UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORTINET INC.,
Petitioner,

v.

BT AMERICAS INC.,
Patent Owner.

Case IPR2019-01324
Patent 7,895,641

DECLARATION OF BRUCE SCHNEIER IN SUPPORT OF BT AMERICAS INC.'S PRELIMINARY RESPONSE UNDER 35 U.S.C. §313 AND 37 C.F.R. §42.107(a)

1. My name is Bruce Schneier and I am the first-named inventor on United States Patent Nos. 7,159,237 and 7,895,641 (respectively, the " '237 and '641 patents").

2. I am a well-known security technologist. I am currently a fellow at the Berkman Klein Center for Internet and Society at Harvard University, a Lecturer in Public Policy at the Harvard Kennedy School, a board member of the Electronic Frontier Foundation, and the Tor Project, an advisory board member of EPIC and VerifiedVoting.org, and the chief security architect at Inrupt, Inc. In addition to the hundreds of articles, essays, and academic articles I have written that relate to cybersecurity, I also author a newsletter and blog (Schneier on Security) that is read by over 250,000 people. A copy of a current CV, which I have reviewed and is accurate, is attached as Exhibit A.

3. In the summer of 1999, my partner Tom Rowley and I formed Counterpane Internet Security, Inc., a managed security monitoring service. Counterpane's successful implementation of technology described in the '237 and '641 patents spawned an entirely new product category -- called Managed Security

Monitoring -- which has since come to be a very large commercial space.

4. Jon Callas and Andrew Gross, both of whom are named as co-inventors in the '237 and '641 patents, were among the first people hired by Counterpane. Both were talented and knowledgeable experts in network security even at the time Counterpane hired them.

5. The systems architecture and method of operation described in the '237 and '641 patents, including the source code for the software, was being developed and operated as we wrote the patent application that resulted in the '237 and '641 patents.

6. That architecture and those methods of operation, including the analysis of residual status data to identify potential security events for further analysis, was built, operated and offered as a managed security service for customers in and after the year 2000. That business was quite successful, and built upon the technology described in the '237 and '641 patents.

7. As a result of Counterpane's success, BT became interested in Counterpane, and acquired the company in 2006.

8. I continued to work at Counterpane after its acquisition by BT until

2012. At the time I left the company to pursue other interests, BT/Counterpane was still operating a successful business built upon technology described in the '237 and '641 patents.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Dated: 26 August 2019

Bruce Schneier

EXHIBIT A

Bruce Schneier

Contact: schneier@schneier.com

Background

Bruce Schneier is an internationally renowned security technologist, called a security guru by the *Economist*. He is the author of 14 books—including the *New York Times* best-seller *Data and Goliath: The Hidden Battles to Collect Your Data and Control Your World*—as well as hundreds of articles, essays, and academic papers. His influential newsletter Crypto-Gram and blog Schneier on Security are read by over 250,000 people. Schneier is a fellow at the Berkman Klein Center for Internet and Society at Harvard University, a Lecturer in Public Policy at the Harvard Kennedy School, a board member of the Electronic Frontier Foundation and the Tor Project, and an advisory board member of EPIC and VerifiedVoting.org. He is also a special advisor to IBM Security and the Chief Technology Officer of IBM Resilient.

Professional Experience

2016+, Chief Technology Officer, IBM Resilient (formerly Resilient: an IBM Company) and special advisor to IBM Security, Cambridge, MA.

2014–2016, Chief Technology Officer, Resilient Systems, Inc. (formerly called Co3 Systems, Inc.), Cambridge, MA.

2006–2013, Chief Security Technology Officer, British Telecom, London, UK.

1999–2006, Chief Technology Officer, Counterpane Internet Security, Inc., Cupertino, CA.

1993–1999, President, Counterpane Systems, Oak Park, IL and Minneapolis, MN.

1991–1993, Member of Technical Staff, AT&T Bell Labs., Schaumburg, IL.

1990, Director of Operations, Intelligent Resources Information Systems, Inc., Chicago, IL.

1987–1990, Program Manager, Space and Naval Warfare Systems Command, Arlington, VA.

1984–1987, Electronics Engineer, Naval Electronics Systems Security Engineering Center, Washington, DC.

