

Declaration of Samuel H. Russ, Ph.D. in Support of
Petitioner's Reply to Patent Owner's Response

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOAST, INC.
Petitioner

v.

GRATUITY, LLC
Patent Owner

IPR2023-01408

U.S. Patent No. 9,741,050

Issue Date: August 22, 2017

Title: SYSTEM AND METHOD FOR MANAGING GRATUITIES

**DECLARATION OF SAMUEL H. RUSS PH.D. IN SUPPORT OF
PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE**

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I, Samuel H. Russ, declare as follows:

I. INTRODUCTION AND MATERIALS CONSIDERED

A. Introduction

1. I previously submitted a declaration in support of Petitioner Toast, Inc.'s ("Petitioner") petition for *inter partes* review of U.S. Patent No. 9,741,050 ("050 patent"). *See* Ex. 1002 ("Opening Decl."). I have been asked by Petitioner to provide responses to certain opinions set forth in the Declaration of Professor Ian H.S. Cullimore, Ph.D., in Support of Patent Owner Response to the Decision Granting Institution. *See* Ex. 2006.

2. The statements set forth in this Declaration and in my Opening Declaration are based on my own personal knowledge. I am being compensated at my usual rate, which is \$450 per hour, for the time spent preparing this Declaration, and my compensation is not contingent on the outcome of any matter or any of the opinions provided below. I have no financial interest in this matter.

B. Materials Considered

3. The analysis that I provide in this Declaration is based on my education and experience in point of sale systems, time management systems, and/or restaurant management computer systems, and in networking and client-server architectures, as well as the documents I have considered, including the '050 patent (Ex. 1001) and its prosecution history (Ex. 1008). The '050 patent states on its face that it issued

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from U.S. Application Ser. No. 13/834,466, which was filed on March 15, 2013.

The '050 patent also claims priority from Provisional Application No. 61/696,569, filed on September 4, 2012. (*See* Ex. 1001, face page and 1:7–9.¹) For the purposes of this Declaration, I have assumed September 4, 2012 as the effective filing date for the '050 patent. Below is a cumulative list of the documents that I have cited in my Opening Declaration and in this Declaration:

Exhibit No.	Description of Document
1001	U.S. Patent No. 9,741,050 (the "'050 patent")
1003	Curriculum Vitae of Dr. Samuel H. Russ
1004	U.S. Patent Application Publication No. 2008/0065396 ("Marshall")
1005	U.S. Patent Application Publication No. 2014/0365322 ("Phillips")
1006	U.S. Patent No. 4,819,612 to Webb ("Webb")
1008	Prosecution History of the '050 patent ("prosecution history")
1009	e ^N -Touch 1000 datasheet

¹ For purposes of this Declaration, citations to patents and patent applications, including the '050 patent, are in the form a:bb – c:dd, where "a" and "c" are column numbers, and "bb" and "dd" are line numbers.

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Exhibit No.	Description of Document
1010	Aaron Weiss. "Computing in the clouds," in netWorker, vol. 11, no. 4, pp. 16–25 (December 2007)
1011	R.L. Grossman, "The Case for Cloud Computing," in IT Professional, vol. 11, no. 2, pp. 23–27, March/April 2009
1012	Mahmood, Z., & Hill, R. (Eds.). (2011). Cloud computing for enterprise architectures (2011th ed.). Springer. pp. 3–4.
1013	Minneapolis-based TimeManagement teams with Agilysys, March 3, 2010.
1014	Christina Volpe, "POS Software 2011", Hospitality Technology Newsletter, Dec. 19, 2010. Accessed via https://hospitalitytech.com/pos-software-2011 on Aug. 17, 2023
1015	https://web.archive.org/web/20120506043919/http://www.agilysys.com/home/Hospitality/Solutions/infogenesis_pos.htm
1016	https://web.archive.org/web/20120506082635/http://www.agilysys.com/home/Hospitality/Solutions/SaaS.htm
1017	https://web.archive.org/web/20120506042637/http://www.agilysys.com/home/Hospitality/Solutions/eatec.htm
1018	https://web.archive.org/web/20101226144359/http://agilysys.com/home/Hospitality/Solutions/TMx.htm
1019	https://web.archive.org/web/20120504124828/http://download2.pcamerica.com/info/RPE%20--%20Quick%20Service.pdf
1020	Levine and Van Wijk, Counting on Computers, Chain Store Publishing Company, 1980
1021	Alan Liddle, "Service staffs steamed over proposed Calif. Tip-share law", Nation's Restaurant News, Vol. 38, No. 15, April 12, 2004

