SG5 Project Proposal

Portable Private WiFi

Group Members

Tinnaphob Angkaprasert (5422800045)
Suchathit Boonnag (5422792754)

Advisor: Steven Gordon

School of Information, Computer and Communication Technology,
Sirindhorn International Institute of Technology,
Thammasat University

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Statement of Contribution

By submitting this document, all students in the group agree that their contribution in the project so far, including the preparation of this document, is as follows:

Tinnaphob Angkaprasert (5422800045)	50%
Suchathit Boonnag (5422792754)	50%

1 Introduction

Nowadays the Internet exists everywhere even public place. Some people want to use it privately on public places, but the privacy concern is an issues. Therefore, our group came up with some ideas in order to solve security and privacy issues. We are going to make portable WiFi that similar to All-In-One router but it is not the same as another. The current access point in public places (e.g. Coffee shop, Hotel, Airport) are not consider safe. During the connectivity, each packets are being sent on the network insecurely. It can be capture with a very common software such as Wireshark. A malicious user may attempt to capture the packets and analyze them. For example, a common situation such as one user is doing an important online transaction on the public place while a malicious user track them at the same time; most of the time a malicious user success and might as well hack their account. We are aware of these issues. Thus, we are going to act similarly to Internet Service Provider (ISP) and provide a services with higher security and privacy concern is our ultimate goal.

Another thing is that many of All-In-One routers are not user friendly and has too many unused features for either users and administrator (home-user) themselves, especially the administrator UI that has various step for configuration. We're going to implement a user friendly interface for both normal user and administrator user.

2 Background

- Internet

The Internet is a global computer networks that use the standard Internet protocol suite (TCP/IP).[1] There are more than 100 countries linked into exchange of data, news, and opinions.[2]

The word Internet and World Wide Web are use in everyday speech. However, the World Wide Web or the Web is just one of a very large number of services running on the Internet.[1] The Internet is a globally distributed network and it operates without a central governing body.[1]

The name spaces of the Internet are maintain by the Internet Corporation for Assigned Names and Numbers (ICANN), It is the authority that coordinates the assignment of unique identifiers for use on the Internet, including domain names, Internet Protocol (IP) addresses and other more.[1]

The common to access Internet are

- dial-up with a computer modem via telephone circuits.
- Broadband over coaxial cable.
- Fiber optic or copper wires.
- Wi-Fi both pay or free.
- Satellite and cellular telephone technology (3G, 4G).[1]

To access Internet via access points are almost every public places such as libraries, Internet cafes, airport halls, coffee shops[1] and shopping mall. User may connected using their own computer laptop, tablets and most of smart phone wirelessly.

- WiFi

A local area network technology (WiFi) allows devices to connect to the Internet when within range of a wireless network. The Wi-Fi Alliance defines Wi-Fi as any "wireless local area network (WLAN) products that are based on the Institute of Electrical and Electronics Engineers' (IEEE) 802.11 standards".[3] A wireless access point connects wireless devices to the wired LAN.

Wireless routers are add Wireless Access Point, Ethernet switch, and internal router firmware application that provides NAT, DNS, IP routing via WAN. A wireless router allows wired and wireless Ethernet LAN devices to connect to WAN device (e.g. DSL modem, cable modem)[3]

- Proxy

A proxy server is a server that acts as requests from clients seeking resources from other servers.[4] It connects to the proxy server to requesting some service (e.g. file, web page or other resource).[4] A proxy server may reside on the user's local computer An anonymous proxy server generally attempts to anonymize web surfing. There are different varieties of anonymizers.[4]

Anonymous HTTPS proxy, Users wanting to bypass web filtering, that want to prevent anyone from monitoring what they are doing, will typically search the internet for an open and anonymous HTTPS transparent proxy. They will then program their browser to proxy all requests through the web filter to this anonymous proxy. Those requests will be encrypted with HTTPs. The web filter cannot distinguish these transactions from, say, a legitimate access to a financial website. Thus, content filters are only effective against unsophisticated users.[4]

- VPN

A virtual private network (VPN) extends a private network across a public network, such as the Internet. It enables a computer to send and receive data across shared or public networks as if it is directly connected to the private network, while benefiting from the functionality, security and management policies of the private network. A VPN is created by establishing a virtual point-to-point connection through the use of dedicated connections, virtual tunneling protocols, or traffic encryptions. A virtual private network connection across the Internet is similar to a wide area network (WAN) link between websites. From a user perspective, the extended network resources are accessed in the same way as resources available within the private network.[5]

Early data networks allowed VPN-style remote connectivity through dial-up modems or through leased line connections utilizing Frame Relay and Asynchronous Transfer Mode (ATM) virtual circuits, provisioned through a network owned and operated by telecommunication carriers.[5]

VPNs can be either remote-access (connecting a computer to a network) or site-to-site (connecting two networks). In a corporate setting, remote-access VPNs allow employees to access their company's intranet from home or while traveling outside the office, and site-to-site VPNs allow employees in geographically disparate offices to share one cohesive virtual network.[5]