Academic Experience

2016+, Lecturer, John F. Kennedy School of Government, Harvard University.

2016+, Research Fellow in the Science, Technology, and Public Policy program at the Belfer Center for Science and International Affairs, Kennedy School of Government, Harvard University.

2013+, Fellow, Berkman Klein Center for Internet and Society, Harvard University.

Board Membership

2016+, Board Member, Tor Project, Cambridge, MA.

2013+, Board Member, Electronic Frontier Foundation, San Francisco, CA.

2004–2013, Board Member, Electronic Privacy Information Center, Washington DC.

Education

M.S. Computer Science, American University, 1986.

B.S. Physics, University of Rochester, 1984.

Books

Click Here to Kill Everybody: Security and Survival in a Hyper-connected World, WW Norton & Company, forthcoming September 2018.

Data and Goliath: The Hidden Battles to Capture Your Data and Control Your World, WW Norton & Company, 2015.

Carry On: Sound Advice from Schneier on Security, John Wiley & Sons, 2013.

Liars and Outliers: Enabling the Trust that Society Needs to Thrive, John Wiley & Sons, 2012.

Cryptography Engineering (with Niels Ferguson and Tadayoshi Kohno), John Wiley & Sons, 2010.

Schneier on Security, John Wiley & Sons, 2008.

Beyond Fear: Thinking Sensibly about Security in an Uncertain World, Copernicus Books, 2003.

Practical Cryptography (with Niels Ferguson), John Wiley & Sons, 2003

Secrets & Lies: Digital Security in a Networked World, John Wiley & Sons, 2000.

The Electronic Privacy Papers: Documents on the Battle for Privacy in the Age of Surveillance (with David Banisar), John Wiley & Sons, 1997.

Applied Cryptography, Second Edition, John Wiley & Sons, 1996.

The Twofish Encryption Algorithm (with John Kelsey, Doug Whiting, David Wagner, Chris Hall, and Niels Ferguson), John Wiley & Sons, 1996.

E-Mail Security, John Wiley & Sons, 1995

Protect Your Macintosh, Peachpit Press, 1994

Applied Cryptography, John Wiley & Sons, 1994.

Academic Publications

H. Farrell, B. Schneier, "Common-Knowledge Attacks on Democracy," Berkman Klein Center Research Publication No. 2018-7, October 2018.

T. Herr, B. Schneier, and C. Morris, "Taking Stock: Estimating Vulnerability Rediscovery," July 2017 (revised October 2017).

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S. Shackelford, B. Schneier, M. Sulmeyer, A. Boustead, B. Buchanan, A. Craig, T. Herr, and J. Z. Malekos Smith, "Making Democracy Harder to Hack: Should Elections Be Classified as 'Critical Infrastructure'?," *University of Michigan Journal of Law Reform*, 2017, to appear.

J. Quinn and B. Schneier, "A Proportional Voting System for Awards Nominations Resistant to Voting Blocs," *Voting Matters*, n. 31, to appear.

B. Schneier, K. Seidel, S. Vijayakumar, "A Worldwide Survey of Encryption Products," Berkman Center Report, February 11, 2016.

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H. Abelson, R. Anderson, S. M. Bellovin, J. Benaloh, M. Blaze, W. Diffie, J. Gilmore, M. Green, S. Landau, P. G. Neumann, R. L. Rivest, J. I. Schiller, B. Schneier, M. Specter, D. J. Weitzner, "Keys Under Doormats: Mandating Insecurity by Requiring Government Access to All Data and Communications," *Journal of Cybersecurity*, November 2015.

B. Schneier, M. Fredrikson, T. Kohno, T. Ristenpart, "Surreptitiously Weakening Cryptographic Systems," *Cryptology ePrint Archive* Report 2015/097, 2015.

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B. Schneier, "Schneier on Security: Privacy and Control," *Journal of Privacy and Confidentiality*, v.2, n.1, pp. 3–4, 2010.

N. Ferguson, S. Lucks, B. Schneier, D. Whiting, M. Bellare, T. Kohno, J. Callas, J. Walker, "The Skein Hash Function Family," version 1.2, September 15, 2009.

M. Bellare, T. Kohno, S. Lucks, N. Ferguson, B. Schneier, D. Whiting, J. Callas, J. Walker, "Provable Security Support for the Skein Hash Family," April 29, 2009.