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Exhibit No.	Description of Document
1022	Dina Berta, "Operators tip hat to practice of holding gratuities until payday", Nation's Restaurant News, Vol. 38, No. 16, April 19, 2004
1023	D. Brown, Restaurant Manager's Handbook, Atlantic Publishing Group, 3rd Edition, 2003, pp. C16-14 to C16-20.
1026	Barry M. Leiner et al., Brief history of the internet, Internet Society, 1997
1027	https://home.cern/science/computing/birth-web/short-history-web
1028	https://web.archive.org/web/20120506082635/http://www.agilysys.com/home/Hospitality/Solutions/SaaS.htm
1029	https://web.archive.org/web/20120506043142/http://www.agilysys.com/home/Hospitality/Solutions/
1034	Excerpts from Transcript of September 3, 2024 Deposition of Ian H.S. Cullimore, Ph.D. ("Cullimore Dep.")
1036	https://aws.amazon.com/about-aws/
1037	https://techcommunity.microsoft.com/t5/educator-developer-blog/the-history-of-microsoft-azure/ba-p/3574204

4. In addition to the above-referenced documents, I have also reviewed the following documents submitted subsequent to my Opening Declaration:

- Decision Granting Institution of *Inter Partes* Review (Paper 11);

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- Patent Owner's Response to the Board's Decision Granting Institution (Paper 14); and
- Declaration of Professor Ian H.S. Cullimore, Ph.D., in Support of Patent Owner's Response to the Decision Granting Institution (Exhibit 2006).

II. LEVEL OF ORDINARY SKILL IN THE ART

5. I previously stated that, “[1] as to the ’050 patent, a POSITA in September 2012 would have had an undergraduate degree in electrical engineering, computer engineering, computer science, or an equivalent degree with two to three years of experience in point of sale systems, time management systems, and/or restaurant management computer systems, and in networking and client-server architectures. [2] To the extent necessary, a POSITA may collaborate with one or more other persons of skill in another art for one or more aspects with which the other person may have expertise, experience, and/or knowledge that was obtained through his/her own education, industrial, or academic experience.” (Ex. 1002, ¶ 34.)

6. I understand that, for purposes of institution, the Board applied the first part of the level of skill that I set forth above. (Paper 11, 18.) I further understand that, although Patent Owner disagreed with the second part of the level of skill set forth above, the Board noted that its “decision to institute does not rely upon a team

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of skilled artisans, whereby [the Board] need not address this disagreement at the present time.” (*Id.*, 18–19, n.7.) The Board further noted that the proposed level of skill is “consistent with the level of skill at the time of the claimed invention reflected by the ‘050 Patent and the cited prior art references.” (*Id.*, 18.)

7. For the opinions set forth in my Opening Declaration, I provided my opinions from the viewpoint of a POSITA with the level of skill set forth in part [1] above. Thus, similar to the Board's institution analysis, my opinions do not rely on a POSITA consisting of a team of skilled artisans. I further agree with the Board's conclusion that the level of skill it applied is “consistent with the level of skill at the time of the claimed invention reflected by the ‘050 Patent and the cited prior art references.” (*Id.*)

8. I understand that Patent Owner's expert, Dr. Cullimore, set forth the following definition of a POSITA: “In my opinion, a POSITA in this technical field on September 4, 2012, would have had a Bachelor of Science in computer science, computer engineering, electrical engineering, or similar major with at least two years of experience related to research, evaluation, design, development, testing, etc. of computer hardware and software. This definition is approximate, and more experience may substitute for education or vice versa.” (Ex. 2006, ¶ 26.)

