Award co-won by Angela Demke Brown (Ph.D. advisee), 2005.
- Most Thought-Provoking Idea Award (for Claytronics), the Wild and Crazy Idea Session IV held at ASPLOS-XI, 2004.
- Best Paper Award, the 20th International Conference on Data Engineering (ICDE), 2004.
- SCS Doctoral Dissertation Award co-won by J. Gregory Steffan (Ph.D. advisee), 2003.
- Runner-Up for Best Paper Award, the ACM SIGMOD Conference, 2001.
- Alfred P. Sloan Research Fellow, 1999–2001.
- TR100 Award (awarded by MIT’s Technology Review magazine to the top 100 most promising young innovators in science and technology), 1999.
- Best Paper Award, the Second Symposium on Operating Systems Design and Implementation, 1996.

Doctoral Thesis Supervision

Student	Thesis Title (or Topic)	Graduation Date
Chi-Keung Luk	Optimizing the Cache Performance of Non-Numeric Applications. <i>(Nominated for the ACM Thesis Award by the University of Toronto Department of Computer Science.)</i>	January, 2000
J. Gregory Steffan	Hardware Support for Thread-Level Speculation. <i>(Co-winner of the SCS Doctoral Dissertation Award.)</i>	April, 2003
Antonia Zhai	Compiler Optimization of Value Communication for Thread-Level Speculation.	January, 2005
Angela Demke Brown	Explicit Compiler-based Memory Management for Out-of-core Applications. <i>(Co-winner of the SCS Doctoral Dissertation Award.)</i>	May, 2005
Christopher Colohan	Applying Thread-Level Speculation to Database Transactions.	November, 2005
Shimin Chen	Redesigning Database Systems in Light of CPU Cache Prefetching.	December, 2005
Amit Manjhi	Increasing the Scalability of Dynamic Web Applications	March, 2008
Olatunji Ruwase	Improving Device Driver Reliability Through Decoupled Dynamic Binary Analysis	May, 2013
Michelle Goodstein	Dataflow Analysis-Based Dynamic Parallel Monitoring	August, 2014
Vivek Seshadri	Simple DRAM and Virtual Memory Abstractions to Enable Highly Efficient Memory Subsystems	May, 2016
Gennady Pekhimenko	Practical Data Compression for Modern Memory Hierarchies	July, 2016
Chris Fallin	Finding and Exploiting Parallelism with Data-Structure-Aware Static and Dynamic Analysis	February, 2019
Prashanth Menon	On Building Robustness into Compilation-Based Main-Memory Database Query Engines	May, 2021
Pratik Fegade	Auto-batching Techniques for Dynamic Deep Learning Computations	January, 2023
Ziqi Wang	Building a More Efficient Cache Hierarchy by Supporting Multiversioning and Leveraging Application-Level Information	January, 2023
Sam Arch	Unifying Declarative and Non-Declarative Code in Relational Database Management Systems	June, 2027 <i>(expected)</i>
Hongyi Jin	Compiler Optimizations for Machine Learning Applications	June, 2027 <i>(expected)</i>
Ruihang Lai	Compiler Optimizations for Machine Learning Applications	June, 2027 <i>(expected)</i>
Patrick Coppock	OS Support for Machine Learning Applications	June, 2027 <i>(expected)</i>

Publications

Book Chapters

1. Amir Yazdanbakhsh, Gennady Pekhimenko, Hadi Esmaeilzadeh, Onur Mutlu, and Todd C. Mowry. Towards Breaking the Memory Bandwidth Wall Using Approximate Value Prediction. In *Approximate Circuits: Methodologies and CAD*, Springer International Publishing, 2019, pages 417–441.

Refereed Journal Articles

1. Mishra, Deepanjali, Konstantinos Kanellopoulos, Ashish Panwar, Akshitha Sriraman, Vivek Seshadri, Onur Mutlu, and Todd C. Mowry. Address Scaling: Architectural Support for Fine-Grained Thread-Safe Metadata Management. In *IEEE Computer Architecture Letters*, 23(01), January 2024.
2. Prashanth Menon, Amadou Ngom, Lin Ma, Todd C. Mowry, and Andrew Pavlo. Permutable Compiled Queries: Dynamically Adapting Compiled Queries without Recompiling. In *Proceedings of the VLDB Endowment*, 14(2):101-113, October 2020.
3. Amir Yazdanbakhsh, Gennady Pekhimenko, Bradley Thwaites, Hadi Esmaeilzadeh, Onur Mutlu, and Todd C. Mowry. RFVP: Rollback-Free Value Prediction with Safe-to-Approximate Loads. In *ACM Transactions on Architecture and Code Optimization (TACO)*, 12(4):62, February 2016.
4. Amir Yazdanbakhsh, Gennady Pekhimenko, Bradley Thwaites, Hadi Esmaeilzadeh, Onur Mutlu, and Todd C. Mowry. Mitigating the Memory Bottleneck with Approximate Load Value Prediction. In *IEEE Design and Test*, 33(1), January 2016.
5. Vivek Seshadri, Samihan Yedkar, Hongyi Xin, Onur Mutlu, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. Mitigating Prefetcher-Caused Pollution Using Informed Caching Policies for Prefetched Blocks. In *ACM Transactions on Architecture and Code Optimization (TACO)*, 11(4), January 2015.
6. Shimin Chen, Phillip B. Gibbons, Michael Kozuch, and Todd C. Mowry. Log-Based Architectures: Using Multicore to Help Software Behave Correctly. In *Operating Systems Review*, 45(1), January 2011.
7. Shimin Chen, Michael Kozuch, Phillip B. Gibbons, Michael Ryan, Theodoros Strigkos, Todd C. Mowry, Olatunji Ruwase, Evangelos Vlachos, Babak Falsafi, and Vijaya Ramachandran. Flexible Hardware Acceleration for Instruction-Grain Lifeguards. In *IEEE Micro (Top Picks from 2008 Computer Architecture Conferences)*, 29(1), January 2009.
8. Seth C. Goldstein, Todd C. Mowry, Jason D. Campbell, Michael P. Ashley-Rollman, Michael De Rosa, Stanislav Funiak, James F. Hoburg, Mustafa E. Karagozler, Brian Kirby, Peter Lee, Padmanabhan Pillai, J. Robert Reid, Daniel D. Stancil, and Michael P. Weller. Beyond Audio and Video: Using Claytronics to Enable Pario. In *AI Magazine*, 30(2), March 2009.
9. Antonia Zhai, J. Gregory Steffan, Christopher B. Colohan, and Todd C. Mowry. Compiler and Hardware Support for Reducing the Synchronization of Speculative Threads. In *ACM Transactions on Architecture and Code Optimization (TACO)*, 5(1), May 2008.
10. Christopher B. Colohan, Anastassia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. Incrementally parallelizing database transactions with thread-level speculation. In *ACM Transactions on Computer Systems (TOCS)*, 26(1), February 2008.
11. Shimin Chen, Anastassia Ailamaki, Phillip B. Gibbons, and Todd C. Mowry. Improving Hash Join Performance through Prefetching. In *ACM Transactions on Database Systems*, 32(3):1-32, September 2007.