A. Czeskis, D. J. St. Hilaire, K. Koscher, S. D. Gribble, T. Kohno, and B. Schneier, "Defeating Encrypted and Deniable File Systems: TrueCrypt v5.1a and the Case of the Tattling OS and Applications," 3rd Usenix Workshop on Hot Topics in Security, 2008.

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N. Ferguson and B. Schneier, "A Cryptographic Evaluation of IPsec," December 2003.

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J. Katz and B. Schneier, "A Chosen Ciphertext Attack against Several E-Mail Encryption Protocols," 9th USENIX Security Symposium, 2000.

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J. Kelsey and B. Schneier, "Minimizing Bandwidth for Remote Access to Cryptographically Protected Audit Logs," *Second International Workshop on the Recent Advances in Intrusion Detection* (RAID '99), September 1999.

B. Schneier, "Inside Risks 110: Biometrics: Uses and Abuses," *Communications of the ACM*, vol 42, n 8, August 1999.

C. Hall, I. Goldberg, and B. Schneier, “Reaction Attacks Against Several Public-Key Cryptosystems,” *Proceedings of Information and Communication Security*, ICICS’99, Springer-Verlag, 1999, pp. 2–12.

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B. Schneier, J. Kelsey, D. Whiting, D. Wagner, C. Hall, and N. Ferguson, “Performance Comparison of the AES Submissions,” Second AES Candidate Conference, April 1999.

D. Whiting, N. Ferguson, and B. Schneier, “Cryptanalysis of FROG,” Second AES Candidate Conference, April 1999.

J. Kelsey, B. Schneier, and D. Wagner, “Key Schedule Weakness in SAFER+,” Second AES Candidate Conference, April 1999.

J. Kelsey, B. Schneier, and D. Wagner, “Mod n Cryptanalysis, with Applications Against RC5P and M6, Fast Software Encryption,” *Sixth International Workshop Proceedings* (March 1999), Springer-Verlag, 1999, pp. 139–155.

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J. Riordan and B. Schneier, “A Certified E-Mail Protocol with No Trusted Third Party,” *13th Annual Computer Security Applications Conference*, ACM Press, December 1998, pp. 347–351.

B. Schneier, “Cryptographic Design Vulnerabilities,” *IEEE Computer*, v. 31, n. 9, Sep 1998, pp. 29–33.

B. Schneier and Mudge, “Cryptanalysis of Microsoft’s Point-to-Point Tunneling Protocol (PPTP),” *Proceedings of the 5th ACM Conference on Communications and Computer Security*, ACM Press, November 1998, pp. 132–141.

J. Kelsey and B. Schneier, “The Street Performer Protocol,” *The Third USENIX Workshop on Electronic Commerce Proceedings*, USENIX Press, November 1998.

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C. Salter, O.S. Saydjari, B. Schneier, and J. Wallner, “Towards a Secure System Engineering Methodology,” *New Security Paradigms Workshop*, September 1998, pp. 2–10.

J. Kelsey, B. Schneier, D. Wagner, and C. Hall, “Side Channel Cryptanalysis of Product Ciphers,” *ESORICS ’98 Proceedings*, Springer-Verlag, September 1998, pp. 97–110.

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D. Wagner, L. Simpson, E. Dawson, J. Kelsey, W. Millan, and B. Schneier, “Cryptanalysis of ORYX,” *Fifth Annual Workshop on Selected Areas in Cryptography*, Springer-Verlag, August 1998, 296–305.

B. Schneier, J. Kelsey, D. Whiting, D. Wagner, and C. Hall, “On the Twofish Key Schedule,” Fifth *Annual Workshop on Selected Areas in Cryptography*, Springer-Verlag, August 1998, 27–42.

C. Hall, J. Kelsey, B. Schneier, and D. Wagner, “Building Pseudo-Random Functions from Pseudo-Random Permutations,” *Advances in Cryptology—CRYPTO ’98 Proceedings*, Springer-Verlag, August 98, pp. 370–389.

J. Riordan and B. Schneier, “Environmental Key Generation towards Clueless Agents,” *Mobile Agents and Security*, G. Vigna, ed., Springer-Verlag, 1998, pp. 15–24.

