

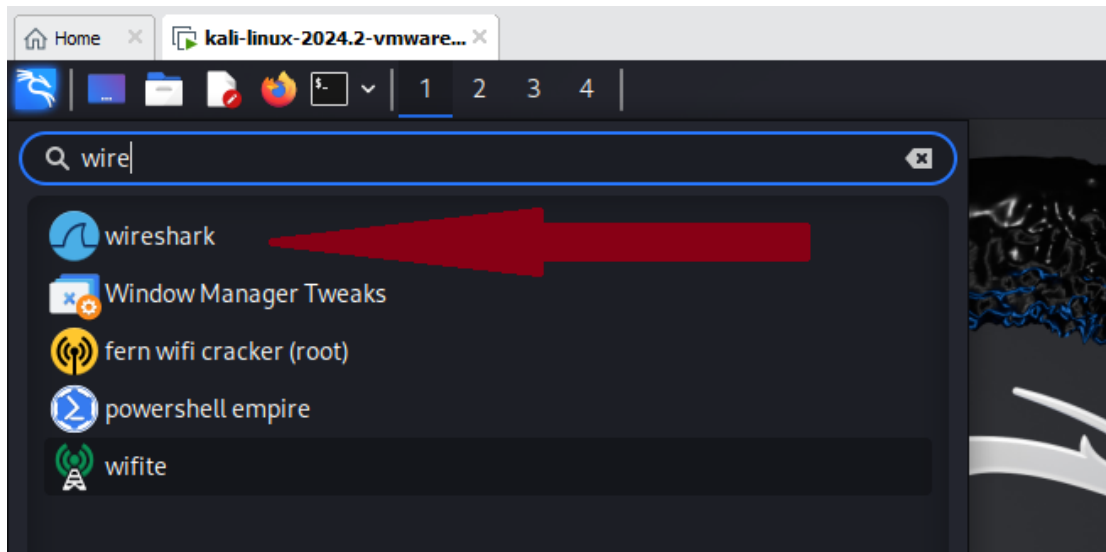
PENTESTING RECONNAISSANCE TOOLS

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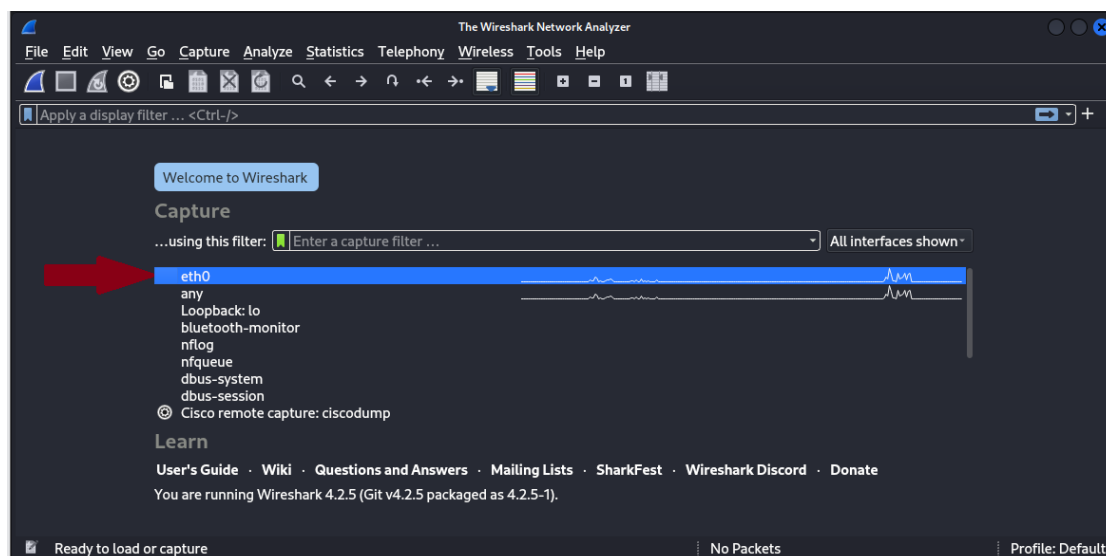
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WIRESHARK