9. I further understand that Dr. Cullimore stated the following disagreement with my proposed level of skill for a POSITA: “I disagree with Dr.

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Russ's definition of a POSITA that they would have had 'two to three years of experience in point of sale systems, time management systems, and/or restaurant management computer systems.' This is a specialized area of computer development. I would not expect a POSITA at that juncture in their working life, unless unusually attracted to POS systems and technology, to have focused on that area." (*Id.*, ¶ 27.)

10. Neither Dr. Cullimore (in his Declaration) nor Patent Owner (in the Patent Owner's Response) explains what difference it would make, if any, to the Board's obviousness analysis in these proceedings if the Board were to use (1) the level of skill of a POSITA proposed in my Opening Declaration and applied by the Board in the Institution Decision or (2) the level of skill proposed in the Cullimore Declaration.

11. Having now considered the definition proposed by Dr. Cullimore, it is my opinion that, applying either definition of a POSITA, the claims of the '050 patent would have been obvious to a POSITA for all of the reasons set forth in my Opening Declaration. My opinions that the claims would have been obvious remain the same under either definition of a POSITA because, according to Patent Owner and Dr. Cullimore, the purported point of novelty of the '050 patent was the implementation of a remote, cloud-based gratuity management system (*see, e.g.*, Paper 14, 3), and, as I explained previously, how to implement a cloud-based

architecture and the benefits of such an architecture were well-known by September 2012. (Ex. 1002, ¶¶ 48–56.) Dr. Cullimore also agrees that cloud computing was well-known by that time. (Ex. 1034, 16:13–20.) Accordingly, a POSITA under either definition would have considered and known how to implement computer systems in the cloud.

12. Under either definition of a POSITA discussed above, I am at least a POSITA now and was also at least a POSITA in the 2011–2012 timeframe relevant to this proceeding.

III. RESPONSES TO DR. CULLIMORE'S OPINIONS ON "WHY A POSITA WOULD NOT HAVE FOUND IT OBVIOUS TO DEVELOP A CLOUD-BASED SOLUTION"

13. In paragraph 87 of his Declaration, Dr. Cullimore states: "There are many reasons a POSITA might choose to not combine a cloud-based solution with a POS System[.]" (Ex. 2006, ¶ 87.) While a cloud-based solution may not be the right solution in every situation, in my opinion, the opinions in Dr. Cullimore's Declaration ignore clear evidence that, by September 2012, the use of cloud-based technology was essentially ubiquitous and thus well-known to a POSITA. (Ex. 1002, ¶¶ 48–56.) For example, as noted in my Opening Declaration, articles explaining cloud technology were published in 2007 (*id.*, ¶ 50) and textbooks on the subject were published in 2011 (*id.*, ¶ 52).

14. Notably, the 2011 textbook explicitly lists several known advantages of

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a cloud-based approach, such as reduction in costs, reduction in management responsibilities, and increased business agility and scalability. (Ex. 1002, ¶ 54.) Moreover, the textbook states that “[t]he business and technical advantages offered by the cloud provision are simply enormous, and so, its adoption and adaption [*sic*] are gaining unprecedented attention and acceleration.” (*Id.*; *see also* Ex. 1012, 187.) This textbook recounted the actual experiences of real companies and used those experiences to explain why cloud computing was taking off rapidly (“gaining unprecedented attention and acceleration”) by 2011. (*See generally* Ex. 1012.)

15. Furthermore, by 2012, companies such as Agilysys and pcAmerica were actively selling point-of-sale systems that were cloud-based and/or had a Web portal. (Ex. 1002, ¶¶ 60–65). In fact, Dr. Cullimore states that “[c]loud-based POS system[s] were introduced in the UK *in 2002*, with many of those systems operating on industry-grade touchscreen PCs.” (Ex. 2006, ¶ 42 (emphasis added).) In other words, a cloud-based point-of-sale system was not merely a theoretical possibility in September 2012—companies were selling such systems on the open market at that time and had done so for many years before as well.