12. Christopher B. Colohan, Anastasia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. CMP Support for Large and Dependent Speculative Threads. In *IEEE Transactions on Parallel and Distributed Systems*, 18(8):1041-1054, August 2007.
13. J. Gregory Steffan, Christopher B. Colohan, Antonia Zhai and Todd C. Mowry. The STAMPede Approach to Thread-Level Speculation. In *ACM Transactions on Computer Systems*, 23(3):253-300, August 2005.
14. Seth Copen Goldstein, Jason Campbell and Todd C. Mowry. Programmable Matter. In *IEEE Computer*, 38(6):99-101, June 2005.
15. Angela Demke Brown, Todd C. Mowry and Orran Krieger. Compiler-Based I/O Prefetching for Out-of-Core Applications. In *ACM Transactions on Computer Systems*, 19(2):111-170, May 2001.
16. Chi-Keung Luk and Todd C. Mowry. Architectural and Compiler Support for Effective Instruction Prefetching: A Cooperative Approach. In *ACM Transactions on Computer Systems*, 19(1):71-109, February 2001.
17. Todd C. Mowry and Chi-Keung Luk. Understanding Why Correlation Profiling Improves the Predictability of Data Cache Misses in Nonnumeric Applications. In *IEEE Transactions on Computers*, 49(4), April 2000.
18. Chi-Keung Luk and Todd C. Mowry. Automatic Compiler-Inserted Prefetching for Pointer-Based Applications. In *IEEE Transactions on Computers*, 48(2), February 1999.
19. Mark Horowitz, Margaret Martonosi, Todd C. Mowry, and Michael D. Smith. Informing Memory Operations: Memory Performance Feedback Mechanisms and their Applications. In *ACM Transactions on Computer Systems*, 16(2):170-205, May 1998.
20. Todd C. Mowry. Tolerating Latency in Multiprocessors through Compiler-Inserted Prefetching. In *ACM Transactions on Computer Systems*, 16(1):55-92, February 1998.
21. Todd Mowry and Anoop Gupta. Tolerating Latency Through Software-Controlled Prefetching in Shared-Memory Multiprocessors. In *Journal of Parallel and Distributed Computing*, 12(2):87-106, 1991.

Refereed Conference Papers

1. Sam Arch, Yuchen Liu, Todd C. Mowry, Jignesh Patel, and Andy Pavlo. The Key to Effective UDF Optimization: Before Inlining, First Perform Outlining. To appear in *Proceedings of VLDB 18*, 2025.
2. Fegade, Pratik, Tianqi Chen, Phillip Gibbons, and Todd Mowry. ACROBAT: Optimizing Auto-batching of Dynamic Deep Learning at Compile Time. In *Proceedings of the Sixth Conference on Machine Learning and Systems (MLSys)*, May 2024.
3. Kai Franz, Samuel Arch, Denis Hirn, Torsten Grust, Todd C. Mowry, and Andrew Pavlo. Dear User-Defined Functions, Inlining Isn't Working Out So Great For Us. Let's Try Batching To Make Our Relationship Work. Sincerely, SQL. To appear in *Proceedings of the 2024 Conference on Innovative Data Systems Research (CIDR)*, January 2024.
4. Wang, Ziqi, Kaiyang Zhao, Pei Li, Andrew Jacob, Michael Kozuch, Todd Mowry, and Dimitrios Skarlatos. Memento: Architectural Support for Ephemeral Memory Management in Serverless Environments. In *Proceedings of the 56th Annual IEEE/ACM International Symposium on Microarchitecture (Micro)*, October 2023.
5. Siyuan Chen, Pratik Pramod Fegade, Phillip Gibbons, Todd C. Mowry, and Tianqi Chen. ED-Batch: Efficient Automatic Batching of Dynamic Neural Networks via Learned Finite State Machines. In *Proceedings of the Fortieth International Conference on Machine Learning (ICML 2023)*, July 2023.

6. Graham Gobieski, Souradip Ghosh, Marijn Heule, Todd C. Mowry, Tony Nowatzki, Nathan Beckmann, and Brandon Lucia. Riptide: A programmable, energy-minimal dataflow compiler and architecture. In *Proceedings of the 2022 55th IEEE/ACM International Symposium on Microarchitecture (MICRO)*, October 2022.
7. Pratik Fegade, Tianqi Chen, Phillip Gibbons, and Todd C. Mowry. The CoRa Tensor Compiler: Compilation for Ragged Tensors with Minimal Padding. In *Proceedings of the Fifth Conference on Machine Learning and Systems (MLSys)*, August 2022.
8. Amadou Ngom, Prashanth Menon, Matthew Butrovich, Lin Ma, Wan Shen Lim, Todd C. Mowry, and Andrew Pavlo. Filter Representation in Vectorized Query Execution. In *Proceedings of the 17th International Workshop on Data Management on New Hardware (DaMoN)*, June 2021.
9. Ziqi Wang, Chul-Hwan Choo, Michael A. Kozuch, Todd C. Mowry, Gennady Pekhimenko, Vivek Seshadri, and Dimitrios Skarlatos. NVOOverlay: Enabling Efficient and Scalable High-Frequency Snapshotting to NVM. In *Proceedings of the 48th Annual International Symposium on Computer Architecture (ISCA)*, June 2021.
10. Pratik Fegade, Tianqi Chen, Phillip Gibbons, and Todd C. Mowry. Cortex: A Compiler for Recursive Deep Learning Models. In *Proceedings of the Fourth Conference on Machine Learning and Systems (MLSys)*, April 2021.
11. Daming D. Chen, Phillip B. Gibbons, and Todd C. Mowry. TardisTM: Incremental Repair for Transactional Memory. In *Proceedings of the Eleventh International Workshop on Programming Models and Applications for Multicores and Manycores (PMAM '20)*, February 2020.
12. Ziqi Wang, Michael A. Kozuch, Todd C. Mowry, and Vivek Seshadri. Multiversioned Page Overlays: Enabling Faster Serializable Hardware Transactional Memory. In *Proceedings of the 28th International Conference on Parallel Architectures and Compilation Techniques (PACT)*, September 2019.
13. Vivek Seshadri, Donghyuk Lee, Thomas Mullins, Hasan Hassan, Amirali Boroumand, Jeremie Kim, Michael A. Kozuch, Onur Mutlu, Phillip B. Gibbons, and Todd C. Mowry. Ambit: in-memory accelerator for bulk bitwise operations using commodity DRAM technology. In *Proceedings of the 50th Annual International Symposium on Microarchitecture (MICRO-50)*, October 2017.
14. Prashanth Menon, Andrew Pavlo, and Todd C. Mowry. Relaxed Operator Fusion for In-Memory Databases: Making Compilation, Vectorization, and Prefetching Work Together At Last. In *Proceedings of VLDB 11(1): 1-13*, September 2017.
15. Andrew Pavlo, Gustavo Angulo, Joy Arulraj, Haibin Lin, Jiexi Lin, Lin Ma, Prashanth Menon, Todd Mowry, Matthew Perron, Ian Quah, Siddharth Santurkar, Anthony Tomasic, Skye Toor, Dana Van Aken, Ziqi Wang, Yingjun Wu, Ran Xian, and Tieying Zhang. Self-Driving Database Management Systems” In *Proceedings of the 2017 Conference on Innovative Data Systems Research (CIDR)*, January 2017.
16. Gennady Pekhimenko, Evgeny Bolotin, Nandita Vijaykumar, Onur Mutlu, Todd C. Mowry, and Stephen W. Keckler. A Case for Toggle-Aware Compression for GPU Systems. In *Proceedings of the 22nd International Symposium on High-Performance Computer Architecture (HPCA)*, March 2016.
17. Michelle L. Goodstein, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. Tracking and Reducing Uncertainty in Dataflow Analysis-Based Dynamic Parallel Monitoring. In *Proceedings of the 2015 International Conference on Parallel Architectures and Compilation Techniques (PACT '15)*, October 2015.
18. Nandita Vijaykumar, Gennady Pekhimenko, Adwait Jog, Abhishek Bhowmick, Rachata Ausavarungnirun, Chita Das, Mahmut Kandemir, Todd C. Mowry, and Onur Mutlu. A Case for Core-Assisted Bottleneck Acceleration in GPUs: Enabling Efficient Data Compression. In *Proceed-*