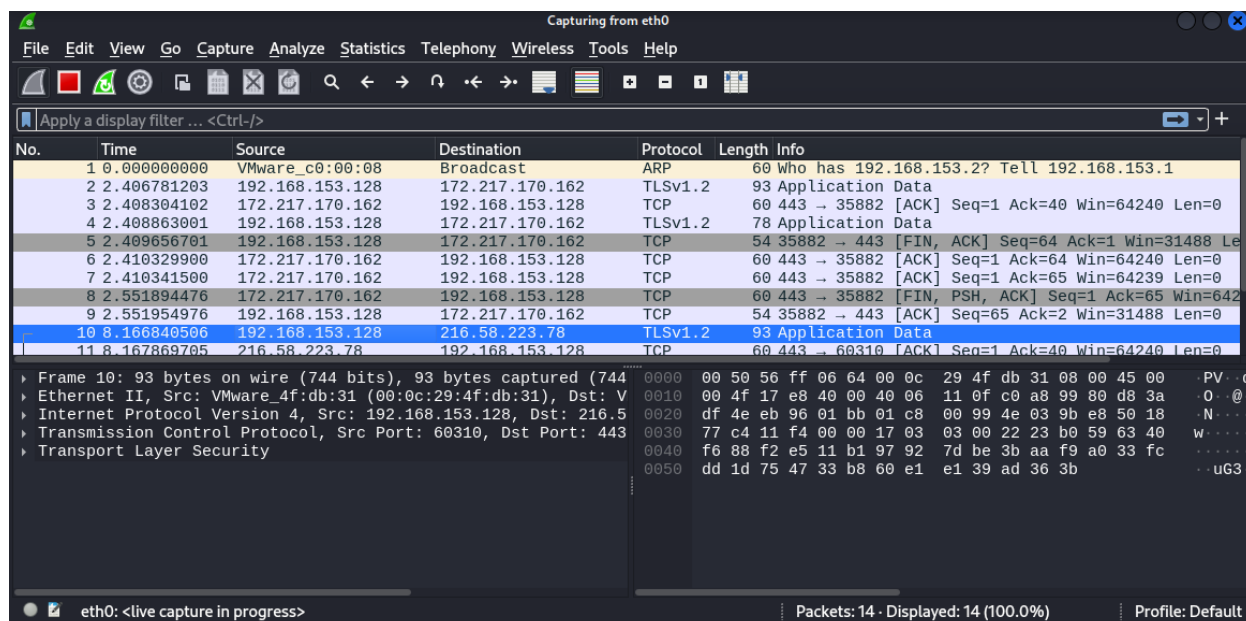
Wireshark is an inbuilt software readily available in Kali Linux Operating Systems (it does not need to be downloaded). Wireshark is an open source network analyzer that can capture and display real-time details of network traffic. It is particularly useful for troubleshooting network issues, analyzing network protocols and ensuring network security. Saved Captures from the Wireshark application use the file extension .pcapng



While using VMware, in order to record/scan activity from your computer, change the Network Adapter setting to **NAT** (Network Address Translation), but if you're monitoring activity from outside your computer but on the network you are on, Use the Network Adapter setting **Bridged**.



Upon opening Wireshark you will quickly notice “Eth0” is your host machine’s network card. When trying to hack into a Wi-Fi network you will need an external network adapter. (Alfa Card Network Adapter.)

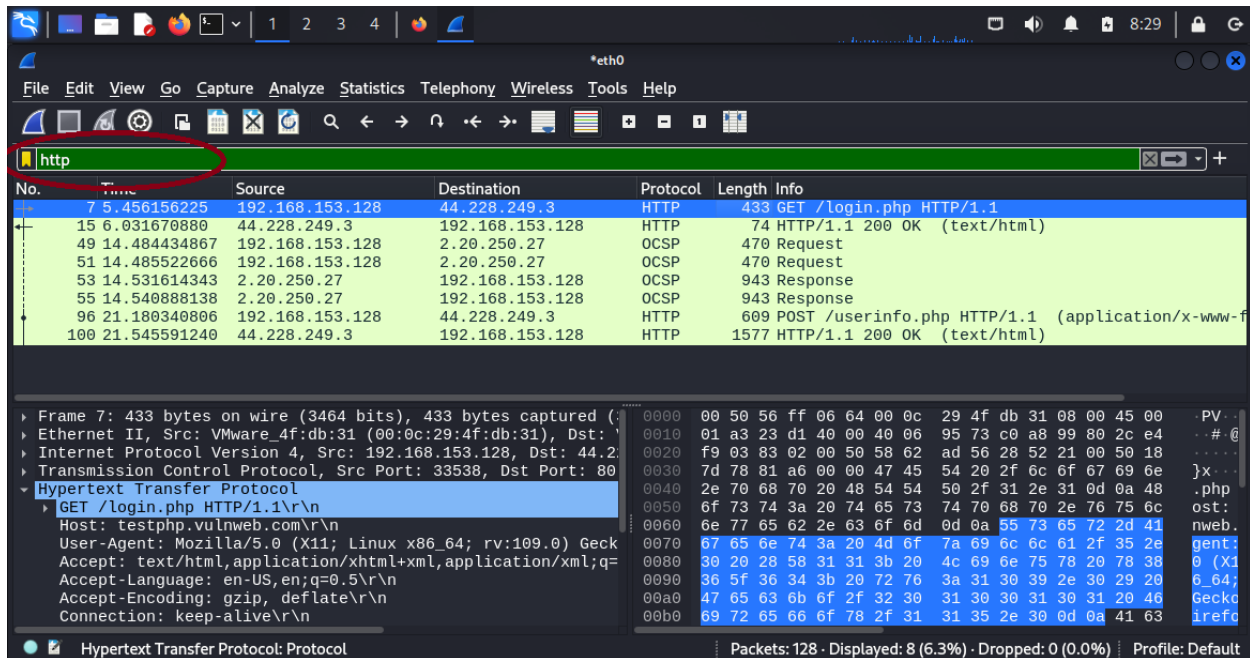


When you click into the “Eth0” adapter, you will be able to monitor the packets being transferred through the network you are currently connected to. For example you can try opening this webpage on your browser testphp.vulnweb.com/login.php

