An Awarding Point Technique in Wi-Fi Sharing System

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Abstract : The urge to go mobile has been one of direst desires of mankind since decades. Back in 1997, scientists and the engineers of IEEE introduced a standard which is being used now all over the world under the unlicensed bands 2.4 and 5 GHz. The emerging demand of WLAN (Wireless local Area Network) in offices, corporate and the industrial sector and city wide university campuses forces the Task Group S of IEEE to come up with further enhancements in the family of 802.11 standards. Since 2004, 802.11s has introduced new enhancements related to wireless frame forwarding packets, security and routing capabilities at data link layer. This article describes the mechanism, architecture and its latest amendments in the family of IEEE 802.11 wireless mesh network which is named as 802.11s.The paper also covers the benefits of using the 802.11s standard, a phone without internet is a waste nowadays so we are going to deal about internet sharing using wireless mesh network.

***IndexTerms* - Component, mesh network, protocol, openwrt, WiFi.**

I. INTRODUCTION

The origins of the Internet date back to research commissioned by the United States Federal Government in the 1960s to build robust, fault-tolerant communication via computer networks. The linking of commercial networks and enterprises in the early 1990s marked the beginning of the transition to the modern Internet, and generated rapid growth as institutional, personal, and mobile computers were connected to the network. By the late 2000s, its services and technologies had been incorporated into virtually every aspect of modern life. Most traditional communications media, including telephony, radio, television, paper mail and newspapers are being reshaped, redefined, or even bypassed by the Internet, giving birth to new services such as email, Internet telephony, Internet television, online music, digital newspapers, and video streaming websites. Newspaper, book, and other print publishing are adapting to website technology, or are reshaped into blogging, web feeds and online news aggregators. The Internet has enabled and accelerated new forms of personal interactions through instant messaging, Internet forums, and social networking. Online shopping has grown exponentially both for major retailers and small businesses and entrepreneurs, as it enables firms to extend their "brick and mortar" presence to serve a larger market or even sell goods and services entirely online. Business-to-business and financial services on the Internet affect supply chains across entire industries.

II. EXISTING SYSTEM

The main purpose of mesh network is to provide emergency communication when the isp or the cellular network cannot provide the support due to some technical or natural disaster problem the mesh network can be used to provide the service this was used early on Brooklyn when the sandy cyclone hit the red hook area they had no communication link with the outer area and no power also to charge their phones at that time a group of youngsters formed a open community to build a wireless mesh network (IEEE 802.11s) this community welcomes volunteers this youngsters chooses large height building to place their AP (access point) this node provides WLAN wireless local area network which doesn’t need big isp to provide service though they have no internet connection they are connected through mesh network.

The main advantage of mesh network that is it can cover large network than traditional way of connecting using this mesh network we can also create a local advertisement or a pop of a event nearby to the people we are connected to that mesh .Mesh networks help people stay connected while avoiding traditional internet providers. Motivation around the country for creating community mesh networks ranges from a desire for social justice, improved information access during natural disasters or just the need to experiment.

A mesh network creates reliable and redundant wireless internet access. Instead of relying on a wired access point to the internet like a traditional network, a mesh network uses wireless radio nodes that speak to each other, thus creating decentralized wireless access points. Because a mesh network does not have to communicate through a central organization (like an ISP), if one node goes down the network will self heal allowing service to continue without interruption.

You are probably wondering, how is this different than your Wifi at home. For one, mesh networks is actually wireless. If you think of your at-home wireless router, it is wired directly to the internet. Within a mesh network, only one node needs to be hardwired. All the other nodes, of which there could be hundreds, do not require direct access to the internet, just access to the mesh network itself. This allows a mesh network to operate without laying new cable, or as a local network during a service outage .We can also make an call to the people without help of our cellular network the investment we do just the hardware components.