- ings of the 42nd Annual International Symposium on Computer Architecture (ISCA), June 2015.
19. Vivek Seshadri, Gennady Pekhimenko, Olatunji Ruwase, Onur Mutlu, Phillip B. Gibbons, Michael A. Kozuch, Todd C. Mowry, and Trishul Chilimbi. Page Overlays: An Enhanced Virtual Memory Framework to Enable Fine-grained Memory Management. In *Proceedings of the 42nd Annual International Symposium on Computer Architecture (ISCA)*, June 2015.
 20. Gennady Pekhimenko, Tyler Huberty, Rui Cai, Onur Mutlu, Phillip P. Gibbons, Michael A. Kozuch, and Todd C. Mowry. Exploiting Compressed Block Size as an Indicator of Future Reuse. In *Proceedings of the 21st International Symposium on High-Performance Computer Architecture (HPCA)*, February 2015.
 21. Vivek Seshadri, Abhishek Bhowmick, Onur Mutlu, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. The Dirty-Block Index. In *Proceedings of the 41st Annual International Symposium on Computer Architecture (ISCA)*, June 2014.
 22. Olatunji Ruwase, Michael A. Kozuch, Phillip B. Gibbons, and Todd C. Mowry. Guardrail: High Fidelity Correctness Checking of Device Drivers for Safeguarding I/O Operations. In *Proceedings of the Nineteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2014)*, March 2014.
 23. Gennady Pekhimenko, Vivek Seshadri, Yoongu Kim, Hongyi Xin, Onur Mutlu, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. Linearly Compressed Pages: A Low-Complexity, Low-Latency Main Memory Compression Framework. In *Proceedings of the 46th Annual International Symposium on Microarchitecture (MICRO-46)*, December 2013.
 24. Vivek Seshadri, Yoongu Kim, Chris Fallin, Donghyuk Lee, Rachata Ausavarungnirun, Gennady Pekhimenko, Yixin Luo, Onur Mutlu, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. RowClone: Fast and Energy-Efficient In-DRAM Bulk Data Copy and Initialization. In *Proceedings of the 46th Annual International Symposium on Microarchitecture (MICRO-46)*, December 2013.
 25. Michelle L. Goodstein, Shimin Chen, Phillip B. Gibbons, Michael A. Kozuch, and Todd C. Mowry. Chrysalis Analysis: Incorporating Synchronization Arcs in Dataflow-Analysis-based Parallel Monitoring. In *Proceedings of the 21st International Conference on Parallel Architectures and Compilation Techniques (PACT-2012)*, September 2012.
 26. Vivek Seshadri, Onur Mutlu, Todd C. Mowry, and Michael A. Kozuch. The Evicted-Address Filter: A Unified Mechanism to Address Both Cache Pollution and Thrashing. In *Proceedings of the 21st International Conference on Parallel Architectures and Compilation Techniques (PACT-2012)*, September 2012.
 27. Gennady Pekhimenko, Vivek Seshadri, Onur Mutlu, Todd C. Mowry, Phillip B. Gibbons, and Michael A. Kozuch. Base-Delta-Immediate Compression: A Practical Data Compression Mechanism for On-Chip Caches. In *Proceedings of the 21st International Conference on Parallel Architectures and Compilation Techniques (PACT-2012)*, September 2012.
 28. Olatunji Ruwase, Shimin Chen, Phillip Gibbons, and Todd C. Mowry. Decoupled Lifeguards: Enabling Path Optimizations for Dynamic Correctness Checking Tools. In *Proceedings of the ACM SIGPLAN 2010 Conference on Programming Language Design and Implementation (PLDI)*, June 2010.
 29. F. Ryan Johnson, Radu Stoica, Anastasia Ailamaki, and Todd C. Mowry. Decoupling Contention Management from Scheduling. In *Proceedings of the Fifteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2010)*, March 2010.
 30. Michelle Goodstein, Evangelos Vlachos, Shimin Chen, Phillip B. Gibbons, Michael Kozuch, and Todd C. Mowry. Butterfly Analysis: Adapting Dataflow Analysis to Dynamic Parallel Monitoring. In *Proceedings of the Fifteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2010)*, March 2010.

31. Evangelos Vlachos, Michelle Goodstein, Michael Kozuch, Shimin Chen, Babak Falsafi, Phillip B. Gibbons, and Todd C. Mowry. ParaLog: Enabling and Accelerating Online Parallel Monitoring of Multithreaded Applications. In *Proceedings of the Fifteenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2010)*, March 2010.
32. Amit Manjhi, Charles Garrod, Bruce M. Maggs, Todd C. Mowry, Anthony Tomasic. Holistic Query Transformations for Dynamic Web Applications. In *Proceedings of the 2009 IEEE 25th International Conference on Data Engineering (ICDE)*, March-April 2009.
33. Daniel J. Dewey, Michael P. Ashley-Rollman, Michael DeRosa, Seth Copen Goldstein, Todd C. Mowry, Siddhartha S. Srinivasa, Padmanabhan Pillai, and Jason Campbell. Generalizing metamodules to simplify planning in modular robotic systems. In *Proceedings of the IEEE/RSJ 2008 International Conference on Intelligent Robots and Systems (IROS)*, September 2008.
34. Charles Garrod, Amit Manjhi, Anastasia Ailamaki, Bruce Maggs, Todd Mowry, Christopher Olston, and Anthony Tomasic. Scalable Query Result Caching for Web Applications. In *Proceedings of the 34th International Conference on Very Large Databases (VLDB)*, August 2008.
35. Lei Li, Wenjie Fu, Fan Guo, Todd C. Mowry, and Christos Faloutsos. Cut-and-stitch: efficient parallel learning of linear dynamical systems on SMPs. In *Proceedings of the 14th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*, August 2008.
36. Shimin Chen, Michael Kozuch, Theodoros Strigkos, Babak Falsafi, Phillip B. Gibbons, Todd C. Mowry, Michael Ryan, Olatunji Ruwase, and Evangelos Vlachos. Flexible Hardware Acceleration for Instruction-Grain Program Monitoring. In *Proceedings of the 35th Annual International Symposium on Computer Architecture (ISCA)*, June 2008.
37. Olatunji Ruwase, Phillip B. Gibbons, Todd C. Mowry, Vijaya Ramachandran, Shimin Chen, Michael Kozuch, and Michael Ryan. Parallelizing dynamic information flow tracking. In *Proceedings of the 20th Annual ACM Symposium on Parallel Algorithms and Architectures (SPAA)*, June 2008.
38. Brian Kirby, Burak Aksak, James Hoburg, Todd C. Mowry, and Padmanabhan Pillai. A Modular Robotic System Using Magnetic Force Effectors. In *Proceedings of the IEEE/RSJ 2007 International Conference on Intelligent Robots and Systems (IROS)*, October 2007.
39. Michael Ashley-Rollman, Seth Goldstein, Peter Lee, Todd C. Mowry, and Padmanabhan Pillai. Meld: A Declarative Approach to Programming Ensembles. In *Proceedings of the IEEE/RSJ 2007 International Conference on Intelligent Robots and Systems (IROS)*, October 2007.
40. Amit Manjhi, Phillip B. Gibbons, Anastassia Ailamaki, Charles Garrod, Bruce M. Maggs, Todd C. Mowry, Christopher Olston, Anthony Tomasic, and Haifeng Yu. Invalidation Clues for Database Scalability Services. In *Proceedings of the 2007 IEEE 23rd International Conference on Data Engineering (ICDE)*, pages 316-325, April 2007.
41. Michael De Rosa, Peter Lee, Seth Goldstein, Jason Campbell, Padmanabhan Pillai, and Todd C. Mowry. Distributed Watchpoints: Debugging Large Multi-Robot Systems. In *Proceedings of the 2007 IEEE International Conference on Robotics and Automation (ICRA)*, pages 3723-3729, April 2007.
42. Benjamin D. Rister, Jason Campbell, Padmanabhan Pillai, and Todd C. Mowry. Integrated Debugging of Large Modular Robot Ensembles. In *Proceedings of the 2007 IEEE International Conference on Robotics and Automation (ICRA)*, pages 2227-2234, April 2007.
43. Shimin Chen, Phillip Gibbons, Michael Kozuch, Vasileios Liaskovitis, Anastassia Ailamaki, Guy Blelloch, Babak Falsafi, Limor Fix, Nikos Hardavellas, Todd C. Mowry and Chris Wilkerson. Scheduling Threads for Constructive Cache Sharing on CMPs. In *Proceedings of 18th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, pages 105-115, June 2007.