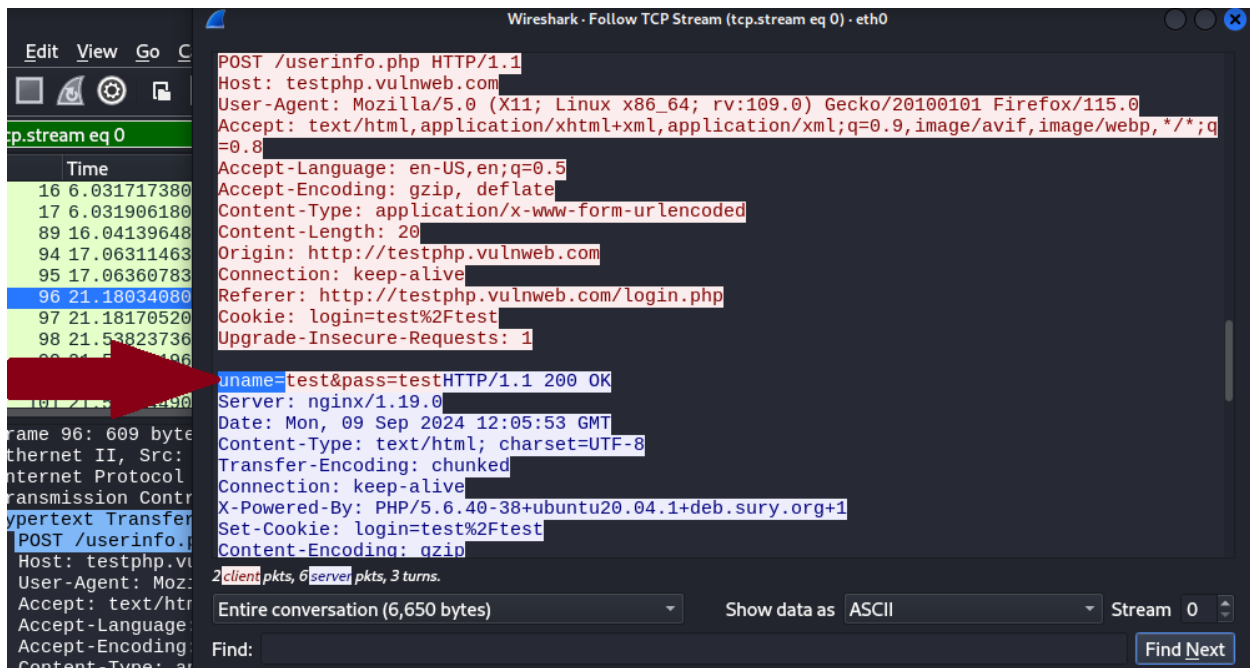
This webpage is used by learners to use vulnerability scanners and other tools. So for example you want to capture the information you key in specifically into this website, perform the following:

1. Open the website on your browser.
2. Go to Wireshark and make sure that it is not recording any data or reset and clear any old data, (this step reduces traffic information flowing through. Makes it easy to monitor the exact data we’re looking for rather than sifting through a lot of figures).
3. Go to back to the browser and type in the Username and Password for the page. Click login and observe what happened on Wireshark. Be sure to stop the recording.
4. Filter out the target protocols and observe for further information.
 - a. The packets captured are still plenty which is why it is important to know who or what it is that you’re targeting beforehand. Important info may include: The

Protocol for example a website using **HTTP/HTTPS** (Simply type it into the filter),
the IP Address of the target machine (ip.addr==192.168.0.100).



5. For this example, we know that the website we're monitoring is HTTP, we know that there is a login page and we know that some information was sent through the network to enable the user to login. Now for us to know what exactly what transferred through that network, we need to right click on the exact packet => click on follow => then click on TCP Stream.
 - a. **TAKE NOTE:** The information in red is the devices' sent data packet, while the blue section is the response from the server.
 - b. From the image below, the highlighted section will reveal the Username and Password that was input. These are the parameters of the data packet sent from the computer to the server.



WHOIS

This is a website (whois.com) used to register domains and keeps track of your registered data when claiming a domain. It allows anyone to do a domain lookup (investigating for more information about a specific website). You're able to find out, **who owns** a website, whether it's a company or an individual details provided may include: Name, Email and Phone Number, Country, P.O Box, and Street Info (unless redacted for privacy purposes). You can also find out when the domain was **registered**, when the domain license **expires** and when it was **last updated**.

A similar website is arin.net



Use the Whois Search

From this point onwards, we will perform a full reconnaissance of Jumia through their website jumia.co.ke. See results below:

jumia.co.ke

Updated 1 second ago ↻

Domain Information	
Domain:	jumia.co.ke
Registrar:	Afriregister Limited
Registered On:	2012-06-26
Expires On:	2025-06-26
Updated On:	2023-05-31
Status:	active
Name Servers:	ns-650.awsdns-17.net ns-2012.awsdns-59.co.uk ns-1111.awsdns-10.org ns-328.awsdns-41.com