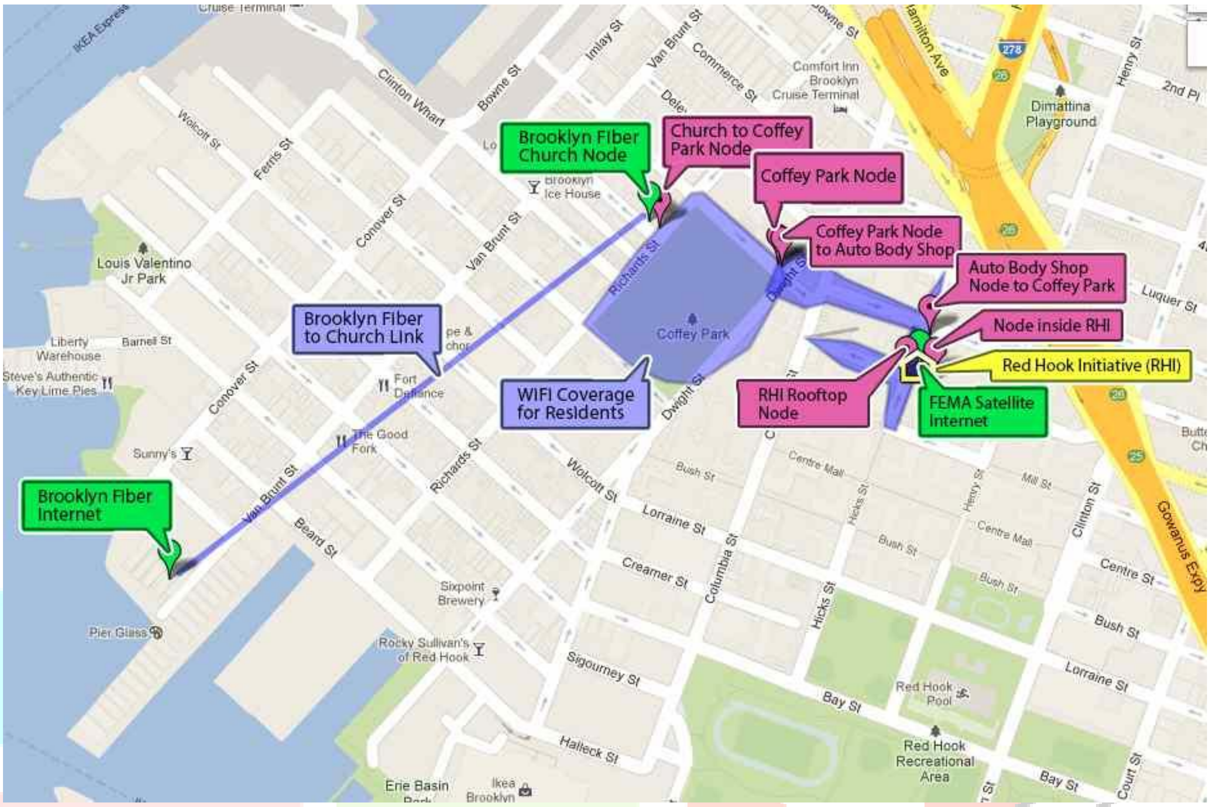

Brooklyn Fiber Church Node
Church to Coffey Park Node
Coffey Park Node
Coffey Park Node to Auto Body Shop
Auto Body Shop Node to Coffey Park
Node inside RHI
Red Hook Initiative (RHI)
Brooklyn Fiber to Church Link
WIFI Coverage for Residents
RHI Rooftop Node
FEMA Satellite Internet
Brooklyn Fiber Internet
Coffey Park
Louis Valentino Jr Park
Red Hook Recreational Area
Erie Basin

Fig.1 Red hook area

III. Proposed System

The need to go mobile has been one of direst desires of mankind since decades. Back in 1997, scientists and the engineers of IEEE introduced a standard which is being used now all over the world under the unlicensed bands 2.4 and 5 GHz. Since 2004, 802.11s has introduced new enhancements related to wireless frame forwarding packets, security and routing capabilities at data link layer.