16. In paragraph 88 of his Declaration, Dr. Cullimore sets forth two steps that, according to him, would typically have been taken to develop a POS system using a client/server model. (Ex. 2006, ¶ 88.) While I disagree with Dr. Cullimore that he has set forth a “typical technology growth plan for a client/server-based

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system” (*id.*), I note that Dr. Cullimore does not explain anywhere in paragraph 88 why a cloud-based architecture would be undesirable in such a situation. For example, a POSITA in September 2012 would have understood that the hypothetical URL in step b (“www.my-pos-system.com”) (*id.*) could be a URL that “points to” a cloud or could be a reference to a Web server that, in turn, accesses cloud resources.

17. In paragraph 89 of his Declaration, Dr. Cullimore lists four alternatives that a POSITA could have considered as part of “scaling up” a system: in-house servers; an in-house server farm; a rented server farm; and a cloud of servers. (Ex. 2006, ¶ 89.) Dr. Cullimore therefore concedes that using a cloud-based architecture to implement a POS system was a known option to a POSITA in September 2012. I agree with Dr. Cullimore on this point.

18. I disagree, however, with the assertion in paragraph 90 of the Cullimore Declaration that the “transition[] to a Cloud system is far from an obvious choice” (Ex. 2006, ¶ 90), because, as discussed above and in my Opening Declaration, cloud-based systems and their benefits were known well before September 2012. (*See, e.g.,* Ex. 1002, ¶¶ 48–56.)

19. In paragraph 90, Dr. Cullimore identifies five potential reasons why it would not have been obvious to a POSITA to implement a POS system in the cloud. I disagree with each of those purported reasons.

20. *First*, Dr. Cullimore states, “The server code will likely have been

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originally in say C on a Linux server, or Java, or some other server platform development environment.” (Ex. 2006, ¶ 90(1).) I disagree that programming language would have been a reason not to utilize a cloud-based architecture. A POSITA in September 2012 would have been fluent in multiple programming languages. At that time, Java and C# were well-known, and they have very similar syntax to C++. Moreover, Dr. Cullimore's opinion here incorrectly assumes that the only path for a POSITA in 2012 would have been to start with a single server with code written in C for a Linux operating system, only later to change over to C# (or some other equivalent) on a cloud implementation. I disagree with Dr. Cullimore's assumption. Given that cloud technology had many known advantages and was widely used prior to September 2012, a POSITA seeking to implement a POS system would be unlikely to begin with a single-server implementation knowing that cloud technology was readily available.

21. *Second*, Dr. Cullimore states, “This will have to be ported to a Cloud-system, such as Amazon's AWS, or Microsoft Azure.” (Ex. 2006, ¶ 90(2).) As noted above, I disagree with the assumption that a POSITA necessarily would have started with a single-server architecture and then transitioned to a cloud-based architecture later. Again, cloud technology was well-known by 2012, so it would have been well within the skill of a POSITA to begin implementing a POS system using a cloud-based architecture. Additionally, Dr. Cullimore's references to

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Amazon AWS (launched in 2006 (*see* Ex. 1036)) and Microsoft Azure (first introduced in 2008 (*see* Ex. 1037)) indicate that cloud technology was mature and known by 2012.

22. *Third*, Dr. Cullimore states: “This means probably ‘ripping up’ the original code and starting again, which is time consuming. Cloud-based systems tend to use large scale server-centric programming systems, such as Java, C#, and extensive and rich APIs (Application Programming Interfaces) such as AWS or Azure - such architectures have large numbers of new APIs to master. It would take significant effort to ‘port’ to new platforms.” (Ex. 2006, ¶ 90(3).) This opinion is again based on the incorrect assumption that a POSITA would need to start with a single-server architecture before later porting the system over to the cloud. Moreover, I disagree that it would take “significant effort” for a POSITA to learn how to use APIs for cloud servers such as AWS or Azure. APIs are specifically designed to make it easier for programmers to use the underlying technology. A POSITA would have been capable of designing a cloud-based system using known APIs such as for AWS or Azure.