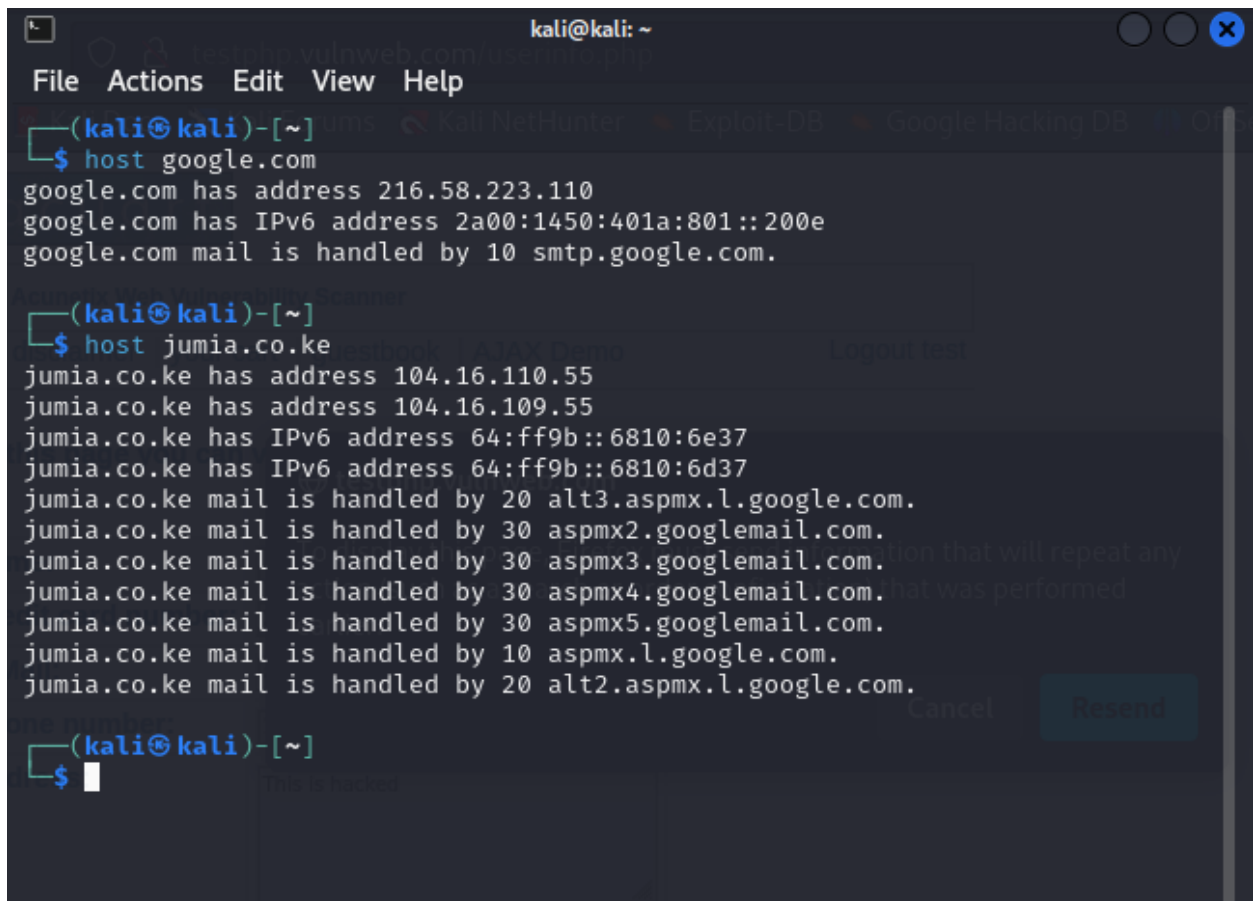
Registrant Contact	
Organization:	Jumia Services GmbH
Country:	DE

Raw Whois Data

```
Domain Name: jumia.co.ke
Registry Domain ID: 72462-KENIC
Registrar URL: null
Updated Date: 2023-05-31T20:01:27Z
Creation Date: 2012-06-26T17:01:58Z
Registry Expiry Date: 2025-06-26T17:01:58Z
Registrar Registration Expiration Date: 2025-06-26T17:01:58Z
Domain Status: active https://icann.org/epp#active
Registrar: Afriregister Limited
Registrar Address: Riara Rd, Bamboo ln
P.O. Box 21682 - 00100
Nairobi
Registrar Country: KE
Registrar Abuse Contact Email: admin@afriregister.co.ke
Registrar Abuse Contact Phone: Registry Registrant ID: 480952-KENIC
Registrant Name: REDACTED FOR PRIVACY
Registrant Organization: Jumia Services GmbH
Registrant Street: REDACTED FOR PRIVACY
Registrant City: REDACTED FOR PRIVACY
Registrant State/Province: REDACTED FOR PRIVACY
Registrant Postal Code: REDACTED FOR PRIVACY
Registrant Country: DE
Registrant Phone: REDACTED FOR PRIVACY
Registrant Email: REDACTED FOR PRIVACY
```

HOSTING

To find out the IP Address of a website open the Linux Terminal => use the host key word e.g.
host jumia.co.ke

A screenshot of a Kali Linux terminal window. The window title is 'kali@kali: ~'. The terminal shows the execution of the 'host' command for two domains. First, 'host google.com' is entered, resulting in three lines of output: 'google.com has address 216.58.223.110', 'google.com has IPv6 address 2a00:1450:401a:801::200e', and 'google.com mail is handled by 10 smtp.google.com.'. Then, 'host jumia.co.ke' is entered, resulting in eight lines of output: 'jumia.co.ke has address 104.16.110.55', 'jumia.co.ke has address 104.16.109.55', 'jumia.co.ke has IPv6 address 64:ff9b::6810:6e37', 'jumia.co.ke has IPv6 address 64:ff9b::6810:6d37', and five lines stating 'jumia.co.ke mail is handled by' followed by different Google mail server addresses. The terminal prompt is currently at the start of a new line after the last command.

```
kali@kali: ~  
File Actions Edit View Help  
(kali@kali)-[~]  
$ host google.com  
google.com has address 216.58.223.110  
google.com has IPv6 address 2a00:1450:401a:801::200e  
google.com mail is handled by 10 smtp.google.com.  
  
(kali@kali)-[~]  
$ host jumia.co.ke  
jumia.co.ke has address 104.16.110.55  
jumia.co.ke has address 104.16.109.55  
jumia.co.ke has IPv6 address 64:ff9b::6810:6e37  
jumia.co.ke has IPv6 address 64:ff9b::6810:6d37  
jumia.co.ke mail is handled by 20 alt3.aspmx.l.google.com.  
jumia.co.ke mail is handled by 30 aspmx2.googlemail.com.  
jumia.co.ke mail is handled by 30 aspmx3.googlemail.com.  
jumia.co.ke mail is handled by 30 aspmx4.googlemail.com.  
jumia.co.ke mail is handled by 30 aspmx5.googlemail.com.  
jumia.co.ke mail is handled by 10 aspmx.l.google.com.  
jumia.co.ke mail is handled by 20 alt2.aspmx.l.google.com.  
  
(kali@kali)-[~]  
$
```

With these IP Addresses you can not only launch a Whois search, but you can now also find out the exact location of the servers using ip2location.