This article describes the mechanism, architecture and its latest amendments in the family of IEEE 802.11 wireless mesh network which is named as 802.11s.The paper also covers the benefits of using the 802.11s standard, a phone without internet is a waste nowadays so we are going to deal about internet sharing using wireless mesh network. As discussed early the Wi-Fi mesh network is used here for sharing of internet for emergency purpose when a person comes across the access point in a mesh network he can access the internet using that access point.

First we are hosting a web application to create a account for the particular user and make authenticate him and also used to improve the accessibility of user. We also introduce non initialization of payment and data waste management because no isp is not returning the data which is remaining at the expire of your data plan. We are giving 1000 points to the user once he logged in and created his account to avoid money transfer while sharing because each isp provide data for different rate. We are creating a secured network because without proper authentication there would be a chance of cybercrime the free Wi-Fi which are found are not with proper authentication so we are using a radius server which will get the users private ip in the open Wi-Fi now available there would be no proper authentication

First when a user finds an open Wi-Fi mesh network then he will turn on the Wi-Fi and connect to the hotspot first he will be asked to enter his mobile number them an otp is used to provide a onetime password and provide access to the user. We use apache server to host the web page and to maintain the data base of the user and maintain the account details about the user. When a user access the AP and uses 4 Mb of data then the user will transfer four point to the provider to his account. For this purpose both of the should have a account so they could use point system instead of money transfer. The points gained by the provider can be used in another mesh network in emergency situation.

Wireless Network Adapters

Wireless network adapters (also known as wireless NICs or wireless network cards) are required for each device on a wireless network. All newer laptop computers, tablets, and smart phones incorporate wireless capability as a built-in feature of their systems Separate add-on adapters must be purchased for older laptop PCs; these are available in either PCMCIA "credit card" or USB form factors. Unless you are running old hardware, you can set up a wireless network without worrying about network adapters. To increase the performance of network connections, accommodate more computers and devices, and increase the network's range, other types of hardware are needed.

Wireless Routers and Access Points

Wireless routers are the heart of the wireless network. They function comparably to traditional routers for wired Ethernet networks. You need a wireless router when building an all-wireless network at home or office. The current standard for wireless routers is 802.11ac, which deliver smooth video streaming and responsive online gaming. Older routers are slower, but still, work, so the router choice can be made by the requirements you plan to put on it. However, an AC router is dozens of times faster than the 802.11n version that preceded it. The AC router also handles multiple devices better than the older router models. Many homes have computers, tablets, phones, smart TVs, streaming boxes and smart home devices that all use a wireless connection with the router.

The wireless router usually connects directly to the modem supplied by your high-speed internet service provider by wire, and everything else in the home connects wirelessly to the router. Similar to routers, access points allow wireless networks to join an existing wired network. This situation occurs in an office or home that already has wired routers and equipment installed. In home networking, a single access point or router possesses sufficient range to span most residential buildings. Businesses in office buildings often must deploy multiple access points and/or routers.

IV. HARDWARE

Wireless Antennas

Access points and routers can use a Wi-Fi wireless antenna to significantly increase the communication range of the wireless radio signal. These antennas are built in on most routers, but they are optional and removable on some older equipment. It's possible to mount aftermarket add-on antennas on wireless clients to increase the range of wireless adapters. Add-ons antennas are usually not required for typical wireless home networks, although it's common practice for war drivers to use them. War driving is the practice of deliberately searching a local area looking for available Wi-Fi wireless network signals.

