UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Canon Inc. *et al.*,

Petitioners

v.

Papst Licensing GmbH & Co., KG,

Patent Owner

CASE: Unassigned

Patent No. 8,504,746

DECLARATION OF DR. PAUL F. REYNOLDS, Ph.D.
IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW

I, Dr. Paul F. Reynolds, Ph.D., declare as follows:

I. BACKGROUND AND QUALIFICATIONS

1. From 1980 until August 2012, I was a Professor of Computer Science at the University of Virginia's School of Engineering and Applied Science.

2. I have also served, and in some cases continue to serve, as an expert consultant on distributed system matters for MITRE, Aerospace Corporation, the Institute for Defense Analyses, Vanguard Research and currently for the U.S. Army National Ground Intelligence Center.

3. I have a Bachelor of Arts degree in Psychology from Ohio Northern University that I obtained in 1970, a Master's of Science in Computer Science from the University of Texas at Austin, obtained in 1975, and a Doctor of Philosophy in Computer Science from the University of Texas at Austin, obtained in 1979. Both my Masters and Ph.D. focused on parallel and distributed systems and networking topics.

4. During my time as a Professor, I was awarded over 60 grants, and conducted research sponsored by DARPA, the National Science Foundation, DUSA (OR), the National Institute for Science and Technology, the Defense Modeling and Simulation Office, Virginia Center for Innovative Technology and numerous industries.

5. I taught many Ph.D. level classes on topics relating to distributed computing and high performance networking. I have advised, to completion, 65 graduate degrees. The majority of my students, including my 16 Ph.D. students, conducted research in distributed computing and networking. I published on many of these topics.

6. Since the mid-1970s, almost half of my research has been in the field of parallel and distributed systems and networking.

7. In particular, much of my research in the 1980's and 1990's was focused on efficient time management of distributed simulations. I published widely on the topic, and was actively involved in the deployment of related technologies within the Department of Defense (DoD) modeling and simulation communities.

8. Specifically, I was one of the originators of the DoD High Level Architecture for distributed simulations (IEEE standard 1516). I was also an organizer and overseer for the DoD Joint National Test Facility (having a focus on distributed simulation) in Colorado Springs.

9. Because of my experience, I was selected to be the program chair for the IEEE Parallel and Distributed Simulation Conference on two different occasions.

10. I am also the co-architect of Isotach Networks, a system which guarantees message delivery order in distributed systems without employing real time clocks and supports very efficient management of consistency in concurrent caches. Isotach Networks was supported by both the National Science Foundation and the Defense Advanced Research Projects Agency and became subject material in four of the Ph.D. dissertations I supervised.

11. Below is a partial list of my publications:

- Spiegel, M., Reynolds, P.F., "Lock-Free Multiway Search Trees," ACM/IEEE International Conference on Parallel Processing, Sept., 2010.
- Highley, T.J., Reynolds, P.F., and Vellanki, V. "Marginal Cost-Benefit Analysis for Predictive File Prefetching," ACM Southeast Conference, March, 2003
- Srinivasa, R., Reynolds, P.F., and Williams, C., "A New Look at Time-Stamp Ordering Concurrency Control," 12th International Conference on Database and Expert Systems Applications - DEXA 2001, Sept., 2001.
- Williams, C., Reynolds, P.F., and de Supinski, B.R. "Delta Coherence Protocols," IEEE Concurrency, Spring, 2000.
- Srinivasa, R., Reynolds, P.F., and Williams, C. "IsoRule: Parallel Execution of Rule-based Systems," 1999 Int'l Conference on Parallel Processing, June 1999.
- Srinivasan S., and Reynolds, P.F. "Elastic Time," ACM Trans on Modeling and Computer Simulation, 1998.
- Srinivasan, S., Lyell, M., Wehrwein, J., Reynolds, P.F., "Fast Reductions on a Network of Workstations," 1997 International Conference on High Performance Computing (HiPC97), Bangalore, India, Dec., 1997.
- Williams, C., and Reynolds, P.F. "Isotach Networks," IEEE Transactions on Parallel and Distributed Systems, 1997.

- Williams, C., and Reynolds, P.F., "Combining Atomic Actions," Journal of Parallel and Distributed Computing, pp. 152-163, Feb., 1995.
- Srinivasan, S. and Reynolds, P.F., "Non-Interfering GVT Computation via Asynchronous Global Reductions," Proceedings of ACM Winter Simulation Conference, pp. 740-749, Dec., 1993.
- Reynolds, P.F., Pancerella, C., and Srinivasan, S., "Design and Performance Analysis of Hardware Support for Parallel Simulation," Journal of Parallel and Distributed Computing, pp. 435-453, Aug., 1993.
- Pancerella, C. and Reynolds, P.F., "Disseminating Critical Target-Specific Synchronization Information in Parallel Discrete Event Simulations," Proceedings of the 7th Workshop on Parallel and Distributed Simulation, pp. 52-59, May, 1993, San Diego, CA.
- Williams, C., and Reynolds, P.F., "Network-Based Coordination of Asynchronously Executing Processes with Caches," Workshop on Fine-Grain Massively Parallel Coordination, 4 pages, May, 1993, San Diego, CA.
- Reynolds, P.F., Pancerella, C. and Srinivasan, S. "Making Parallel Simulations Go Fast," Proceedings of the 1992 ACM Winter Simulation Conference, pp. 646-656, Dec., 1992.
- Reynolds, P.F., "An Efficient Framework for Parallel Simulation," International Journal on Computer Simulation, 2, 4, pp. 427-445 (1992).
- Nicol, D.M., and Reynolds, P.F., "Optimal Dynamic Remapping of Parallel Computations," IEEE Transactions on Computer Systems, pp. 206-219 (Feb., 1990).
- Reynolds, P.F., "Heterogeneous Distributed Simulation," Proceedings of the 1988 ACM Winter Simulation Conference, pp. 206-209, Dec., 1988, San Diego, CA.
- Reynolds, P.F., "A Spectrum of Options for Parallel Simulation," Proceedings of the 1988 ACM Winter Simulation Conference, pp. 325-332, Dec., 1988, San Diego, CA.
- Carson, S.D. and Reynolds, P.F., "The Geometry of Semaphore Programs," ACM Transactions on Programming Languages and Systems, 9, 1, pp. 25-53 (Jan., 1987).

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