IP2LOCATION

IP2Location is a non-intrusive website (ip2location.com) with IP location lookup technology that retrieves geolocation information with no explicit permission required from users. In simple terms, if you have the IP Address of a hosted website, you can track their location from this website.

Why is this important? Having gathered the IP Address of the target website, it is important to confirm not only the location of the servers but also to perform a further survey of the layout of where the server is.

Let's continue with the example of Jumia's website and find out more about the physical location of the company's resources.

IP2LOCATION

Home Solutions ▾ Products ▾ Pricing Resources ▾ → Log In ▾

0 item | US\$0.00

IP Lookup Result ¹

Share The Result

Geolocation Data

The geolocation data uses [IP2Location DB26](#) geolocation database.

Permalink	https://www.ip2location.com/104.16.110.55
<input checked="" type="checkbox"/> IP Address	104.16.110.55
<input type="checkbox"/> Country	United States of America [US]
<input type="checkbox"/> Region	California
<input type="checkbox"/> City	San Francisco
<input type="checkbox"/> Coordinates of City ¹	37.775700, -122.395200 (37°46'33"N 122°23'43"W)
<input type="checkbox"/> ISP	CloudFlare Inc.
<input type="checkbox"/> Local Time	09 Sep, 2024 05:29 PM (UTC -07:00)
<input type="checkbox"/> Domain	cloudflare.com
<input type="checkbox"/> Net Speed	(T1) Data Center/Transit
<input type="checkbox"/> IDD & Area Code	(1) 415
<input type="checkbox"/> ZIP Code	94107
<input type="checkbox"/> Weather Station	San Francisco (USCA0987)
<input type="checkbox"/> Mobile Carrier	-
<input type="checkbox"/> Mobile Country Code	-
<input type="checkbox"/> Mobile Network Code	-
<input type="checkbox"/> Elevation	14m
<input type="checkbox"/> Usage Type	(CDN) Content Delivery Network
<input type="checkbox"/> Address Type	(A) Anycast
<input type="checkbox"/> Category	(IAB19-11) Data Centers
<input type="checkbox"/> District	City and County of San Francisco
<input type="checkbox"/> ASN	AS13335 CloudFlare Inc.
Olson Time Zone	America/Los_Angeles

Proxy Data

The proxy data uses [IP2Proxy PX11](#) proxy database.

<input checked="" type="checkbox"/> IP Address	104.16.110.55
<input type="checkbox"/> Anonymous Proxy	No
<input type="checkbox"/> Proxy Country	-
<input type="checkbox"/> Proxy Region	-
<input type="checkbox"/> Proxy City	-
<input type="checkbox"/> Proxy ISP	-
<input type="checkbox"/> Proxy Domain	-
<input type="checkbox"/> Proxy Usage Type	-
<input type="checkbox"/> Proxy Type	DCH
<input type="checkbox"/> Proxy ASN	-
<input type="checkbox"/> Threat	-
<input type="checkbox"/> Last Seen	-
<input type="checkbox"/> Provider	-

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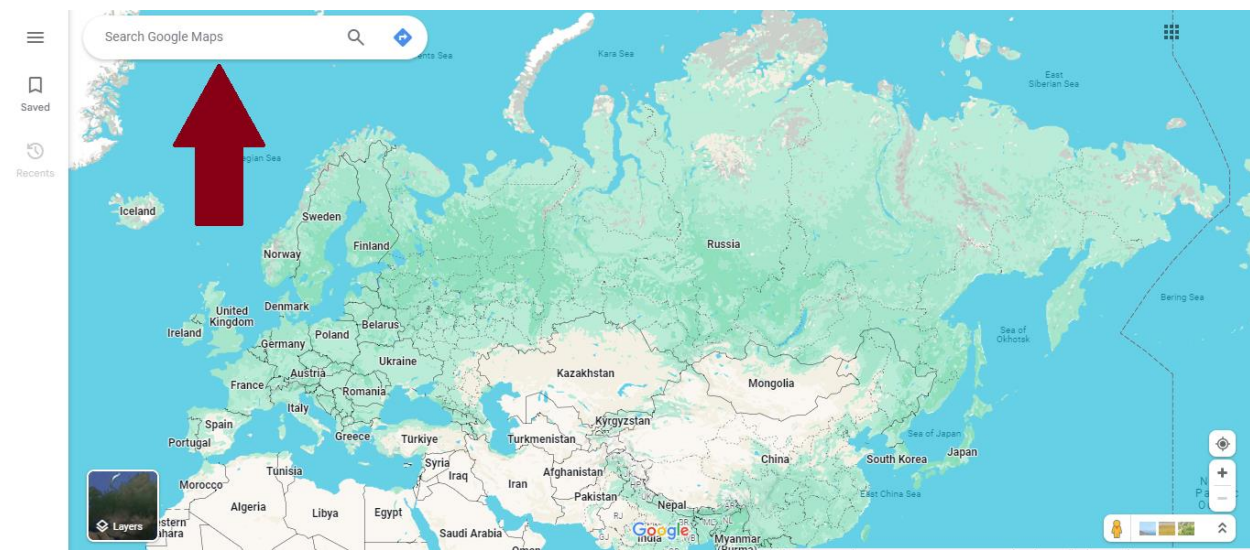
All of this is very important information but take note of the “Coordinates of the City”. Those are Longitude and Latitude showing the exact location of the servers. These can be copied into Google Maps so as to gain a layout of the environment.

