ISF: IoT Firmware security analysis to secure IoT-based Smart Home Ecosystems

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Abstract

The worldwide ecosystem of communication, information, and new-age technologies are using the Internet of Things (IoT) which connect devices or things on the Internet with each other from any location. IoT has seen tremendous expansion in its applications and services over the last few years. This has generated the attention of device manufacturers along with corporate vendors, and individual investors, which have resulted in a rapid influx of new-age businesses. As the adoption and use of IoT devices are increasing, these things on the Internet are being used in almost every area of our life. Since confidential data and information are involved, securing the IoT devices has become the prime is gaining more and more importance. Security assessments of smart cities and homes running IoT devices require appropriate security controls to mitigate threats and risks due to the smart technology deployments. This research focuses on the IoT device firmware to secure the smart home environment. The authors present a security framework for conducting IoT firmware analysis and investigations that revealed hardcoded user IDs and passwords as well as sensitive information for further attacks and compromise of the IoT devices. The authors proposed a hypothesis to analyze real-time datasets generated from IoT search engines based on keywords as per device types, locations, and manufacturers. The outcome exposed device owners taking 11-13 months to upgrade firmware even among the IoT manufacturers only HP and Cisco were consistently delivering firmware upgrades to secure the IoT devices.

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