44. Shimin Chen, Babak Falsafi, Phillip B. Gibbons, Michael Kozuch, Todd C. Mowry, Radu Teodorescu, Anastassia Ailamaki, Limor Fix, Gregory R. Ganger, Bin Lin, and Steven W. Schlosser. Log-Based Architectures for General-Purpose Monitoring of Deployed Code. In *Proceedings of the Workshop on Architectural and System Support for Improving Software Dependability (ASID), held with ASPLOS XII*, October 2006.
45. Christopher B. Colohan, Anastassia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. Tolerating Dependences Between Large Speculative Threads Via Sub-Threads. In *Proceedings of the 33rd Annual International Symposium on Computer Architecture (ISCA)*, pages 216-226, June 2006.
46. Amit Manjhi, Anastassia Ailamaki, Bruce M. Maggs, Todd C. Mowry, Christopher Olston, and Anthony Tomasic. Simultaneous Scalability and Security for Data-Intensive Web Applications. In *Proceedings of the 2006 ACM SIGMOD International Conference on Management of Data*, pages 241-252, June 2006.
47. Vasileios Liaskovitis, Shimin Chen, Phillip B. Gibbons, Anastassia Ailamaki, Guy E. Blelloch, Babak Falsafi, Limor Fix, Nikos Hardavellas, Michael Kozuch, Todd C. Mowry, and Chris Wilkerson. Parallel Depth First vs. Work Stealing Schedulers on CMP Architectures. In *Proceedings of 18th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, August 2006.
48. Brian Kirby, Jason Campbell, Burak Aksak, Padmanabhan Pillai, James F. Hoburg, Todd C. Mowry, and Seth Copen Goldstein. Catoms: Moving Robots without Moving Parts. In *Proceedings of the Twentieth National Conference on Artificial Intelligence (AAAI)*, pages 1730-1731, July 2005.
49. Christopher Olston, Amit Manjhi, Charles Garrod, Anastassia Ailamaki, Bruce M. Maggs, and Todd C. Mowry. A Scalability Service for Dynamic Web Applications. In *Proceedings of the Second Biennial Conference on Innovative Data Systems Research (CIDR)*, pages 56-69, January 2005.
50. Christopher B. Colohan, Anastassia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. Optimistic Intra-Transaction Parallelism on Chip Multiprocessors. In *Proceedings of the 31st International Conference on Very Large Data Bases (VLDB)*, pages 73-84, September 2005.
51. Shimin Chen, Anastassia Ailamaki, Phillip B. Gibbons, and Todd C. Mowry. Inspector Joins. In *Proceedings of the 31st International Conference on Very Large Data Bases (VLDB)*, pages 817-828, September 2005.
52. Antonia Zhai, Christopher B. Colohan, J. Gregory Steffan, and Todd C. Mowry. Compiler Optimization of Memory-Resident Value Communication Between Speculative Threads. In *Proceedings of the 2007 International Symposium on Code Generation and Optimization (CGO)*, pages 39-52, March 2004.
53. Shimin Chen, Anastassia Ailamaki, Phillip B. Gibbons and Todd C. Mowry. Improving Hash Join Performance through Prefetching. In *Proceedings of the 20th International Conference on Data Engineering (ICDE)*, pages 116-127, April 2004. (*This paper received the Best Paper Award.*)
54. Antonia Zhai, Christopher B. Colohan, J. Gregory Steffan and Todd C. Mowry. Compiler Optimization of Scalar Value Communication Between Speculative Threads. In *Proceedings of the Tenth International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS-X)*, October 2002.
55. Shimin Chen, Philip B. Gibbons, Todd C. Mowry and Gary Valentin. Fractal Prefetching B+-Trees: Optimizing Both Cache and Disk Performance. In *Proceedings of the 2002 ACM SIGMOD International Conference on Management of Data*, June 2002.
56. J. Gregory Steffan, Christopher B. Colohan, Antonia Zhai and Todd C. Mowry. Improving Value Communication for Thread-Level Speculation. In *Proceedings of the Eighth International Symposium on High-Performance Computer Architecture (HPCA)*, February 2002.

57. Shimin Chen, Philip B. Gibbons and Todd C. Mowry. Improving Index Performance through Prefetching. In *Proceedings of the 2001 ACM SIGMOD International Conference on Management of Data*, pages 235-246, May 2001. (*This paper received the Runner-Up for Best Paper Award.*)
58. Angela Demke Brown and Todd C. Mowry. Taming the Memory Hogs: Using Compiler-Inserted Releases to Manage Physical Memory Intelligently. In *Proceedings of the Fourth Symposium on Operating Systems Design and Implementation (OSDI 2000)*, pages 31-44, October 2000.
59. J. Gregory Steffan, Christopher B. Colohan, Antonia Zhai and Todd C. Mowry. A Scalable Approach to Thread- Level Speculation. In *Proceedings of the 27th Annual International Symposium on Computer Architecture*, pages 1-12, June 2000.
60. Todd C. Mowry and Sherwyn R. Ramkisson. Software-Controlled Multithreading Using Informing Memory Operations. In *Proceedings of the Sixth International Symposium on High-Performance Computer Architecture*, January, 2000.
61. Chi-Keung Luk and Todd C. Mowry. Memory Forwarding: Enabling Aggressive Layout Optimizations by Guaranteeing the Safety of Data Relocation. In *Proceedings of the 26th Annual International Symposium on Computer Architecture (ISCA)*, pages 88-99, May 1999.
62. Chi-Keung Luk and Todd C. Mowry. Cooperative Prefetching: Compiler and Hardware Support for Effective Instruction Prefetching in Modern Microprocessors. In *Proceedings of the 31st Annual International Symposium on Microarchitecture*, pages 182-193, December 1998.
63. J. Gregory Steffan and Todd C. Mowry. The Potential for Using Thread-Level Data Speculation to Facilitate Automatic Parallelization. In *Proceedings of the Fourth International Symposium on High-Performance Computer Architecture*, pages 2-13, February, 1998.
64. Charles Chan, Adley Lo, and Todd C. Mowry. Comparative Evaluation of Latency Tolerance Techniques for Software Distributed Shared Memory. In *Proceedings of the Fourth International Symposium on High-Performance Computer Architecture*, pages 300-311, February, 1998.
65. Todd C. Mowry and Chi-Keung Luk. Predicting Data Cache Misses in Non-Numeric Applications Through Correlation Profiling. In *Proceedings of the 30th Annual International Symposium on Microarchitecture*, pages 314-320, December 1997.
66. Todd C. Mowry, Angela K. Demke and Orran Krieger. Automatic Compiler-Inserted I/O Prefetching for Out-of-Core Applications. In *Proceedings of the Second Symposium on Operating Systems Design and Implementation (OSDI '96)*, pages 3-17, October 1996. (*This paper received the Best Paper Award.*)
67. Chi-Keung Luk and Todd C. Mowry. Compiler-Based Prefetching for Recursive Data Structures. In *Proceedings of the Seventh International Conference on Architectural Support for Programming Languages and Operating Systems*, pages 222-233, October 1996.
68. Edouard Bugnion, Jennifer M. Anderson, Todd C. Mowry, Mendel Rosenblum and Monica S. Lam. Compiler- Directed Page Coloring for Multiprocessors. In *Proceedings of the Seventh International Conference on Architectural Support for Programming Languages and Operating Systems*, pages 244-255, October 1996.
69. Mark Horowitz, Margaret Martonosi, Todd C. Mowry, and Michael D. Smith. Informing Memory Operations: Providing Memory Performance Feedback in Modern Processors. In *Proceedings of the 23rd Annual International Symposium on Computer Architecture*, pages 260-270, May 1996.
70. Todd C. Mowry, Monica S. Lam and Anoop Gupta. Design and Evaluation of a Compiler Algorithm for Prefetching. In *Proceedings of the Fifth International Conference on Architectural Support for Programming Languages and Operating Systems*, pages 62-73, October 1992.

