Security Challenges Facing IoT Layers and its Protective Measures

Abstract

The Internet of Things (IoT) is profoundly affecting people’s routine lives in various fields ranging from petite wearable devices to enormous commercial systems and it has been predicted that in upcoming few years, more than 50 billion devices will become the part of the IoT as many of these applications have already been developed. However, the maintenance of security and privacy is a great challenge that restricts the broad implementation of IoT. As the Internet of Things has no standardized architecture, so various types of attacks occurred on different layers of IoT. Some proficient security methods have already developed to protect the IoT system but not enough, so, there is a dire need to do more. This paper describe the security challenges facing four basic layers of IoT and suggest the protective measures to enhance the reliability and robustness of the IoT. Also, portrays the comparative analysis of security challenges between IoT and traditional network.

References
1. Ren, Z., Liu X. and Ye R. 2017. Security and Privacy on Internet of Things. In 7th IEEE International Conference on Electronic Information and Emergency Communication (ICEIEC), pp. 140-142.
2. Adat, V. and Gupta, B. B. June, 2017. Security in Internet of Things: issues, challenges, taxonomy, and architecture, Telecommunication Systems, pp. 1-19.
3. Uttarkar, R. and Kulkarni, R. 2014. Internet of Things: Architecture and Security. International Journal of Computer Application, 3(4), pp. 12-19.
4. Ahmed, M. M., Shah, M.A. and Wahid, A. 2017. IoT Security: A Layered Approach for Attacks & Defenses. in IEEE International Conference on Communication Technologies (ComTech), pp. 104-110.
5. Razzaq, A., Latif, K., Ahmad, H. F., Hur, A., Anwar, Z. and Bloodsworth, P.C, 2014. Semantic security against web application attacks. Information Sciences, vol. 254, pp. 19-38.
6. Hashizume, K., Rosado, D. G., Fernandez-Medina, E. and Fernandez, E. B. December, 2013. An analysis of security issues for cloud computing. Journal of Internet Services and Applications, pp. 1-13.
7. Kumar, S. A., Vealey, T. and Srivastava, H. 2016. Security in Internet of Things: Challenges, Solutions and Future Directions. 49th Hawaii International Conference on System Sciences (HICSS), pp. 5772-5781.
8. Avoine, G., Bingol, M. A., Carpent, X. and Yalcin, S. B. O. October, 2013. Privacy-Friendly Authentication in RFID Systems: On Sublinear Protocols Based on Symmetric-Key Cryptography. IEEE Transactions on Mobile Computing, 12(10) pp. 2037-2049.
9. Alizadeh, M., Salleh, M., Zamani, M., Shayan, J. and Karamizadeh, S. 2012. Security and Performance Evaluation of Lightweight Cryptographic Algorithms in RFID. Recent Researches in Communications and Computing, pp. 45-50.
10. Vasilomanolakis, E., Daubert, J., Luthra, M., Gazis, V., Wiesmaier, A. and Kikiras, P. 2015. On the Security and Privacy of Internet of Things Architectures and Systems. IEEE International Workshop on Secure Internet of Things (SloT), pp. 49-57.
11. Daneshmand, S., Jafarnia-Jahromi, A., Broumandan, A. and Lachapelle, G. 2012. A Low-Complexity GPS Anti-Spoofing Method Using a Multi-Antenna Array. ION GNSS12 Conference, pp. 1–11.
12. Singh, Y., Kandah, F. and Zhang, W. 2011. A secured cost-effective multi-cloud storage in cloud computing. IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS), pp. 619–624.
13. Kumar, S., Singh, S. P., Singh, A. K. and Ali, J. June, 2013. Virtualization, The Great Thing and Issues in Cloud Computing. International Journal of Current Engineering and Technology, pp. 338–341.
14. Jing, Q., Vasilakos, A. V., Wan, J., Lu, J. and Qiu, D. November, 2014. Security of the Internet of Things: Perspectives and challenges. Wireless Networks, 20(8), pp. 2481-2501.

Index Terms

Computer Science
Information Systems
Keywords

Internet of things, security, privacy, layer architecture, security challenges, protective measures