Wireless Repeaters

A wireless repeater connects to a router or access point to extend the reach of the network. Often called signal booster or range expander, a repeater serves as a two-way relay station for wireless radio signals, to allow equipment otherwise unable to receive a network's wireless signal to join. Wireless repeaters are used in large homes when one or more rooms don’t receive a strong Wi-Fi signal, usually because of their distance from the wireless router. A network bridge is a computer networking device that creates a single aggregate network from multiple communication networks or network segments. This function is called network bridging. Bridging is distinct from routing, as routing allows multiple different networks to communicate independently while remaining separate whilst bridging connects two separate networks as if they are only one network (hence the name "bridging"). In the OSI model, bridging is performed in the first two layers, below the network layer (layer 3) If one or more segments of the bridged network are wireless, the device is known as a wireless bridge and the function as wireless bridging. There are four types of network bridging technologies: simple bridging, multiport bridging, learning or transparent bridging, and source route bridging.

A simple bridge connects two network segments, typically by operating transparently and deciding on a frame-by-frame basis whether or not to forward from one network to the other. A store and forward technique is typically used so, during forwarding, the frame integrity is verified on the source network and CSMA/CD delays are accommodated on the destination network. Contrary to repeaters that simply extend the maximum span of a segment, bridges only forward frames that are required to cross the bridge. Additionally, bridges reduce collisions by partitioning the collision domain. A multiport bridge connects multiple networks and operates transparently to decide on a frame-by-frame basis whether and where to forward traffic. Like the simple bridge, a multiport bridge typically uses store and forward operation. The multiport bridge function serves as the basis for network switches.

A transparent bridge uses a forwarding database to send frames across network segments. The forwarding database starts empty - entries in the database are built as the bridge receives frames.

If an address entry is not found in the forwarding database, the frame is flooded to all other ports of the bridge, flooding the frame to all segments except the one from which it was received. By means of these flooded frames, the destination network will respond and a forwarding database entry will be created.

In the context of a two-port bridge, one can think of the forwarding database as a filtering database. A bridge reads a frame's destination address and decides to either forward or filter. If the bridge determines that the destination node is on another segment on the network, it forwards (retransmits) the frame to that segment. If the destination address belongs to the same segment as the source address, the bridge filters (discards) the frame. As nodes transmit data through the bridge, the bridge establishes a filtering database of known MAC addresses and their locations on the network. The bridge uses its filtering database to determine whether a frame should be forwarded or filtered.

Transparent bridging can also operate over devices with more than two ports. As an example, consider a bridge connected to three hosts, A, B, and C. The bridge has three ports. A is connected to bridge port 1, B is connected to bridge port 2, C is connected to bridge port 3. A sends a frame addressed to B to the bridge. The bridge examines the source address of the frame and creates an address and port number entry for A in its forwarding table. The bridge examines the destination address of the frame and does not find it in its forwarding table so it floods it to all other ports: 2 and 3. The frame is received by hosts B and C. Host C examines the destination address and ignores the frame. Host B recognizes a destination address match and generates a response to A. On the return path, the bridge adds an address and port number entry for B to its forwarding table. The bridge already has A's address in its forwarding table so it forwards the response only to port 1. Host C or any other hosts on port 3 are not burdened with the response. Two-way communication is now possible between A and B without any further flooding in network.

Both source and destination addresses are used in this algorithm: source addresses are recorded in entries in the table, while destination addresses are looked up in the table and matched to the proper segment to send the frame to.