GOOGLE MAPS

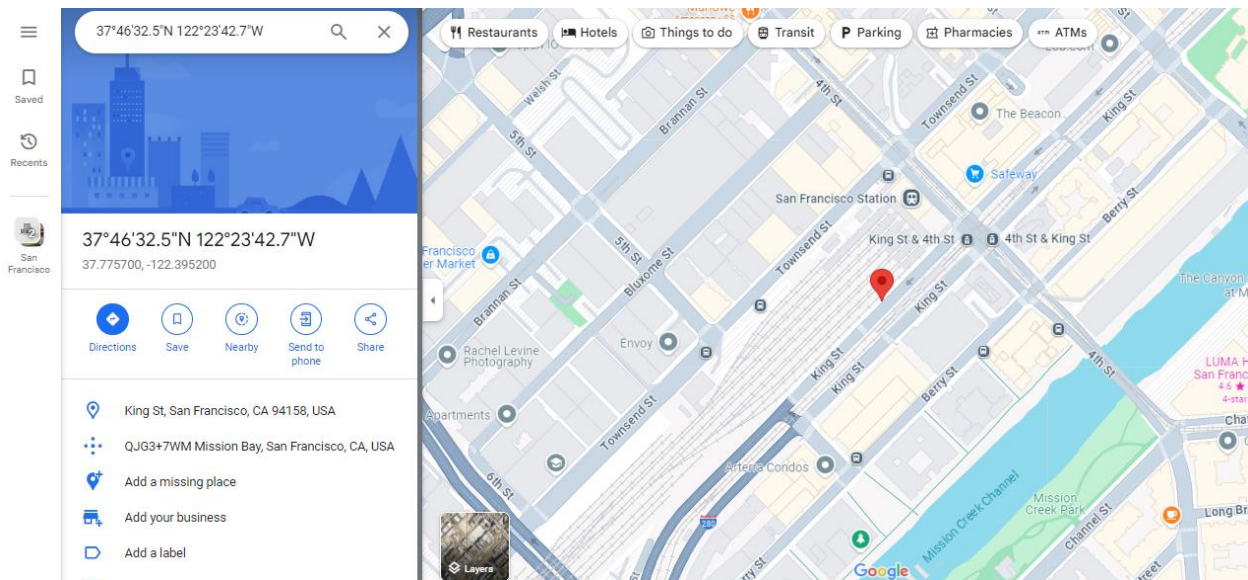
Google Maps is a widely used web mapping service developed by Google. It is a valuable tool in reconnaissance because it provides, site assessment, route planning if you’re going to visit the place physically, has street view for casual inspection of buildings and provides a deeper understanding of the geographical layout and any local amenities and business that may be relevant to your mission. Visit maps.google.com to explore the various tools.

Copy the coordinates given from the ip2location website. Take note that the coordinates are split into two types, either one of them will do.

Paste the coordinates to the search box on Google Maps.



If you are unfamiliar with the location it may be difficult to determine which exact building you’re targeting, but you can quickly survey the area around for CCTV cameras, police posts, crowded areas / tourist hotspots and so much more.



Above is the location of the Jumia Servers in San Francisco California.

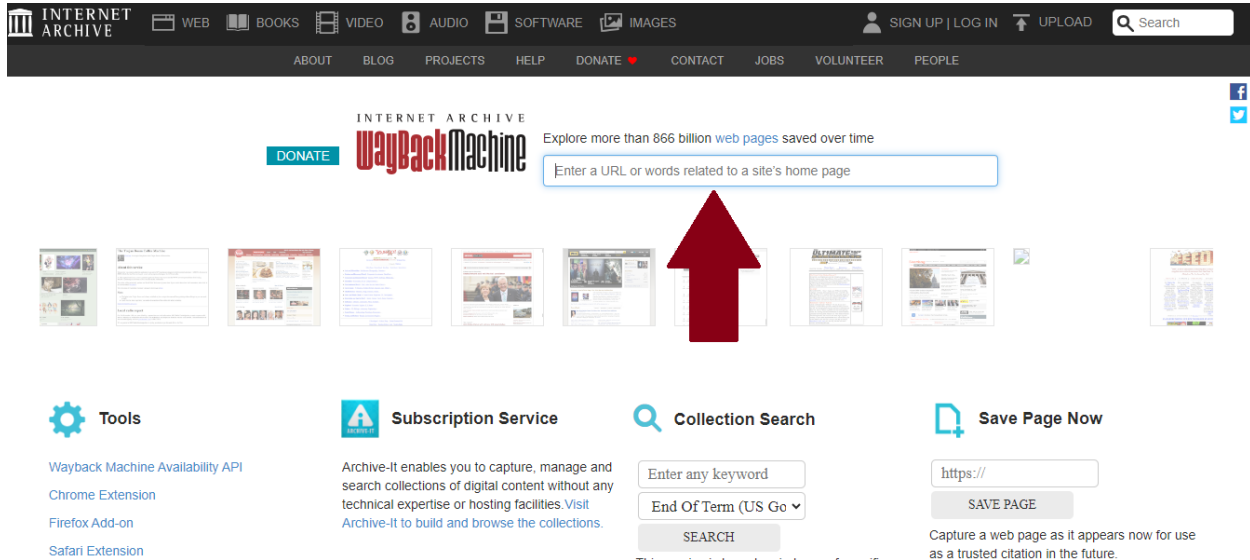


Using the street view tool, this is the supposed building that may contain the servers. One thing's for sure... They're in here somewhere.