C. Hall, J. Kelsey, B. Schneier, and D. Wagner, “Cryptanalysis of SPEED (Extended Abstract),” *Financial Cryptography ’98*, Springer-Verlag, 1998, 309–310.

B. Schneier, J. Kelsey, D. Whiting, D. Wagner, C. Hall, and N. Ferguson, “Twofish: A 128-Bit Block Cipher,” 15 June 1998.

J. Kelsey, B. Schneier, D. Wagner, and C. Hall, “Cryptanalytic Attacks on Pseudorandom Number Generators,” *Fast Software Encryption, Fifth International Workshop Proceedings* (March 1998), Springer-Verlag, 1998, pp. 168–188.

D. Coppersmith, D. Wagner, B. Schneier, and J. Kelsey, “Cryptanalysis of TwoPrime,” *Fast Software Encryption, Fifth International Workshop Proceedings* (March 1988), Springer-Verlag, 1998, 32–48.

B. Schneier and J. Kelsey, “Cryptographic Support for Secure Logs on Untrusted Machines,” *The Seventh USENIX Security Symposium Proceedings*, USENIX Press, January 1998, pp. 53–62.

J. Kelsey, B. Schneier, C. Hall, and D. Wagner, “Secure Applications of Low-Entropy Keys,” *1997 Information Security Workshop* (ISW’97), Proceedings (September 1997), Springer-Verlag, 1998, pp. 121–134.

B. Schneier and C. Hall, “An Improved E-mail Security Protocol,” *13th Annual Computer Security Applications Conference*, ACM Press, December 1997, pp. 232–238.

C. Hall and B. Schneier, “Remote Electronic Gambling,” *13th Annual Computer Security Applications Conference*, ACM Press, December 1997, pp. 227–230.

J. Kelsey, B. Schneier, and D. Wagner, “Related-Key Cryptanalysis of 3-WAY, Biham-DES, CAST, DES-X, NewDES, RC2, and TEA,” *ICICS ’97 Proceedings*, Springer-Verlag, November 1997, pp. 233–246.

D. Wagner, B. Schneier, and J. Kelsey, “Cryptanalysis of the Cellular Message Encryption Algorithm,” *Advances in Cryptology—CRYPTO ’97 Proceedings*, Springer-Verlag, August 1997, pp. 526–537.

N. Ferguson and B. Schneier, “Cryptanalysis of Akelarre,” Fourth Annual Workshop on Selected Areas in Cryptography, August 1997, pp. 201–212.

H. Abelson, R. Anderson, S.M. Bellovin, J. Benaloh, M. Blaze, W. Diffie, J. Gilmore, P. G. Neumann, R.L. Rivest, J.I. Schiller, and B. Schneier, “The Risks of Key Recovery, Key Escrow, and Trusted Third-Party Encryption,” *World Wide Web Journal*, v.2, n.3, 1997, pp. 241–257.

J. Kelsey and B. Schneier, “Conditional Purchase Orders,” *4th ACM Conference on Computer and Communications Security*, ACM Press, April 1997, pp. 117–124.

J. Kelsey, B. Schneier, and D. Wagner, “Protocol Interactions and the Chosen Protocol Attack,” *Security Protocols, International Workshop April 1997 Proceedings*, Springer-Verlag, 1998, pp. 91–104.

B. Schneier and J. Kelsey, “Remote Auditing of Software Outputs Using a Trusted Coprocessor,” *Journal of Future Generation Computer Systems*, v.13, n.1, 1997, pp. 9–18.

B. Schneier, “Why Cryptography is Harder than it Looks,” *Information Security Bulletin*, v. 2, n. 2, March 1997, pp. 31–36.

B. Schneier and D. Whiting, “Fast Software Encryption: Designing Encryption Algorithms for Optimal Software Speed on the Intel Pentium Processor,” *Fast Software Encryption, Fourth International Workshop Proceedings* (January 1997), Springer-Verlag, 1997, pp. 242–259.

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B. Schneier and J. Kelsey, “A Peer-to-Peer Software Metering System,” *The Second USENIX Workshop on Electronic Commerce Proceedings*, USENIX Press, November 1996, pp. 279–286.

