

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT TRIAL & APPEAL BOARD**

In re Patent of: Geoffrey B. Hoese *et al.*
U.S. Patent No.: 7,051,147
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Appl. No.: 10/658,163
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Title: Storage Router and Method for Providing Virtual Local Storage

DECLARATION OF PROFESSOR JEFFREY S. CHASE, Ph.D.

I, Prof. Jeffrey S. Chase, Ph.D., declare as follows:

I. Background and Qualifications

(1.) My name is Jeffrey S. Chase. I am a Professor at Duke University in the Computer Science Department. I have studied and practiced in the field of computer science for over 30 years, and have taught Computer Science at Duke since 1995.

(2.) I received my Doctor of Philosophy (Ph.D.) degree in the field of Computer Science from the University of Washington in 1995. I received my Masters of Science (M.S.) degree in Computer Science from the University of Washington and my Bachelor of Arts (B.A.) degree in Mathematics and Computer Science from Dartmouth College.

(3.) Before and during graduate school, I worked as a software design engineer at Digital Equipment Corporation, developing operating system kernel functionality for storage systems and network storage. During the period 1985-

1992, I helped develop the Network File System software for Digital's Unix operating system, was the lead developer for file storage elements of Digital's first multiprocessor Unix kernel, and was a kernel engineer for a hierarchical storage system product.

(4.) Upon receiving my Ph.D. degree, I joined the faculty of Duke University in the Department of Computer Science as an Assistant Professor. As a professor I teach undergraduate and graduate courses in operating systems, distributed systems, and networking. I have also participated in a number of industry collaborations. For example, during the 2003-2004 academic year, I worked as a visiting scholar at Hewlett-Packard Laboratories, resulting in two patents directed towards the design of storage systems. Other industry appointments include a collaborative project in 1996 with AT&T Corporation (resulting in U.S. Patent No. 5,944,780 entitled "Network with Shared Caching") and in 2001 with a group at IBM Corporation (resulting in U.S. Patent No. 6,785,794 entitled "Differentiated Storage Resource Provisioning") as well as additional collaborations with IBM resulting, to date, in six additional patents. All of these collaborations and patents involved managing services that provide storage to multiple client hosts over a network.

(5.) I have supervised the research of 12 Ph.D. dissertations in the field of Computer Science, and along with my graduate students, published over 100 peer-

reviewed technical publications in scientific journals or conferences in the field of Computer Science. In addition to Ph.D. dissertations, I have also supervised the research of 20 graduate students who earned Master's degrees at Duke.

(6.) In addition to classroom and research activities, I give external presentations each year relating to networked systems and network storage. In 1999, I received an invitation to present in a special session on network storage at the 1999 IEEE Symposium on High-Performance Interconnects. I have served on the editorial program committee for the leading annual academic conference on storage systems (Symposium on File and Storage Technologies or FAST) multiple times and chaired the FAST conference in 2003, and have had similar roles in dozens of other related academic venues.

(7.) As part of my research, I have developed new techniques for accessing remote storage devices through high-speed networks, and for managing virtual storage within networked storage arrays, similar to the goals of U.S. Patent No. 7,051,147 ("the '147 patent"). An exemplary list of publications relevant to this topic, which also highlight my familiarity with the concept of managing virtual local storage within storage networks (*i.e.* the underlying concept of the '147 patent) is provided below. These papers are limited to the period from the mid-1990s and up to 2002, and are in reverse chronological order.

K. Magoutis, S. Addetia, A. Fedorova, M. Seltzer, J. Chase, A. Gallatin, R. Kisley, R. Wickremesinghe, and E. Gabber. **Structure and Performance of the Direct Access File System**. In *2002 USENIX Annual Technical Conference*. June 2002. *Best paper award*. Acceptance ratio: 25/105.

K. Yocum and J. Chase. **Payload Caching: High-Speed Data Forwarding for Network Intermediaries**. In the *2001 USENIX Technical Conference*, June 2001. Acceptance ratio for *USENIX-01*: 24/82.

D. Anderson, J. Chase, and A. Vahdat. **Interposed Request Routing for Scalable Network Storage**. In the *Fourth ACM/USENIX Symposium on Operating System Design and Implementation (OSDI)*, October 2000. Acceptance ratio for *OSDI-2000*: 24/111. *Award paper*.

D. Anderson and J. Chase. **Failure-Atomic File Access in an Interposed Network Storage System**. In the *Ninth IEEE International Symposium on High Performance Distributed Computing (HPDC-9)*, August 2000. Acceptance ratio for *HPDC-9*: 32/103

J. Chase, D. Anderson, A. Gallatin, A. Lebeck, and K. Yocum. **Network I/O with Trapeze**. In the 1999 IEEE Symposium on High-Performance Interconnects (Hot Interconnects-7), August 1999. Invited for a special session on network storage.

G. Voelker, T. Kimbrel, M. Feeley, A. Karlin, J. Chase, H. Levy. **Implementing Cooperative Prefetching and Caching in a Globally-Managed Memory System**. In Proceedings of the 1998 ACM Conference on Performance Measurement, Modeling, and Evaluation (SIGMETRICS), June 1998. Acceptance ratio for SIGMETRICS-98: 25/135.

D. Anderson, J. Chase, S. Gadde, A. Gallatin, K. Yocum, M. Feeley. **Cheating the I/O Bottleneck: Network Storage with Trapeze/Myrinet**. In *Proceedings of the 1998 USENIX Technical Conference*, June 1998. Acceptance ratio for *USENIX-98*: 23/87.

K. Yocum, J. Chase, A. Gallatin, and A. Lebeck. **Cut-Through Delivery in Trapeze: An Exercise in Fast Messaging**. In *Proceedings of the Sixth IEEE International Symposium on High Performance Distributed Computing (HPDC-6)*, August 1997. Acceptance ratio for *HPDC-97*: 36/76. (10 pages).

(8.) I am involved with several professional organizations including memberships in both the Association for Computing Machinery (ACM) and USENIX.

(9.) A copy of my latest *curriculum vitae* (C.V.) is attached to this declaration as Appendix A.

II. Description of the Relevant Field and the Relevant Timeframe

(10.) I have carefully reviewed the '147 patent.

(11.) For convenience, all of the information that I considered in arriving at my opinions is listed in Appendix B.

(12.) Based on my review of these materials, I believe that the relevant field for purposes of the '147 patent is virtual local storage provided on remote storage devices using a storage router. I have been informed that the relevant timeframe is on or before December 31, 1997.

(13.) As described in Section I above, I have extensive experience in computer science, networking, and storage systems. Based on my experience, I have a good understanding of the relevant field in the relevant timeframe.

III. The Person of Ordinary Skill in the Relevant Field in the Relevant Timeframe

(14.) I have been informed that “a person of ordinary skill in the relevant field” is a hypothetical person to whom an expert in the relevant field could assign a routine task with reasonable confidence that the task would be successfully

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