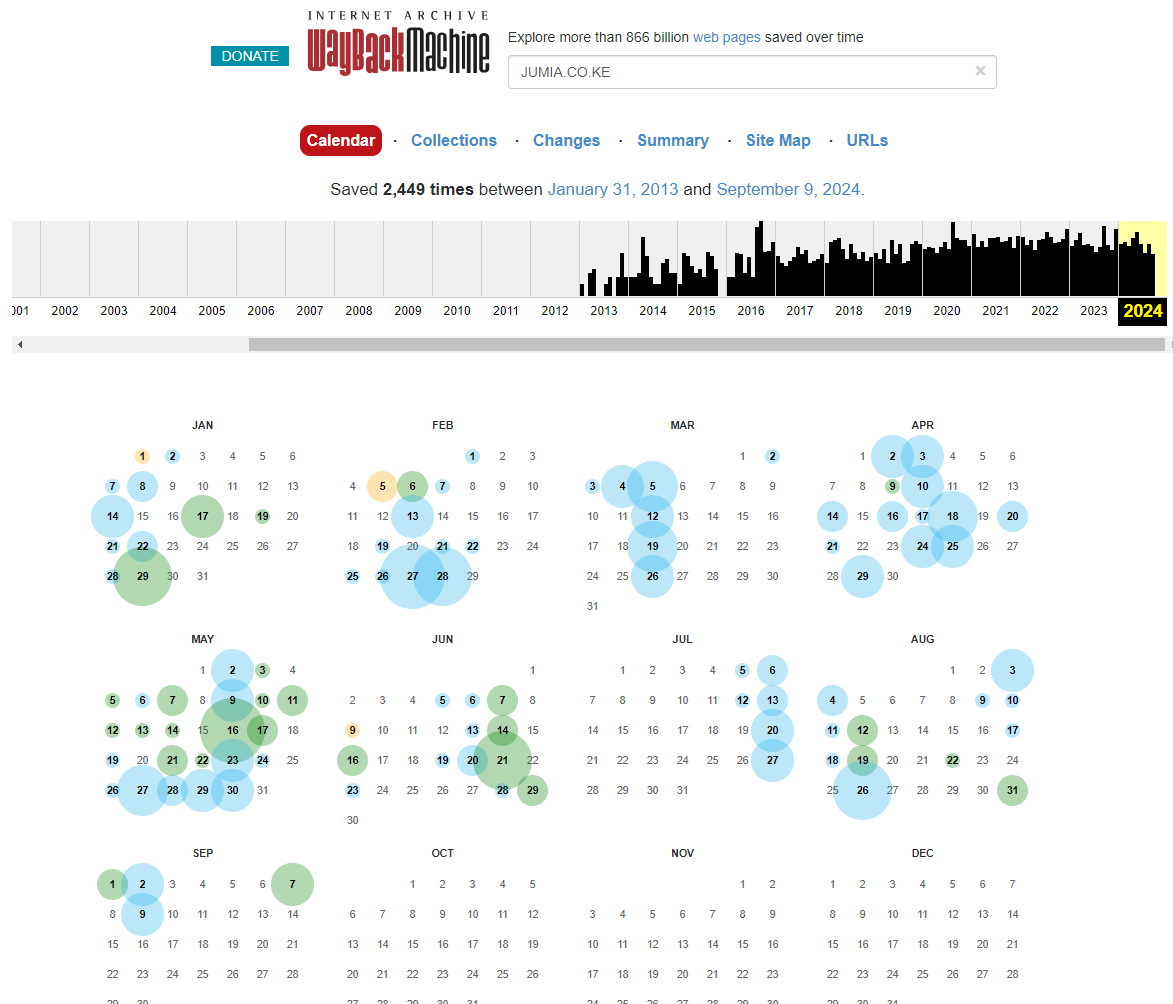
WAYBACK MACHINE

The Wayback Machine is a digital archive of the Internet. It allows users to view archived versions of web pages dating back to the early days of the internet. Users can select different dates to view how a website looked at various points in time, allowing them to see changes and historical content.

As seen in the photo below, this is the [Wayback Machine \(web.archive.org\)](http://web.archive.org)



