UNITED STATES DISTRICT COURT

WESTERN DISTRICT OF WASHINGTON

AT SEATTLE

SRC LABS LLC and SAINT REGIS MOHAWK TRIBE, Plaintiff, v. MICROSOFT CORPORATION, Defendants.	Case No. 2:18-cv-00321-JLR **DECLARATION OF DR. HENRY HOUH IN SUPPORT OF DEFENDANT'S CLAIM CONSTRUCTION POSITIONS**

I, Henry H. Houh, Ph.D., do hereby declare as follows under penalty of perjury under the laws of the State of Washington and the United States:

I. INTRODUCTION

1. I, Dr. Henry Houh, am over eighteen years of age, and I am competent to testify as to the matters set forth herein if I am called upon to do so.

2. I have been engaged by Microsoft Corporation ("Microsoft") to provide expert analysis testimony in the above-captioned matter. In particular, I have been asked to provide my opinions on the proper construction of certain claim terms recited in U.S. Patent Nos. 6,247,110 ("110 Patent"); 6,076,152 ("152 Patent"); 7,225,324 ("324 Patent"); 7,620,800 ("800 Patent"),

6,434,687 (“687 Patent”); and 7,421,524 (“524 Patent”) (*i.e.*, “the Patents-in-Suit”). I have also been asked to provide my opinions on the qualifications of a person of ordinary skill in the art at the time of the inventions claimed in the Patents-in-Suit.

3. In reaching my opinions, I have reviewed the documents cited herein and relied on my many years of knowledge and experience in the field of information retrieval (outlined in Section II). I am being compensated at a rate of $620 per hour for my study and other work in this matter. I am also being reimbursed for reasonable and customary expenses associated with my work and testimony in this investigation. My compensation is not contingent on the outcome of this matter or the specifics of my testimony.

II. BACKGROUND AND EXPERIENCE

4. My professional career has spanned more than 25 years. As set forth in my curriculum vitae, a copy of which is submitted as Attachment 1, during these years I have gained extensive experience in computer system and networking architectures, including the design and use of reconfigurable logic in such systems.

5. I received a Ph.D. in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology (“MIT”) in 1998. I also received a Master of Science degree in Electrical Engineering and Computer Science in 1991, a Bachelor of Science Degree in Electrical Engineering and Computer Science in 1989, and a Bachelor of Science Degree in Physics in 1990, all from MIT.

6. As an undergraduate student, I had a strong interest in digital design and computer architecture. The core EECS course on Computer Architecture, also known as 6.004 Computation Structures, involved building a microcoded computer from discreet components and programming the microcoded instructions through a series of lab projects. The final optional lab project was to optimize the hardware and/or software of the computer. My hardware and software optimizations produced a speed up of roughly thirty times faster for executing the benchmark programs. Based on the results of the final project, I was invited to become a laboratory teaching assistant (lab TA)

for the class, and I also secured an Undergraduate Research Opportunities Program (UROP) with the course professor, Steve Ward, as part of the Computer Architecture Group (CAG) in the Laboratory for Computer Science. I later became the head lab TA for 6.004, and I revised and rewrote some of the lab assignments. During the second half of my senior year, I was admitted to the graduate school at MIT and I became a full course TA for 6.004, a role only graduate students were allowed to undertake. I was a TA for 6.004 three times, and was the head TA the final time. 6.004 was a required class for all undergraduate electrical engineering and computer science students. The topics taught in 6.004 included computer architecture, interpreters, data path details, symbolic microcoding, vertical vs horizontal microcoding, microarchitecture, addressing modes, RISC vs CISC, machine language, assemblers, microinterpreter organization and data structures, memory organization, bus and communication protocols, multi-level memories, cache organization and coherence, virtual memory, memory mapping, memory protection, operating systems, pipelined machines, and multiprocessors.

7. During my graduate studies, my thesis research focused on communications and data networking. To fulfill my course requirements for a Ph.D, I took graduate courses in communications networks, optical communications, digital signal processing, and data networking, among others.