71. Anoop Gupta, John Hennessy, Kourosh Gharachorloo, Todd Mowry, and Wolf-Dietrich Weber. Comparative Evaluation of Latency Reducing and Tolerating Techniques. In *Proceedings of the 18th Annual International Symposium on Computer Architecture*, pages 254-263, May 1991.
72. Anoop Gupta, Wolf-Dietrich Weber, and Todd Mowry. Reducing Memory and Traffic Requirements for Scalable Directory-Based Cache Coherence Schemes. In *Proceedings of International Conference on Parallel Processing*, pages 312-321, August 1990.

Technical Reports

- Evangelos Vlachos, Michelle Goodstein, Michael Kozuch, Shimin Chen, Babak Falsafi, Phillip B. Gibbons, Todd C. Mowry, and Olatunji Ruwase. Parallel LBA: Conherence-based Parallel Monitoring of Multithreaded Applications. Carnegie Mellon University Technical Report CMU-CS-09-108, March 2009.
- Michelle Goodstein, Evangelos Vlachos, Shimin Chen, Phillip Gibbons, Michael Kozuch, and Todd C. Mowry. The Butterfly Model: Theoretical Foundations. Carnegie Mellon University Technical Report CMU-CS-08-170, February 2009.
- Amit Manjhi, Anastassia Ailamaki, Bruce M. Maggs, Todd C. Mowry, Christopher Olston, and Anthony Tomasic. Simultaneous Scalability and Security for Data-Intensive Web Applications. Carnegie Mellon University Technical Report CMU-CS-06-116, March 2006.
- Charles Garrod, Amit Manjhi, Anastassia Ailamaki, Phillip Gibbons, Bruce Maggs, Todd Mowry, Christopher Olston, and Anthony Tomasic. Scalable Consistency Management for Web Database Caches. Carnegie Mellon University Technical Report CMU-CS-06-128, July 2006.
- Amit Manjhi, Phillip B. Gibbons, Anastassia Ailamaki, Charles Garrod, Bruce M. Maggs, Todd C. Mowry, Christopher Olston, Anthony Tomasic, and Haifeng Yu. Invalidation Clues for Database Scalability Services. Carnegie Mellon University Technical Report CMU-CS-06-139, July 2006.
- Christopher B. Colohan, Anastassia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. Supporting Large Speculative Threads for Databases and Beyond. Carnegie Mellon University Technical Report CMU-CS-05-109, July 2005.
- Christopher B. Colohan, Anastassia Ailamaki, J. Gregory Steffan, and Todd C. Mowry. Optimistic Intra-Transaction Parallelism on Chip Multiprocessors. Carnegie Mellon University Technical Report CMU-CS-05-118, March 2005.
- Shimin Chen, Anastassia Ailamaki, Phillip B. Gibbons, and Todd C. Mowry. Improving Hash Join Performance through Prefetching. Carnegie Mellon University Technical Report CMU-CS-03-157, October 2003.
- Shimin Chen, Phillip B. Gibbons, Todd C. Mowry, and Gary Valentin. Fractal Prefetching B+-Trees: Optimizing Both Cache and Disk Performance. Carnegie Mellon University Technical Report CMU-CS-02-115, March 2002.
- Spiros Papadimitriou and Todd C. Mowry. Exploring Thread-Level Speculation in Software: The Effects of Memory Access Tracking Granularity. Carnegie Mellon University Technical Report CMU-CS-01-145, July 2001.
- Shimin Chen, Phillip B. Gibbons and Todd C. Mowry. Improving Index Performance through Prefetching. Carnegie Mellon University Technical Report CMU-CS-00-177, December 2000.
- J. Gregory Steffan, Christopher B. Colohan and Todd C. Mowry. Extending Cache Coherence to Support Thread-Level Data Speculation on a Single Chip and Beyond. Carnegie Mellon University Technical Report CMU-CS-98-171, December 1998.
- Todd C. Mowry and Sherwyn R. Ramkisson. Software-Controlled Multithreading Using Informing Memory Operations. Carnegie Mellon University Technical Report CMU-CS-98-169, October 1998.

- Chi-Keung Luk and Todd C. Mowry. Compiler and Hardware Support for Automatic Instruction Prefetching: A Cooperative Approach. Carnegie Mellon University Technical Report CMU-CS-98-140, June 1998.
- J. Gregory Steffan, Christopher B. Colohan and Todd C. Mowry. Architectural Support for Thread-Level Data Speculation. Carnegie Mellon University Technical Report CMU-CS-97-188, November 1997.
- Todd C. Mowry and Chi-Keung Luk. Predicting Data Cache Misses in Non-Numeric Applications Through Correlation Profiling. Carnegie Mellon University Technical Report CMU-CS-97-175, September 1997.
- J. Gregory Steffan and Todd C. Mowry. The Potential for Thread-Level Data Speculation in Tightly-Coupled Multiprocessors. University of Toronto Technical Report CSRI-TR-350, February 1997.
- Chi-Keung Luk and Todd C. Mowry. Predicting Data Cache Misses in Non-Numeric Applications Through Correlation Profiling. University of Toronto Technical Report CSRI-TR-359, February, 1997.
- Mark Horowitz, Margaret Martonosi, Todd C. Mowry, and Michael D. Smith. Informing Loads: Enabling Software to Observe and React to Memory Behavior. Stanford University Technical Report CSL-TR-95-673, July 1995.
- Todd C. Mowry. Tolerating Latency Through Software-Controlled Data Prefetching. Technical Report CSL-TR-94-628, Stanford University, June 1994.

Patents Held

- Todd C. Mowry. U.S. Patent 7,127,586: Prefetching hints. Issued October, 2006.
- Shimin Chen, Phillip B. Gibbons, and Todd C. Mowry. U.S. Patent 6,772,179: System and method for improving index performance through prefetching. Issued August, 2004.
- Todd C. Mowry. U.S. Patent 6,240,488: Prefetching hints. Issued May, 2001.
- Todd C. Mowry. U.S. Patent 5,732,242: Consistently specifying way destinations through prefetching hints. Issued March, 1998.
- Todd C. Mowry and Earl A. Killian. U.S. Patent 5,696,958: Method and apparatus for reducing delays following the execution of a branch instruction in an instruction pipeline. Issued December, 1997.

Distinguished Lectures

- 9/25/13: *“The Log-Based Architectures Project: Exploiting Multicore to Help Parallel Software Behave Correctly”*, University of Wisconsin-Madison, Department of Computer Science, Distinguished Lecture Series.
- 2/7/08: *“Pario: the Next Step Beyond Audio and Video”*, University of Toronto, Department of Electrical and Computer Engineering Distinguished Lecture Series.

Professional Activities

Professional Societies

- Member of the Institute of Electrical and Electronics Engineers (IEEE)
- Member of the Association of Computing Machinery (ACM)

Industrial Employment

5/04–6/07: Intel Corporation, Pittsburgh, Pennsylvania: Director of the Intel Research Pittsburgh Lab.

6/89–11/93: Silicon Graphics, Inc., Mountain View, California (formerly MIPS Computer Systems, Sunnyvale California): Computer Architect (part-time).

Consulting

7/07–2/11: Intel Corporation, Pittsburgh, Pennsylvania: Research Advisor.

8/96–4/04: SandCraft, Inc., Santa Clara, California: Member of the Technical Advisory Board.

1/96–4/04: IBM, Toronto: Visiting Scientist.

12/93–12/96: Silicon Graphics, Inc., Mountain View, California: Computer Architecture Consultant.

University Committee Work and Other Service Activities

Committee Work

- Faculty Hiring Committees:
 - Computer Science Department: 2008, 2010.
 - Computer Systems Area: 2000, 2001, 2002, 2003, 2004.
- Chair of the Computer Science Department Head Selection Committee, 2007.
- CSD Ph.D. Admissions Committee, 2001, 2002, 2003.
- School of Computer Science Council, 2001-2004.
- Carnegie Mellon University Faculty Senate (Presidential Appointee), 2000-2001.
- Computer Systems Area Advocate, 2000-2004.
- Doctoral Review Committee, 1998-2004.
- ACM Thesis Award Nomination Committee, 1999.