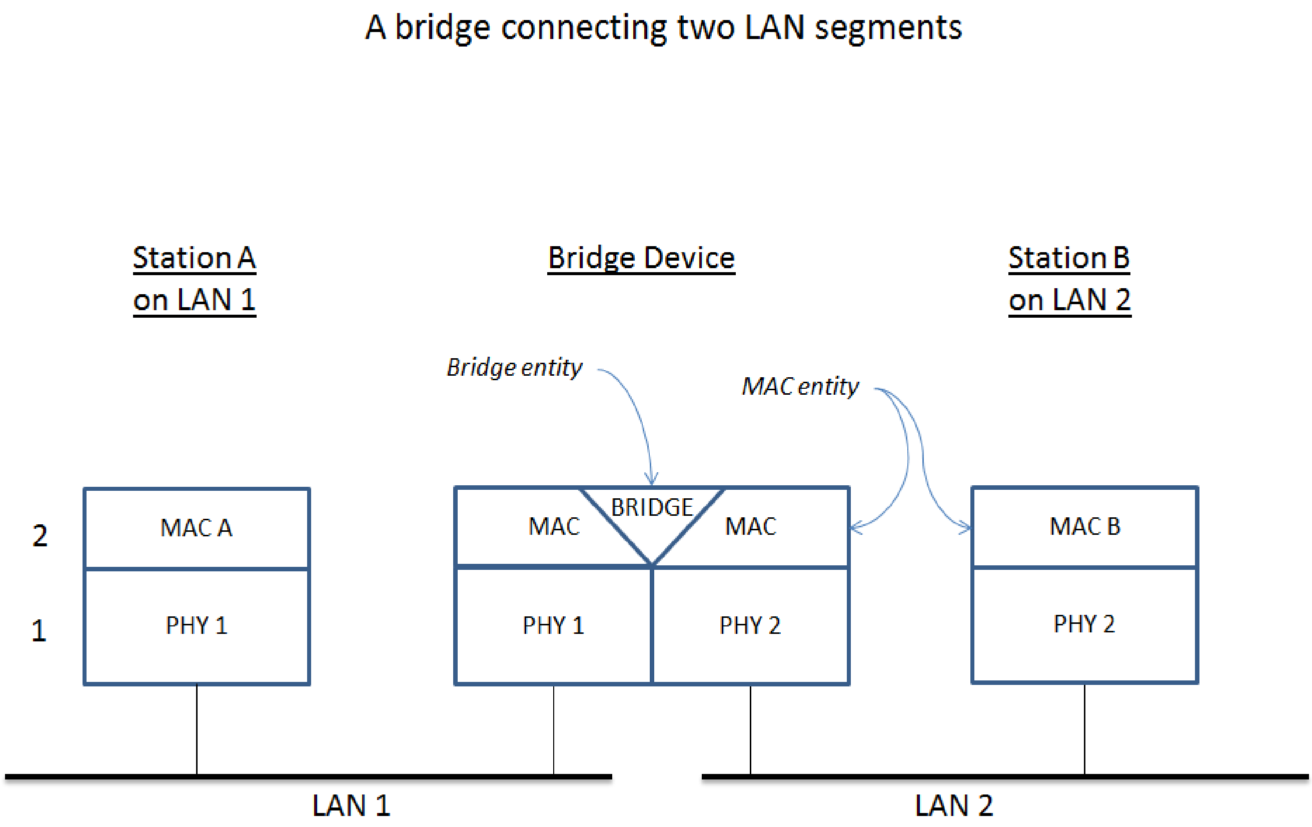
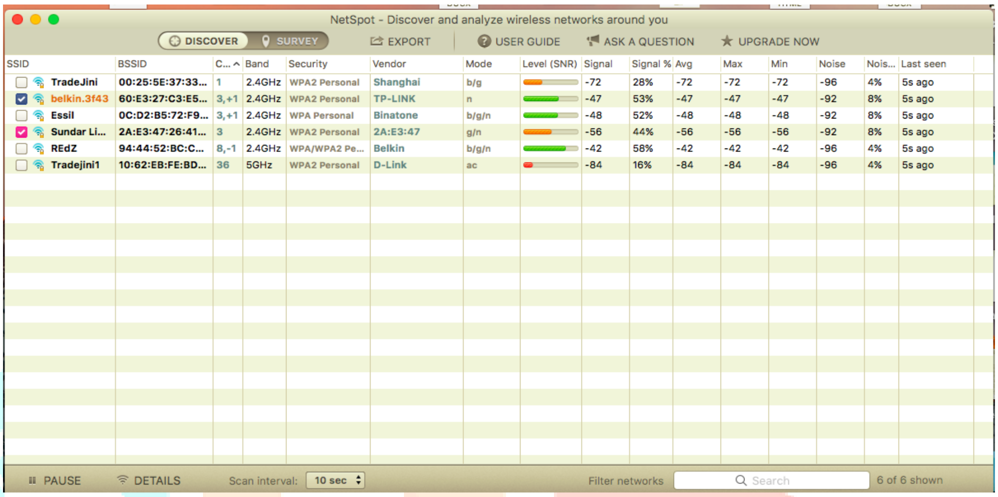


