

運用網路誘捕系統對入侵行為之分析與實作

楊景隆、曹偉駿

E-mail: 9314333@mail.dyu.edu.tw

摘要

現今大部份的資訊安全專家分析網路資料，找出入侵者的行為模式，並發展新的偵測規則給入侵偵測系統(Intrusion Detection System, IDS)使用，但是這工作是依靠專家的能力和知識，總是辛苦和耗時，而且有時不能保證完成可以偵測出入侵行為。本研究描述在應用HoneyNet架構下分析發覺網路入侵和攻擊行為，本研究運用了一個網路誘捕系統收集、擷取入侵者的惡意行為，因此收集到的資料是惡意的行為，並詳盡的紀錄入侵者活動的行為，資料量當然是比完全在網路上擷取所有封包還要少的很多，而且有意義。本研究認為一個入侵行為是由一連串的有次序的警報事件所組成，所以在資料的分析上，採取情節法則的探勘方式，可以解析出更具有代表性的惡意網路行為特徵。

關鍵詞：網路安全、入侵偵測系統、網路誘捕系統、情節法則

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參考文獻

- 參考文獻 [1] R. Agrawal and R. Srikant. "Mining Sequential Patterns," Proceedings of the Eleventh International Conference on Data Engineering, pp. 3-14, 1995.
- [2] B. Caswell, "Snort 2.0 Intrusion Detection," Syngress Publishing, Inc., 2003.
- [3] W. W. Cohen, "Fast Effective Rule Induction," Proceedings of the 12th International Conference on Machine Learning, 1995.
- [4] J. E. Dickerson and J. A. Dickerson, "Fuzzy network profiling for intrusion detection," Fuzzy Information Processing Society, NAFIPS 19th International Conference of the North American, pp. 301-306, 2000.
- [5] J. E. Dickerson, J. Juslin, O. Koukousoula and J.A. Dickerson, "Fuzzy intrusion detection," IFSA World Congress and 20th NAFIPS International Conference, vol. 3 , pp. 1506-1510, 2001.
- [6] T. Dobrowiecki, "Episode Mining to Automatically Filter False Alarms," Proceedings of the 10th PhD Mini-Symposium on IEEE Hungary Section, pp. 44-45, 2003.
- [7] H. Han, X. L. Lu, J. Lu, C. Bo and R. L. Yong, "Data mining aided signature discovery in network-based intrusion detection system," Source ACM SIGOPS Operating Systems Review, vol.36 , Issue 4, pp. 7-13, 2002.
- [8] W. Lee, S.J. Stolfo and K.W. Mok, "A data mining framework for building intrusion detection models" Proceedings of the 1999 IEEE Symposium on Security and Privacy, pp. 120-132, 1999.
- [9] J. Levine, R. Labella, H. Owen, D. Contis and B. Culver, "The use of Honeynets to detect exploited systems across large enterprise networks," Information Assurance Workshop on IEEE Systems, Man and Cybernetics Society, pp. 92-99, 2003.
- [10] J. Luo, S. Bridges, and R. B. Vaugham, "Fuzzy Frequent Episodes for Real-time Intrusion Detection," IEEE International Conference on Fuzzy Systems, pp. 368-371, 2001.
- [11] H. Mannila and H. Toivonen. "Discovering Generalized Episodes using Minimal Occurrences," Proceedings of the Second Int'l Conf. on knowledge discovery and data mining, 1996.

- [12] H. Mannila, H. Toivonen, and A. I. Verkamo. "Discovery of Frequent Episodes in Event Sequences," Data Mining and Knowledge Discovery, 1997.
- [13] N. Provos, "A Virtual Honeytrap Framework," Center for Information Technology Integration of University of Michigan Technical Report 03-1, 2003, <http://www.citi.umich.edu/techreports/> [14] R. Rehman, "Intrusion Detection with SNORT: Advanced IDS Techniques Using SNORT, Apache, MySQL, PHP, and ACID, " Prentice Hall PTR; 1st edition, 2003.
- [15] L. Spitzner, "Honeytraps: Tracking Hackers," Addison-Wesley Pub Co., 2003.
- [16] L. Spitzner, "The Honeytrap Project: Trapping the Hackers," IEEE Security & Privacy, vol. 1, No. 2, pp. 15-23, 2003.
- [17] L. Spitzner, "Honeytraps: Definitions and Value of Honeytraps," <http://www.tracking-hackers.com/papers/honeytraps.html> [18] R. Srikant, and R. Agrawal, "Mining Generalized Association Rules," Proceedings of the 21st Int'l Conference on Very Large Databases, 1995.
- [19] L. C. Wu, and S. F. Chen, "Building Intrusion Pattern Miner for Snort Network Intrusion Detection System," The IEEE International Carnahan Conference on Security Technology, ICCST2003, pp. 477-484, 2003.
- [20] S. Yeldi, S. Gupta, T. Ganacharya, S. Doshi and D. Bahirat, "Enhancing network intrusion detection system with honeytrap," TENCON 2003. Conference on Convergent Technologies for Asia-Pacific Region, vol. 4, pp. 1521-1526, 2003.
- [21] J. Yin, G. Zhang and Y. Chen, "Intrusion discovery with data mining on honeytrap," International Conference on Machine Learning and Cybernetics, pp. 41-45, 2003.
- [22] F. Zhang, S. Zhou, Z. Qin and J. Liu, "Honeytrap: a Supplemented Active Defense System for Network Security," Proceedings of the Fourth International Conference on Parallel and Distributed Computing Applications and Technologies, pp. 231-235, 2003.
- [23] Analysis Console for Intrusion Databases (ACID), <http://acidlab.sourceforge.net/> [24] The Honeytrap Project Whitepapers, <http://project.honeytrap.org/papers/index.html> [25] The Honeytrap Project Tools for Honeytraps, <http://project.honeytrap.org/tools/index.html>
- [26] Snort, <http://www.snort.org> [27] Snort_inline, <http://snort-inline.sourceforge.net> [28] Zone-H.org Stats & graphs, <http://www.zone-h.org/en/stats>