Journal, Conference and Workshop Organization

- Editor-in-Chief, ACM Transactions on Computer Systems, 2013-2018.
- Associate Editor, ACM Transactions on Computer Systems, 2001-2013.
- Program Chair of the International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2011.
- Sponsorship Chair, International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2010.
- Member of the ISCA program committee, 1998, 2000, and 2011.
- Member of the ASPLOS program committee, 2000, 2004.
- Member of the ASPLOS external review committee, 2012.
- Co-Program Chair of the International Conference on Parallel Architectures and Compilation Techniques (PACT), 2001.
- Member of the International Symposium on Microarchitecture program committee, 1998.
- Member of the Workshop on Architectural and System Support for Improving Software Dependability (ASID) program committee, 2005.
- Member of the Workshop on Memory System Performance (MSP) program committee (in conjunction with PLDI), 2002 and 2004.
- Member of the IBM CASCON program committee, 1995, 1996, 1997.
- Member of the First SUIF Workshop Program Committee, 1996.
- Organized the CASCON 97 workshop on Compiler Optimization, 1997.
- Initiated and organized the 1st Toronto / Rochester Workshop on Shared-Memory Multiprocessors, 1994.

APPENDIX B: CHALLENGED CLAIMS LISTING

No.	Claim/Limitation
[1.pre]	A computer-readable medium storing instructions executable by a processor to perform operations for processing coupons across a network, the operations comprising:
[1.1]	receiving, at a coupon processing server, a unique account identifier from a first point of sale terminal via a network,
[1.2]	where the coupon processing server is configured to communicate with a plurality of point of sale terminals,
[1.3]	where the unique account identifier was scanned at the first point-of-sale terminal which is located at a retail store and
[1.4]	where the coupon processing server is at a location that is remote from the retail store;
[1.5]	in response to receiving the unique account identifier, determining whether at least one valid coupon is associated with the unique account identifier in a database of accounts;
[1.6]	in response to determining that at least one valid coupon is associated with the unique account identifier in the database of accounts, transmitting, from the coupon processing server, an indication of the at least one valid coupon to the first point of sale terminal via the network, wherein the indication includes the at least one valid coupon;
[1.7]	in response to receiving, at the coupon processing server from the first point of sale terminal, an indication of at least one redeemed coupon,
[1.7.a]	updating the database of accounts and
[1.7.b]	transmitting, from the coupon processing server to a manufacturer associated with the at least one redeemed coupon, an indication that the at least one redeemed coupon was redeemed against a purchased transaction, where the at least one redeemed coupon is at least one of the at least one valid coupon.
[2]	The computer-readable medium of claim 1, where a valid coupon comprises a first coupon code portion and a second coupon code portion.

No.	Claim/Limitation
[3]	The computer-readable medium of claim 2, where the indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion and the indication that the at least one redeemed coupon was redeemed comprises the second coupon code portion.
[4]	The computer-readable medium of claim 2, where the first coupon code portion comprises one of: a GS1 EAN/UPC Type 5 barcode, a GS1 128 barcode, and a GS1 Databar barcode and where the second coupon code portion comprises a manufacture offer code.
[5]	The computer-readable medium of claim 1, where the indication of at least one redeemed coupon further comprises purchase transaction information, where the purchase transaction information comprises at least one of an identification of a product purchased, a time of the purchase transaction and a location of the purchase transaction.
[6]	The computer-readable medium of claim 5, where the indication that the at least one redeemed coupon was redeemed further comprises the purchase transaction information.
[7]	The computer-readable medium of claim 1, where the operations further comprise monitoring at least volume and traffic of redeemed coupons to identify abnormalities and to prevent coupon counterfeiting.
[8]	The computer-readable medium of claim 1, where determining whether at least one valid coupon is associated with the unique account identifier in the database of accounts comprises: determining whether at least one associated coupon is associated with the unique account identifier in the database of accounts, and for each associated coupon of the at least one associated coupon, determining whether the associated coupon has been previously redeemed and determining whether the associated coupon has expired, where the associated coupon is determined to be a valid coupon in response to both determining that the associated coupon has not been previously redeemed and determining that the associated coupon has not expired.
[9]	The computer-readable medium of claim 1, where updating the database of accounts comprises deactivating the at least one redeemed coupon.

No.	Claim/Limitation
[10]	The computer-readable medium of claim 1, where the operations further comprise, in response to determining that no valid coupons are associated with the unique account identifier in the database of accounts, transmitting, from the coupon processing server, a “no coupons available” message to the first point of sale terminal via the network.
[11.pre]	A computer-readable medium storing instructions executable by a processor to perform operations for processing coupons across a network, the operations comprising:
[11.1]	scanning, at a point-of-sale terminal located at a retail store, a unique account identifier;
[11.2]	during a purchase transaction, transmitting, from the point of sale terminal, the unique account identifier to a coupon processing server via a network,
[11.3]	where the coupon processing server is configured to communicate with a plurality of point of sale terminals and
[11.4]	where the coupon processing server is at a location that is remote from the retail store;
[11.5]	in response to transmitting the unique account identifier, receiving, at the point of sale terminal, an indication of whether at least one valid coupon is associated with the unique account identifier from the coupon processing server via the network, where a valid coupon is a coupon that has been validated by the coupon processing server and the indication includes the at least one valid coupon;
[11.6]	in response to receiving the indication that the at least one valid coupon is associated with the unique account identifier, the point of sale terminal completing the purchase transaction by validation of the at least one valid coupon against the purchased transaction; and
[11.7]	in response to the purchase transaction comprising a redemption of at least one of the at least one valid coupon, transmitting, from the point of sale terminal to the coupon processing server, an indication of the at least one redeemed coupon.

No.	Claim/Limitation
[12]	The computer-readable medium of claim 11, where a valid coupon comprises a first coupon code portion and a second coupon code portion.
[13]	The computer-readable medium of claim 12, where an indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion.
[14]	The computer-readable medium of claim 12, where the first coupon code portion comprises one of: a GS1 EAN/UPC Type 5 barcode, a GS1 128 barcode, and a GS1 Databar barcode and where the second coupon code portion comprises a manufacture offer code.
[15]	The computer-readable medium of claim 11, where, when at least one valid coupon is associated with the unique account identifier, the indication of whether at least one valid coupon is associated with the unique account identifier comprises an indication of the at least one valid coupon.
[16]	The computer-readable medium of claim 11, where the indication of at least one redeemed coupon further comprises purchase transaction information, where the purchase transaction information comprises at least one of: an identification of a product purchased, a time of the purchase transaction and a location of the purchase transaction.
[17.pre]	An apparatus, comprising a processor and a memory storing software, the processor is configured to, when executing the software, cause the apparatus to perform operations, the operations comprising:
[17.1]	to receive a unique account identifier from a first point of sale terminal via a network,
[17.2]	where the apparatus is configured to communicate with a plurality of point of sale terminals,
[17.3]	where the unique account identifier was scanned at the first point-of-sale terminal which is located at a retail store and
[17.4]	where the apparatus is at a location that is remote from the retail store;
[17.5]	in response to receiving the unique account identifier, to determine whether at least one valid coupon is associated with the unique account identifier in a database of accounts;

No.	Claim/Limitation
[17.6]	in response to determining that at least one valid coupon is associated with the unique account identifier in the database of accounts, to transmit an indication of the at least one valid coupon to the first point of sale terminal via the network, wherein the indication includes the at least one valid coupon;
[17.7]	in response to receiving, from the first point of sale terminal, an indication of at least one redeemed coupon,
[17.7.a]	to update the database of accounts and
[17.7.b]	to transmit, to a manufacturer associated with the at least one redeemed coupon, an indication that the at least one redeemed coupon was redeemed against a purchased transaction, where the at least one redeemed coupon is at least one of the at least one valid coupon.
[18]	The apparatus of claim 17, where a valid coupon comprises a first coupon code portion and a second coupon code portion.
[19]	The apparatus of claim 18, where the indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion and the indication that the at least one redeemed coupon was redeemed comprises the second coupon code portion.
[20]	The apparatus of claim 17, where the indication of at least one redeemed coupon further comprises purchase transaction information, where the purchase transaction information comprises at least one of an identification of a product purchased, a time of the purchase transaction and a location of the purchase transaction.
[21]	The apparatus of claim 20, where the indication that the at least one redeemed coupon was redeemed further comprises the purchase transaction information.
[22]	The apparatus of claim 17, where the operations further comprise to monitor at least volume and traffic of redeemed coupons to identify abnormalities and to prevent coupon counterfeiting.