Fig.2 A Bridge connecting two LAN segments

V. Software

NetSpot:

NetSpot is a software tool for wireless network assessment, scanning, and surveys, analyzing Wi-Fi coverage and performance. It runs on Mac OS X 10.6+ and Windows 7-8-10 and supports 802.11n, 802.11a, 802.11b, and 802.11g wireless networks. NetSpot uses the standard Wi-Fi network adapter and its Airport interface to map radio signal strength and other wireless network parameters, and build reports on that. NetSpot was released in August, 2011 and available at MacApp Store.



	SSID	BSSID	C... ^	Band	Security	Vendor	Mode	Level (SNR)	Signal	Signal %	Avg	Max	Min	Noise	Nois...	Last seen
□	TradeJini	00:25:5E:37:33...	1	2.4GHz	WPA2 Personal	Shanghai	b/g	🟧	-72	28%	-72	-72	-72	-96	4%	5s ago
☑	belkin.3f43	60:E3:27:C3:E5...	3,+1	2.4GHz	WPA2 Personal	TP-LINK	n	🟩	-47	53%	-47	-47	-47	-92	8%	5s ago
□	Essil	0C:D2:B5:72:F9...	3,+1	2.4GHz	WPA Personal	Binatone	b/g/n	🟩	-48	52%	-48	-48	-48	-92	8%	5s ago
☑	Sundar Li...	2A:E3:47:26:41...	3	2.4GHz	WPA2 Personal	2A:E3:47	g/n	🟧	-56	44%	-56	-56	-56	-92	8%	5s ago
□	REdZ	94:44:52:BC:C...	8,-1	2.4GHz	WPA/WPA2 Pe...	Belkin	b/g/n	🟩	-42	58%	-42	-42	-42	-96	4%	5s ago
□	Tradejini1	10:62:EB:FE:BD...	36	5GHz	WPA2 Personal	D-Link	ac	🟥	-84	16%	-84	-84	-84	-96	4%	5s ago

