

# **ABSTRACT**

## **SOAR: An experimental platform for home Wi-Fi routers**

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by

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As one of the most economically significant and fastest growing sectors of the Internet, broadband networks have attracted a great deal of interest from researchers. Conducting network measurements through home-based Wi-Fi routers can provide important insight about how to improve the performance and reliability of home networks. But, utilizing these routers requires careful consideration of both user privacy and the efficient use of limited computational resources.

To better understand the characteristics of home networks, we developed SOAR, an open research testbed that utilizes computational resources provided by end users on wireless routers. Unlike most other research platforms, SOAR can protect both the privacy of embedded device data, and the security of the device itself, despite the use of potentially buggy experimental code. We find that our platform is flexible enough to implement a variety of network measurements (e.g., the set of devices, aggregate traffic statistics, characteristics of the Wi-Fi environment, etc.) despite restrictions set to protect the user device. This paper discusses some of the challenges we faced building and using the platform for home network deployment, the design and implementation of the platform, and our experience gathering measurements on these networks. Finally, we demonstrate SOAR's utility with three case studies.