- OpenVPN

Is an open source software application that make a virtual private network (VPN) techniques it creating secure point-to-point routed configurations. It uses a custom security protocol that utilizes SSL/TLS for key exchange. It is capable of traversing network address translators (NATs) and firewalls.[6]

OpenVPN uses the OpenSSL library to provide encryption of both the data and control channels and offers several internal security features. It has up to 256-bit Encryption through OpenSSL library although some service providers may offer lower rates for faster connectivity.[6]

- TOR

Tor (The Onion Router) is free designed to for users to surf the internet anonymously, so their activities and location cannot be discovered by government agencies, corporations, or anyone else. Tor directs Internet traffic through a free, worldwide, volunteer network consisting of more than five thousand relays to conceal a user's location and usage from anyone conducting network surveillance or traffic analysis.[7]

The U.S. National Security Agency (NSA) has called Tor "the king of high-secure, low-latency internet anonymity," and Business Week magazine has described it as "perhaps the most effective means of defeating the online surveillance efforts of intelligence agencies around the world." Other media have described Tor as "a sophisticated privacy tool," "easy to use" and "so secure that even the world's most sophisticated electronic spies haven't figured out how to crack it."[7]

Tor enables users to surf the internet, chat and send instant messages anonymously, and is used by a wide variety of people for both licit and illicit purposes. The Tor Project says Tor's users include "normal people" who want to keep their internet activities private from websites and advertisers, people concerned about cyber-spying, users who are evading censorship such as activists and journalists, and military professionals.[7]

Tor aims to conceal its users' identities and their online activity from surveillance and traffic analysis by separating identification and routing. It is an implementation of onion routing, which encrypts and then randomly bounces communications through a network of relays run by volunteers around the globe. These onion routers employ encryption in a multi-layered manner (hence the onion metaphor) to ensure perfect forward secrecy between relays, thereby providing users with anonymity in network location.[7]

3 Objectives

Our aims in this project are…

- Make device secure
    - We will use VPN and TOR to make the connection securely and privately.
- Easy to use for anyone
    - Anyone can use it without any manual book.
        - It just a few step.
    - User will get good user experience.

    - We will redesign web configuration to be simple than current.
        - The redesign will base on OpenWRT.
        - Remove unimportant features out.
- Let's anonymous user use our device anonymously and freely without disturb other user.
    - It separate by SSID.
    - Always hiding anonymous user identity.

4 Outputs and Expected Benefits

4.1 Outputs

It will have two side, server side and client side.

- Server side
    - Set up VPS outside of The kingdom of Thailand.
    - Installed OpenVPN, TOR client and proxy server.
- Client side
    - An all in one router with best security tools.
    - The two different SSID for friends and family of device owner and anyone as anonymous user.
    - Internet input (WAN) WLAN, LAN and 3G/4G
    - Internet output (LAN) Wi-Fi and LAN

4.2 Benefits

In short term, It will help IT and especially non-IT persons to use the internet securely and privately with the good user experience. After both of them can feel safe when there surfing the web or sent secret chat.

In long term, When this project are widely in public area, It will help people how want to use the internet anonymously to use it in anywhere and any time.

5 Literature Review

What other people have done in this area?

Review of example or selected products or projects. This is mandatory for all projects. Often you will refer to products and web sites.

Review of research (and papers). This is optional; requires you to find related papers and understand them!

Note that a "Review" says what the other people did, and tries to list the advantages and disadvantages (or limitations and benefits of their approach). When reviewing something, make sure you include the appropriate references.

6 Methodology

6.1 Approach

What steps will you take in the project? List the steps. This is a good place to present a high-level system (block) diagram, showing the components of your system. Then you can describe tasks for each component.

6.2 Tools and Techniques

What tools and techniques will you use in the project? Languages, software, processes, ...

7 Project Schedule

Table or diagram of schedule, showing tasks, deadlines or duration, and the person responsible for the task. An example table is shown below. Aim to divide the project into tasks of about 1-2 weeks duration. If you have a task with a duration of 1 month, then divide it into multiple smaller tasks. If this document also reports your current progress, it will be useful to annotate the plan with a current status column (e.g. percent complete of each item). You could include a Gantt chart if desired.

Task	**Description**	**Person**	**Duration**	**Deadline**	**Status**
1	Design database for recording users and orders.	SG	1w	1 Oct 09	50%. Still need to design data for users.
2	Study about programming language X	CN	2w	15 Sep 09	-
3	Learn how to use software Y	PA	3d	1 Oct 09	-
4	Implement login functionality for web site	CN	2w	15 Oct 09	-
5	Test ability for user to add new items	SG	1w	12 Dec 09	80%. Works for all items except type Z.
6	Prepare slides for Mid-term presentation	PA	2d	25 Dec 09	-
7	...	...	...	...	...

8 Project Progress (optional)

If you have started doing work, then in this section you should report on the current progress of the project. You can consider the previous sections as the “Proposal” of what you intend to do and why, whereas this section reports on what you have done. You may break into multiple sections or sub-sections if necessary. You should include any designs and implementation details.

9 References

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