Scan interval: 10 sec

Filter networks Search 6 of 6 shown

Fig.3 Discover and analyzation of wireless networks

Network Mapper

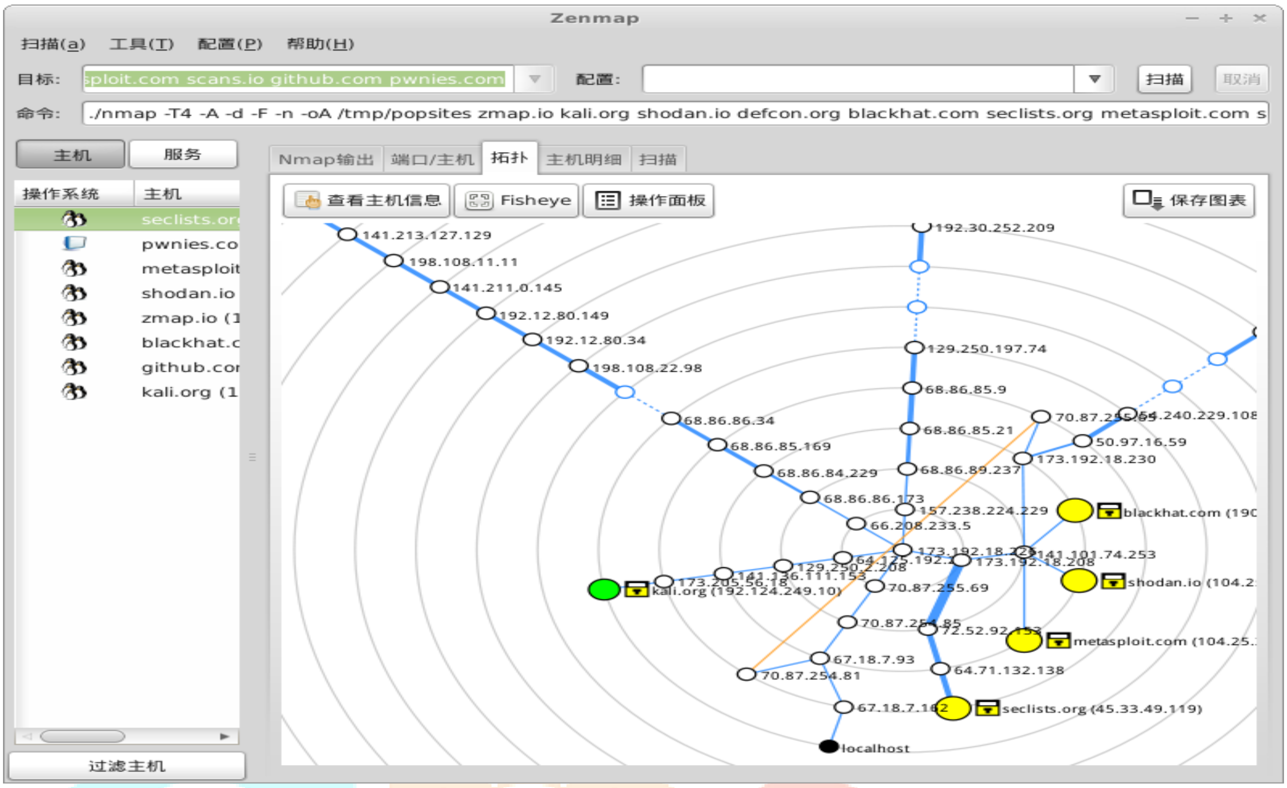
Nmap (Network Mapper) is a security scanner, originally written by Gordon Lyon (also known by his pseudonym Fyodor Vaskovich), used to discover hosts and services on a computer network, thus building a "map" of the network. To accomplish its goal, Nmap sends specially crafted packets to the target host(s) and then analyzes the responses.

The software provides a number of features for probing computer networks, including host discovery and service and operating-system detection. These features are extensible by scripts that provide more advanced service detection, vulnerability detection, and other features. Nmap can adapt to network conditions including latency and congestion during a scan. The Nmap user community continues to develop and refine the tool.

Nmap started as a Linux-only utility, but porting to Windows, Solaris, HP-UX, BSD variants (including macOS), AmigaOS, and IRIX have followed. Linux is the most popular platform, followed closely by Windows.

Network Simulator

Ns is a name for a series of discrete event network simulators, specifically ns-1, ns-2 and ns-3. All of them are discrete-event computer network simulators, primarily used in research and teaching and ns-3 is free software, publicly available under the GNU GPLv2 license for research, development, and use. The goal of the ns-3 project is to create an open simulation environment for computer networking research that will be preferred inside the research community. It should be aligned with the simulation needs of modern networking research. It should encourage community contribution, peer review, and validation of the software. Since the process of creation of a network simulator that contains a sufficient number of high-quality validated, tested and maintained models requires a lot of work, ns-3 project spreads this workload over a large community of users and developers