8. As part of my doctoral research at MIT from 1991-1998, I worked as a research assistant in the Telemedia Network Systems ("TNS") group at the Laboratory for Computer Science. The TNS group built a high-speed gigabit ATM interconnect network and applications which ran over the network, such as remote video capture (including audio), processing and display on computer terminals. I helped design the core network components (such as the ATM switch), and I designed and built the high speed ATM links, and designed and wrote the device drivers for the host interface cards.

9. I designed several versions of the host interface card to connect our workstations to our high speed network. Each host interface card connected to the computer's peripheral bus, specifically the DEC TURBOchannel bus, used in the DEC 3000 and 5000 Alpha workstations.

Each board used Programmable Array Logic for the control logic. The initial version of the host interface operated in programmed I/O mode, where the CPU polled the board and initiated all the data reads and writes from/to the host interface card. The next version of the host interface was a DMA bus master, and could transfer data directly into system memory without intervention of the CPU.

10. Interconnection of various endpoints in our networking system required the setup of end-to-end virtual circuits which required, for each switch in the connection path, the switch's header remapping tables to be configured for each virtual circuit required. I developed and implemented our system's protocol of controlling the content of these tables and the overall circuit setup.

11. I also set up the group's web server, which at the time was one of the first several hundred web servers in existence. The TNS group was the first group to initiate a remote video display over the World Wide Web. Vice President Al Gore visited our group in 1996 and received a demonstration of – and remotely drove – a radio controlled toy car with a wireless video camera mounted on it; the video was encoded by TNS-designed hardware, streamed over the TNS-designed network and displayed using TNS-designed software.

12. I authored or co-authored twelve papers and conference presentations on our group's research. I also co-edited the final report of the gigabit networking research effort with Professor David Tennenhouse and Senior Research Scientist David Clark. David Clark is generally considered to be one of the fathers of the Internet Protocol and served as Chief Protocol Architect for the Internet. With its focus on networking, the group, including myself, set up and maintained the network and computer systems. These systems included the networking on the workstations and desktops, the distributed file system, desktops and workstations, setting up and maintaining the distributed file system (Network File System) and the authentication system (Network Information Service, formerly known as Yellow Pages). Our system allowed users to log into any of the group's workstations using their username/password, which allowed that all of the user's files would be virtually mounted on that workstation as a networked home directory.

13. I defended and submitted my Ph.D. thesis, titled "Designing Networks for Tomorrow's Traffic," in January 1998. As part of my thesis research, I analyzed local-area and wide-area flows to show a more efficient method for routing packets in a network, based on traffic patterns at the time. My thesis also addressed real-time streamed audio and video. The network traffic that I analyzed was IP protocol traffic, including UDP and TCP.

14. From 1997 to 1999, I worked at NBX Corporation, which was acquired by 3Com Corporation in 1999. During this time, I was a Senior Scientist and Engineer working in IP Telephony. NBX delivered the world's first fully featured business telephone system to run over a data network, the NBX100. NBX was one of the first business phone systems to be configurable via a web interface. Users and administrators had access to varying levels of configuration for the phone system.

15. As part of my work at NBX, I designed the core audio reconstruction algorithms for the telephones which depacketized the voice data and reconstructed the audio. In addition, I designed the voice data packet transmission algorithms. I created a system to capture and analyze network packets sent by devices in the NBX system for aid in testing and debugging. I also designed and validated the core packet transport protocol used by the phone system, used for every command instruction sent throughout the NBX system. In addition, I designed and oversaw the development of the underlying transport protocol used by the NBX100 phone system for reliable packet transport. That transport protocol was used by the NBX100 system and its successor. I wrote NBX's first demonstration IP software stack, which added the capability for utilizing the NBX100 phone system on an IP network. NBX first demonstrated a phone in the NBX100 system working over the Internet in 1998 at a trade show in Las Vegas. I was later the lead architect in designing NBX's next-generation highly scalable system, and, after NBX was acquired by 3Com, I did some work with 3Com's cable equipment division, including demonstrating a working NBX IP phone system over 3Com's cable equipment infrastructure using an early version of DOCSIS at a trade show in 1999. The NBX100 was the market's leading business phone system to run on a data network for several years following its introduction. During that time, I became more

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