No.	Claim/Limitation
[23]	The apparatus of claim 17, where, when determining whether at least one valid coupon is associated with the unique account identifier in the database of accounts, the operations further comprise: to determine whether at least one associated coupon is associated with the unique account identifier in the database of accounts, and for each associated coupon of the at least one associated coupon, to determine whether the associated coupon has been previously redeemed and to determine whether the associated coupon has expired, where the associated coupon is determined to be a valid coupon in response to both determining that the associated coupon has not been previously redeemed and determining that the associated coupon has not expired.
[24]	The apparatus of claim 17, where, when updating database of accounts, the operations further comprise to deactivate the at least one redeemed coupon.
[25.pre]	An apparatus, comprising a processor and a memory storing software, the processor is configured to, when executing the software, cause the apparatus to perform operations, the operations comprising:
[25.1]	to scan a unique account identifier;
[25.2]	during a purchase transaction, to transmit the unique account identifier to a coupon processing server via a network,
[25.3]	where the coupon processing server is configured to communicate with a plurality of point of sale terminals,
[25.4]	where the apparatus is located at a retail store and where the coupon processing server is at a location that is remote from the retail store;
[25.5]	in response to transmitting the unique account identifier, to receive an indication of whether at least one valid coupon is associated with the unique account identifier from the coupon processing server via the network, where a valid coupon is a coupon that has been validated by the coupon processing server and the indication includes the at least one valid coupon;

No.	Claim/Limitation
[25.6]	in response to receiving at least one valid coupon at the point of sale terminal as an indication that at least one valid coupon is associated with the unique account identifier from the coupon processing server via the network, to complete the purchase transaction using the at least one valid coupon against the purchase transaction; and
[25.7]	in response to the purchase transaction comprising a redemption of at least one of the at least one valid coupon, to transmit, to the coupon processing server, an indication of the at least one redeemed coupon.
[26]	The apparatus of claim 25, where a valid coupon comprises a first coupon code portion and a second coupon code portion.
[27]	The apparatus of claim 26, where an indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion.
[28]	The apparatus of claim 25, where, when at least one valid coupon is associated with the unique account identifier, the indication of whether at least one valid coupon is associated with the unique account identifier comprises an indication of the at least one valid coupon.
[29]	The apparatus of claim 25, where the indication of at least one redeemed coupon further comprises purchase transaction information, where the purchase transaction information comprises at least one of: an identification of a product purchased, a time of the purchase transaction and a location of the purchase transaction.
[30.pre]	An apparatus, comprising:
[30.1]	an input interface configured for receiving a unique account identifier from a first point of sale terminal via a network,
[30.2]	where the apparatus is configured to communicate with a plurality of point of sale terminals,
[30.3]	where the unique account identifier was scanned at the first point-of-sale terminal which is located at a retail store and
[30.4]	where the apparatus is at a location that is remote from the retail store;
[30.5]	a processor configured for determining whether at least one valid coupon is associated with the unique account identifier in a database of accounts in response to receiving the unique account identifier;

No.	Claim/Limitation
[30.6]	an output interface configured for transmitting an indication of the at least one valid coupon to the first point of sale terminal via the network in response to determining that at least one valid coupon is associated with the unique account identifier in the database of accounts, wherein the indication includes the at least one valid coupon;
[30.7]	a server configured for updating the database of accounts and
[30.8]	an internet connection for transmitting, to a manufacturer associated with the at least one redeemed coupon, an indication that the at least one redeemed coupon was redeemed, in response to receiving, from the first point of sale terminal, an indication of at least one redeemed coupon against a purchased transaction, where the at least one redeemed coupon is at least one of the at least one valid coupon.
[31]	The apparatus of claim 30, where a valid coupon comprises a first coupon code portion and a second coupon code portion.
[32]	The apparatus of claim 31, where the indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion and the indication that the at least one redeemed coupon was redeemed comprises the second coupon code portion.
[33.pre]	An apparatus, comprising:
[33.1]	a first input interface configured for scanning a unique account identifier;
[33.2]	an output interface configured for transmitting, during a purchase transaction, the unique account identifier to a coupon processing server via a network,
[33.3]	where the coupon processing server is configured to communicate with a plurality of point of sale terminals,
[33.4]	where the apparatus is located at a retail store and where the coupon processing server is at a location that is remote from the retail store;

No.	Claim/Limitation
[33.5]	a point of sale terminal configured for receiving an indication of whether at least one valid coupon is associated with the unique account identifier from the coupon processing server via the network in response to transmitting the unique account identifier, where a valid coupon is a coupon that has been validated by the coupon processing server and the indication includes the at least one valid coupon;
[33.6]	the point of sale terminal configured for completing the purchase transaction using the at least one valid coupon against the purchase transaction in response to receiving the indication that at least one valid coupon is associated with the unique account identifier from the coupon processing server via the network; and
[33.7]	the output interface configured for transmitting, to the coupon processing server, an indication of the at least one redeemed coupon in response to the purchase transaction comprising a redemption of at least one of the at least one valid coupon.
[34]	The apparatus of claim 33, where a valid coupon comprises a first coupon code portion and a second coupon code portion.
[35]	The apparatus of claim 34, where an indication of the at least one valid coupon comprises the first coupon code portion but not the second coupon code portion.

APPENDIX C: UNDERSTANDING OF THE LAW

I have applied the following legal principles provided to me by counsel in arriving at the opinions set forth in this declaration.

Legal Standard for Prior Art

I am not an attorney. I have been informed by attorneys of the relevant legal principles and have applied them to arrive at the opinions set forth in this declaration.

I understand that the petitioner for inter partes review may request the cancelation of one or more claims of a patent based on grounds available under AIA 35 U.S.C. § 102 and 35 U.S.C. § 103 using prior art that consists of patents and printed publications.

Anticipation and Prior Art

I understand that § 102 specifies when a challenged claim is invalid for lacking novelty over the prior art, and that this concept is also known as “anticipation.” I understand that a prior art reference anticipates a challenged claim, and thus renders it invalid by anticipation, if all elements of the challenged claim are disclosed in the prior art reference. I understand the disclosure in the prior art reference can be either explicit or inherent, meaning it is necessarily present or implied. I understand that the prior art reference does not have to use the same words as the challenged claim, but all of the requirements of the claim must be disclosed

so that a person of ordinary skill in the art could make and use the claimed subject matter.

In addition, I understand that § 102 also defines what is available for use as a prior art reference to a challenged claim.

Under § 102(a)(1), a challenged claim is anticipated if it was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention.

Under § 102(b)(1), a challenged claim is anticipated if it was described in an issued patent or published patent application, in which the patent or application names another inventor and was effectively filed before the effective filing date of the claimed invention.

I understand that the effective filing date of a patent or patent application is the earlier of the actual filing date of the patent or the application for patent or, if the patent or application for patent is entitled to claim earlier priority or the benefit of an earlier filing, the filing date of the earliest application that describes the claimed subject matter.

I understand that when a challenged claim covers several structures, either generically or as alternatives, the claim is deemed anticipated if any of the structures within the scope of the claim is found in the prior art reference.

I understand that when a challenged claim requires selection of an element from a list of alternatives, the prior art teaches the element if one of the alternatives is taught by the prior art.

Legal Standard for Obviousness

I understand that even if a challenged claim is not anticipated, it is still invalid if the differences between the claimed subject matter and the prior art are such that the claimed subject matter would have been obvious to a person of ordinary skill in the pertinent art at the time the alleged invention.