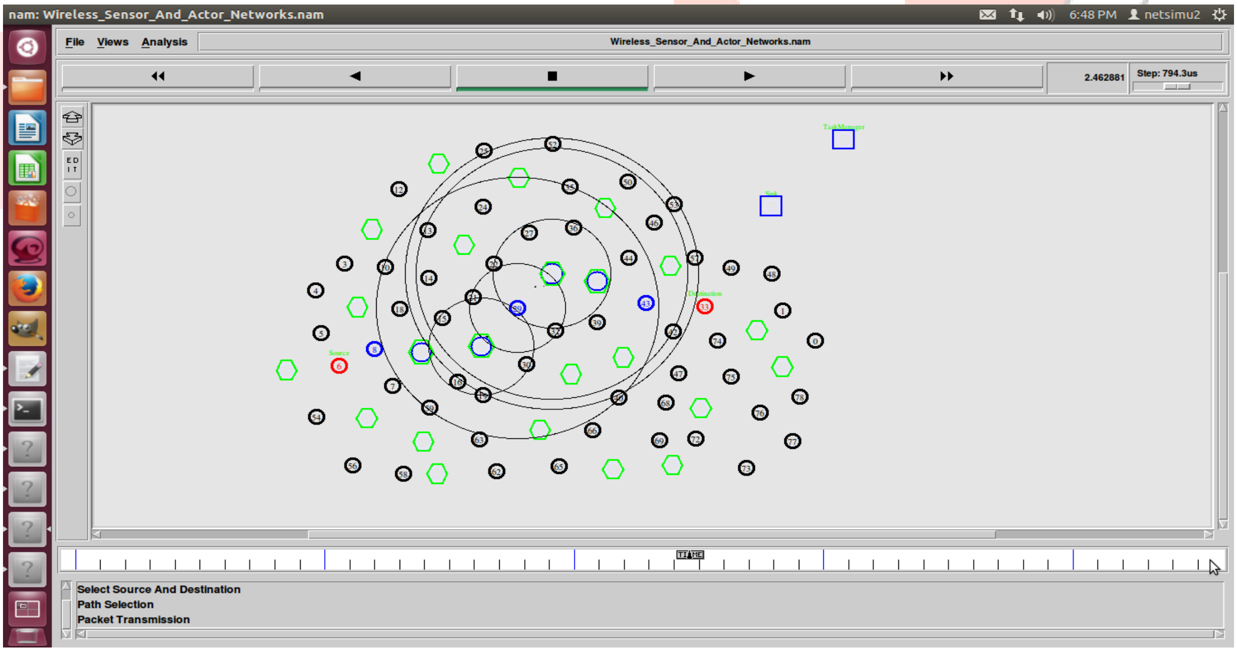


目标: sploit.com scans.io github.com pwnies.com

配置:

命令: ./nmap -T4 -A -d -F -n -oA /tmp/popsites zmap.io kali.org shodan.io defcon.org blackhat.com seclists.org metasploit.com s

Fig.4 Map of the networks



Select Source And Destination
Path Selection
Packet Transmission

nam: Wireless_Sensor_And_Actor_Networks.nam
6:48 PM
netsimu2
File
Views
Analysis
Wireless_Sensor_And_Actor_Networks.nam
2.462881
Step: 794.3us
EDIT

Fig.5 Network simulation output

VI. Conclusion

The created mesh network provides the data waste management, non initialization payment and proper authentication. Under data waste management, the wastage of data in megabytes or gigabytes can be avoided by point system. In other words, the excess of data can be shared to other person and points can be gained which was useful in future under emergency situation when a person needs the network. The non initialization payment shows that people need not to pay initially because it was in the format of points, so this was another advantage of mesh network. Finally, the proper authentication was done by a server entails the use of a user name and password. The security was provided using the wifi securities like Wired Equivalent Privacy (WEP), Wireless Protected Access (WPA), WPA2 and Extensible Authentication Protocol (EAP).

VII. Future Work

The future work is of two ideas first thing is work on one time authentication in the mesh network a person can access to any access point in that mesh network the usage of ad hoc wireless transmission of user information so a person doesn't need to authenticate every time to access different access points. Second thing is to give a person help about place locally and popup about nearby shop advertisements and offers available in the shop around the place of user location this can be achieved by the way of mesh network the user need not to be connected with internet he can also access to the map locally without internet which will be more useful for a person without internet at that time.

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