23. *Fourth*, Dr. Cullimore states: “There’s sometimes a paranoia amongst software developers as to what’s really going on at the Cloud platform – is the code and data secure? How do I know it’s not being copied? Can I trust the reporting statistics (Service Level Agreements etc)? Where are the servers physically located?

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Are they safe and secure?" (Ex. 2006, ¶ 90(4).) Security concerns will almost always be taken into consideration when implementing systems connected to the Internet. However, in my opinion, this says nothing about whether a POSITA would have been capable of implementing a cloud-based POS system. It also ignores all the benefits of cloud-based systems that were already known by 2012.

24. Dr. Cullimore's opinion also ignores the fact that, while cloud systems can cause security concerns, it is equally true that a single company-owned server causes security concerns. A POSITA would understand that servers are natural security holes—they are expressly designed to be contacted by clients from outside the company (e.g., over the Internet). In fact, based on my knowledge and experience, single company-maintained servers actually have less security (generally speaking) because their security is at the mercy of a small number of IT professionals. Cloud systems are well-known for better security simply because they are maintained by a large staff of professionals.

25. *Fifth*, Dr. Cullimore states: "Also, a POSITA might be anxious that taking the decision to port to a Cloud-based system might backfire and be detrimental to the company. For instance, the development, testing and roll-out of such a system would likely be time-consuming, costly, and at risk of failing (or at least not working as well as expected at first). There would have to be financial and engineering justification for 'junking' existing systems which the company had put

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time, effort and money in to developing. The business and financial models for an in-house server-based system and a Cloud-based one would need to be examined and discussed by various departments in the company. There might be unknown financial implications of switching to the financial costing models as defined by the Cloud provider, such as Amazon or Microsoft. Indeed, such a major development direction switch would likely need senior management or even Board level decisions. The company's legal department would have to be called in to review Service Level Agreement.” (Ex. 2006, ¶ 90(5).)

26. In this opinion, Dr. Cullimore ignores the fact, by September 2012, a large number of companies had already made the decision to “junk” existing systems to take advantage of the clear cost, security, and scalability benefits of cloud computing. For example, a company's management knows that one of the worst things a company can do is to fail to scale. A company can start off with (for example) good customer service that deteriorates as the number of customers increases. One major advantage of cloud computing is that it scales quite well—it grows as the company grows. (*See* Ex. 1012, 22–23.) Moreover, none of Dr. Cullimore's opinions here demonstrate that it would not have been obvious to a POSITA to implement a cloud-based POS system; such an implementation would have been well within the technical skill of a POSITA.

27. In sum, by September 2012, numerous companies had rushed to cloud

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computing because of clear advantages (e.g., reduction in costs, reduction in management responsibilities, and increased business agility and scalability). Accordingly, Dr. Cullimore's assertions that companies would fear cloud computing make little sense given that the popularity of cloud computing was already so well documented by that time. Similarly, Dr. Cullimore's opinions that a POSITA would not find it obvious to implement a point-of-sale system using a cloud-based infrastructure are not credible given that companies were already implementing such systems in September 2012 and years prior.

IV. CONCLUSION

28. It remains my opinion, based on my review of the '050 patent, the materials referenced herein and in the Opening Declaration, and my knowledge of what a person of ordinary skill in the art would have known at and before the '050 patent's priority date about the technology at issue, a POSITA would have understood all of the limitations of challenged claims 1–13 to be disclosed or rendered obvious by the prior art for the reasons described above.

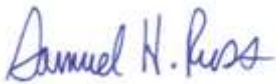
29. Accordingly, it is my opinion that challenged claims 1–13 should be found unpatentable.

30. Furthermore, I reserve the right to supplement my opinions in the future to respond to any arguments or positions that the Patent Owner may raise, taking account of new information as it becomes available to me.

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31. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further 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 12, 2024 at Mobile, Alabama.



Dr. Samuel H. Russ