I understand that, in order for a prior art reference to be proper for use in an obviousness analysis, the reference must be analogous art. I understand that a prior art reference is analogous art if: (1) the reference is from the same field of endeavor as the challenged patent (even if it addresses a different problem); or (2) the reference is reasonably pertinent to the problem faced by the inventor of the challenged patent (even if it is not in the same field of endeavor). I understand that the field of endeavor is determined by reference to explanations of the challenged claims' subject matter in the challenged patent, including the embodiments, functions, and structures of the challenged claims. A prior art reference is "reasonably pertinent" to a problem if it would have logically commended itself to an inventor's attention in considering the problem.

I understand that obviousness must be determined with respect to the challenged claim as a whole.

I understand that one cannot rely on hindsight in deciding whether a claim is obvious.

I also understand that an obviousness analysis includes the consideration of factors such as (1) the scope and content of the prior art, (2) the differences between the prior art and the challenged claim, (3) the level of ordinary skill in the pertinent art, and (4) “secondary” or “objective” evidence of non-obviousness.

Secondary or objective evidence of non-obviousness includes evidence of: (1) a long felt but unmet need in the prior art that was satisfied by the claimed invention; (2) commercial success or the lack of commercial success of the claimed invention; (3) unexpected results achieved by the claimed invention; (4) praise of the claimed invention by others skilled in the art; (5) taking of licenses under the patent by others; (6) deliberate copying of the claimed invention; and (7) contemporaneous and independent invention by others. However, I understand that there must be a relationship between any secondary evidence of non-obviousness and the claimed invention.

I understand that a challenged claim can be invalid for obviousness over a combination of prior art references if a reason existed (at the time of the alleged invention) that would have prompted a person of ordinary skill in the art to combine

elements of the prior art in the manner required by the challenged claim. I understand that this requirement is also referred to as a “motivation to combine,” “suggestion to combine,” or “reason to combine,” and that there are several rationales that meet this requirement.

I understand that the prior art references themselves may provide a motivation to combine, but other times simple common sense can link two or more prior art references. I further understand that obviousness analysis recognizes that market demand, rather than scientific literature, often drives innovation, and that a motivation to combine references may come from market forces.

I understand obviousness to include, for instance, scenarios where known techniques are simply applied to other devices, systems, or processes to improve them in an expected or known way. I also understand that practical and common-sense considerations should be applied in a proper obviousness analysis. For instance, familiar items may have obvious uses beyond their primary purposes.

I understand that the combination of familiar elements according to known methods is obvious when it yields predictable results. For instance, obviousness bars patentability of a predictable variation of a technique even if the technique originated in another field of endeavor. This is because design incentives and other market forces can prompt variations of it, and predictable variations are not the product of innovation, but rather ordinary skill and common sense.

I understand that a particular combination may be obvious if it was obvious to try the combination. For example, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. This would result in something obvious because the result is the product not of innovation but of ordinary skill and common sense. However, I understand that it may not be obvious to try a combination when it involves unpredictable technologies.

It is further my understanding that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill in the art, not just the patentee. Accordingly, I understand that any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

It is my understanding that the Manual of Patent Examining Procedure §2143 sets forth the following as exemplary rationales that support a conclusion of obviousness:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of known technique to improve similar devices (methods, or products) in the same way;

- Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

A person of ordinary skill in the art looking to overcome a problem will often use the teachings of multiple publications together. I understand that obviousness analysis takes into account inferences, creative steps, common sense, and practical logic and applications that a person of ordinary skill in the art would employ under the circumstances.

I understand that a claim can be obvious in light of a single reference, if the elements of the challenged claim that are not explicitly or inherently disclosed in the reference can be supplied by the common sense of one of skill in the art.

I understand that obviousness also bars the patentability of applying known or obvious design choices to the prior art. One cannot patent merely substituting one prior art element for another if the substitution can be made with predictable results.

Likewise, combining prior art techniques that are interoperable with respect to one another is generally obvious and not patentable.

In order for a claim to be found invalid based upon a modification or combination of the prior art, there must be reasonable expectation that a person of ordinary skill would have successfully modified or combined the prior art to arrive at the claimed arrangement. This does not mean that it must be certain that a person of ordinary skill would have been successful—the law only requires that the person of ordinary skill in the art would have perceived a reasonable expectation of success in modifying or combining the prior art to arrive at the claimed invention.

In sum, my understanding is that obviousness invalidates claims that merely recite combinations of, or obvious variations of, prior art teachings using understanding and knowledge of one of skill in the art at the time and motivated by the general problem facing the inventor at the time. Under this analysis, the prior art references themselves, or any need or problem known in the field of endeavor at the time of the invention, can provide a reason for combining the elements of or attempting obvious variations on prior art references in the claimed manner.

Legal Standard for Claim Construction

I understand that before any invalidity analysis can be properly performed, the scope and meaning of the challenged claims must be determined by claim construction.

I understand that a patent may include two types of claims, independent claims and dependent claims. I understand that an independent claim stands alone and

includes only the limitations it recites. I understand that a dependent claim depends from an independent claim or another dependent claim. I understand that a dependent claim includes all the limitations that it recites in addition to the limitations recited in the claim (or claims) from which it depends.

In comparing the challenged claims to the prior art, I have carefully considered the patent and its file history in light of the understanding of a person of skill at the time of the alleged invention.

I understand that to determine how a person of ordinary skill would have understood a claim term, one should look to sources available at the time of the alleged invention that show what a person of skill in the art would have understood disputed claim language to mean. It is my understanding that this may include what is called “intrinsic” evidence as well as “extrinsic” evidence.

I understand that, in construing a claim term, one should primarily rely on intrinsic patent evidence, which includes the words of the claims themselves, the remainder of the patent specification, and the prosecution history. I understand that extrinsic evidence, which is evidence external to the patent and the prosecution history, may also be useful in interpreting patent claims when the intrinsic evidence itself is insufficient. I understand that extrinsic evidence may include principles, concepts, terms, and other resources available to those of skill in the art at the time of the invention.

I understand that words or terms should be given their ordinary and accepted meaning unless it appears that the inventors were using them to mean something else or something more specific. I understand that to determine whether a term has special meaning, the claims, the patent specification, and the prosecution history are particularly important, and may show that the inventor gave a term a particular definition or intentionally disclaimed, disavowed, or surrendered claim scope.

I understand that the claims of a patent define the scope of the rights conferred by the patent. I understand that because the claims point out and distinctly claim the subject matter which the inventors regard as their invention, claim construction analysis must begin with and is focused on the claim language itself. I understand that the context of the term within the claim as well as other claims of the patent can inform the meaning of a claim term. For example, because claim terms are normally used consistently throughout the patent, how a term is used in one claim can often inform the meaning of the same term in other claims. Differences among claims or claim terms can also be a useful guide in understanding the meaning of particular claim terms.

I understand that a claim term should be construed not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the entire specification. I understand that because the

specification is a primary basis for construing the claims, a correct construction must align with the specification.

I understand that the prosecution history of the patent as well as art incorporated by reference or otherwise cited during the prosecution history are also highly relevant in construing claim terms. For instance, art cited by or incorporated by reference may indicate how the inventor and others of skill in the art at the time of the invention understood certain terms and concepts. Additionally, the prosecution history may show that the inventors disclaimed or disavowed claim scope, or further explained the meaning of a claim term.

With regard to extrinsic evidence, I understand that all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises, can also be considered. For example, technical dictionaries may indicate how one of skill in the art used or understood the claim terms. However, I understand that extrinsic evidence is considered to be less reliable than intrinsic evidence, and for that reason is generally given less weight than intrinsic evidence.

I understand that in general, a term or phrase found in the introductory words or preamble of the claim, should be construed as a limitation if it recites essential structure or steps, or is necessary to give meaning to the claim. For instance, I understand preamble language may limit claim scope: (i) if dependence on a

preamble phrase for antecedent basis indicates a reliance on both the preamble and claim body to define the claimed invention; (ii) if reference to the preamble is necessary