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B. Schneier and J. Kelsey, “Automatic Event Stream Notarization Using Digital Signatures,” *Security Protocols, International Workshop April 1996 Proceedings*, Springer-Verlag, 1997, pp. 155–169.

B. Schneier and J. Kelsey, “Unbalanced Feistel Networks and Block Cipher Design,” *Fast Software Encryption, Third International Workshop Proceedings* (February 1996), Springer-Verlag, 1996, pp. 121–144.

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B. Schneier, “The GOST Encryption Algorithm,” *Dr. Dobb’s Journal*, v. 20, n. 1, January 1995, pp. 123–124.

B. Schneier, “A Primer on Authentication and Digital Signatures,” *Computer Security Journal*, v. 10, n. 2, 1994, pp. 38–40.

B. Schneier, “Designing Encryption Algorithms for Real People,” *Proceedings of the 1994 ACM SIGSAC New Security Paradigms Workshop*, IEEE Computer Society Press, August 1994, pp. 63–71.

B. Schneier, “The Blowfish Encryption Algorithm,” *Dr. Dobb's Journal*, v. 19, n. 4, April 1994, pp. 38–40.

B. Schneier, “Description of a New Variable-Length Key, 64-Bit Block Cipher (Blowfish),” *Fast Software Encryption, Cambridge Security Workshop Proceedings* (December 1993), Springer-Verlag, 1994, pp. 191–204.

B. Schneier, “One-Way Hash Functions,” *Dr. Dobb's Journal*, v. 16, n. 9, September 1991, pp. 148–151.

Selected Awards

Schneier on Security listed as one of the Cyber Security Blogs You Need to See, Focus Training, February 2017.

Business Leader in Cybersecurity Award from Boston Global Forum, December 2015.

Named as one of the 20 top security influencers by *eSecurity Planet*, June 2015.

EPIC Lifetime Achievement Award, June 2015.

Named as one of the top ten information security bloggers of 2014 by the ISO 27001 and ISO 22301 blog, December 2014.

Named as an industry pioneer in information security by *SC Magazine*, December 2014.

Berkman Fellow at the Berkman Center for Internet and Society at Harvard University, 2013–2015 academic years.

Named one of the IFSEC 40: The Most Influential People in Security & Fire, January 2013.

Honorary Doctor of Science (ScD) from University of Westminster, London, December 2011.

CSO Compass Award, May 2010.

Named as one of the top 25 most influential people in the security industry by *Security* magazine, December 2008

Inducted into the Infosecurity Europe Hall of Fame, April 2008.

Computer Professionals for Social Responsibility (CPSR) Norbert Wiener Award, January 2008.

Electronic Frontier Foundation (EFF) Pioneer Award, March 2007.

Dr. Dobb's Journal Excellence in Programming Award, April 2006.

Named as one of the top five influential IT security thinkers by *SC* magazine, December 2005.

Infoworld CTO 25 Award, April 2005.

Secrets and Lies won a Productivity Award in the 13th Annual *Software Development Magazine* Product Excellence Awards, 2000.

Legislative Testimony

Testimony Before the House Subcommittee on Digital Commerce and Consumer Protection, hearing on "Securing Consumers' Credit Data in the Age of Digital Commerce," November 1, 2017.

Testimony at the U.S. House of Representatives Committee on Energy and Commerce, Subcommittee on Communications and Technology, and the Subcommittee on Commerce, Manufacturing, and Trade, hearing on "Understanding the Role of Connected Devices in Recent Cyber Attacks," November 16, 2016.

Testimony before the U.S. Senate Judiciary Committee, hearing on "Will REAL ID Actually Make Us Safer? An Examination of Privacy and Civil Liberties Concerns," May 8, 2007.

Testimony at the U.K. House of Lords Science and Technology Committee inquiry into "Personal Internet Security," February 21, 2007.

Testimony before the U.S. House of Representatives Committee on Homeland Security, Subcommittee on Cybersecurity, Science, and Research and Development, hearing on "Overview of the Cyber Problem—A Nation Dependent and Dealing with Risk," June 25, 2003.

Testimony before the U.S. Senate Committee on Commerce, Science and Transportation, Subcommittee on Science, Technology, and Space, hearing on Internet Security, July 16, 2001.

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