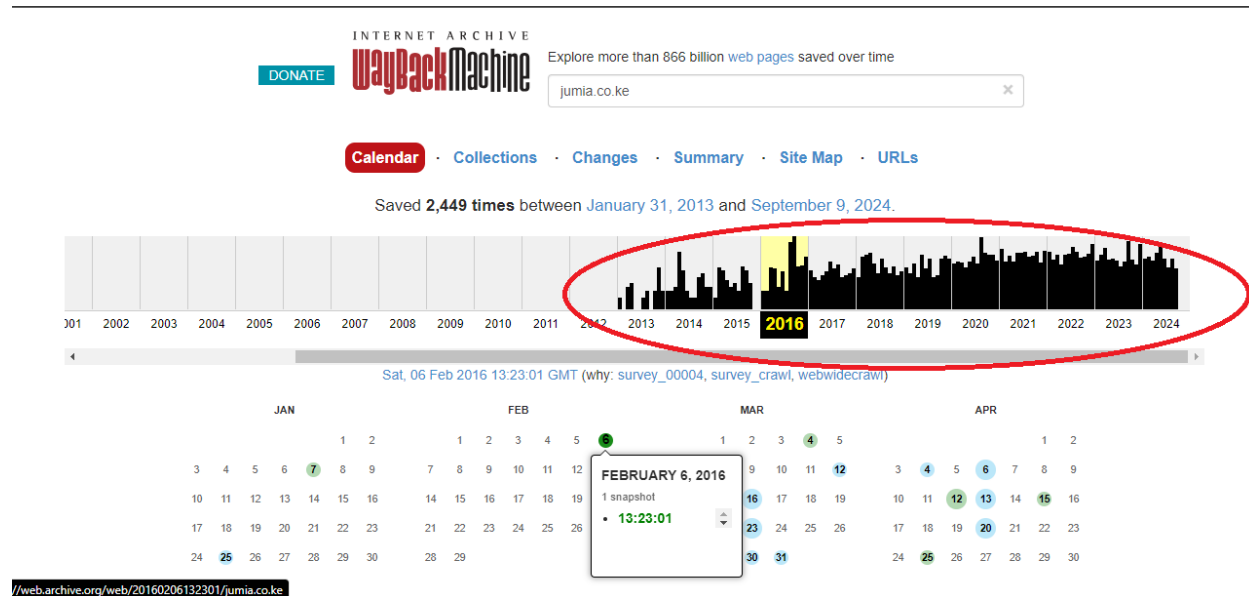
You can write down any webpage to try and explore the archived data (if any). For example we're going to continue using the Jumia webpage and find out more about it



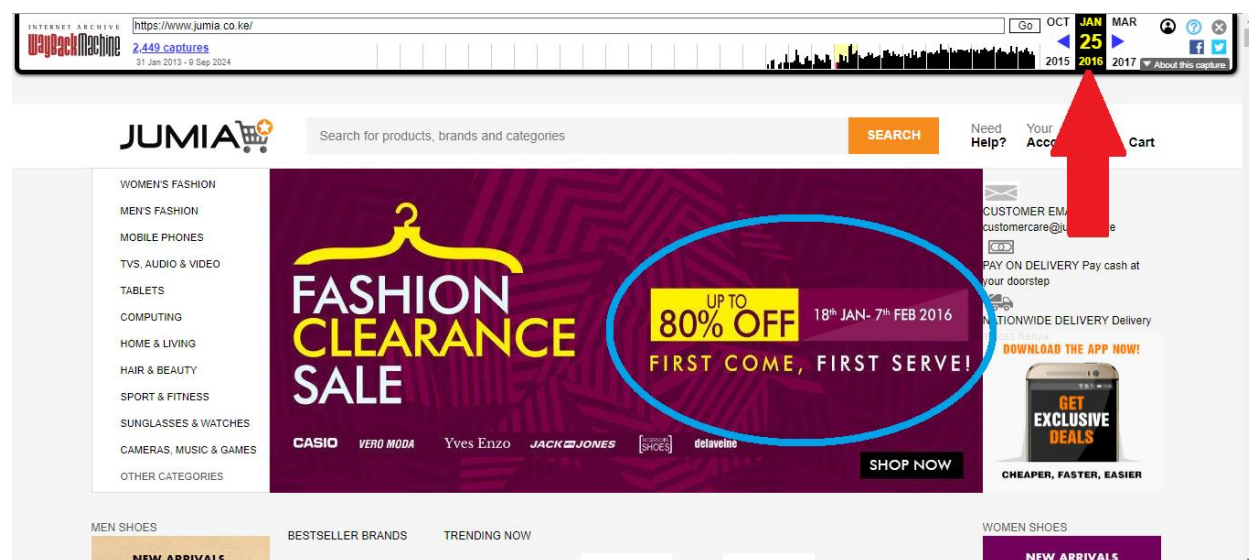
From this results page, we can take note of the following things:

- There were 2,449 captures / updates that have been archived in this website.
- The approximate date when the website was first launched / first updated (31st January 2013).
- The last update made to the website (9th September 2013).
- The frequency at which the website is being updated. From the screenshot above we can tell that there were many updates around April and May, probably in preparation for the “Back to School” discounts that guarantees many visitors to their sites.
- The various colours have meanings as well: Blue is a good result; the full page was archived without error, green means a redirect, orange represents a client error and red denotes a server error.

Take note of this highlighted timeline. This is the tool that will allow you to “travel back in time” specifically in relation to the website you are searching. You can click anywhere on the time line, in this example we clicked on 2016. Upon visiting that year, you will notice there are captures that were archived, for example this one on the 6th of February 2016.



Upon visiting the capture, you will get the website to open like in the screenshot below. You can confirm the exact date you have travelled to from the top right hand corner. The website itself will take time to load but usually you will get some kind of content to confirm that it is successful, such as what I have highlighted in blue (The discount offers at that point in time).



GOOGLE DORKING

A Google Dork is a search query that looks for specific information on Google's search engine. It uses advanced search filters that allow to retrieve more efficient results. It is a technique often used by cybersecurity professionals in order to find valuable information about a target. They can be used to find information that you didn't even know existed.

Below is an example of Search Operators you can try.

Operator	Description	Syntax	Example
()	Group multiple terms or operators. Allows advanced expressions	(<term> or <operator>)	inurl:(html php)
*	Wildcard. Matches any word	<text> * <text>	How to * a computer
""	The given keyword has to match exactly. <i>case-insensitive</i>	"<keywords>"	"google"
m..n / m...n	Search for a range of numbers. <i>n</i> should be greater than <i>m</i>	<number>..<number>	1..100
-	Documents that match the operator are excluded. <i>NOT-Operator</i>	-<operator>	-site:youtube.com
+	Include documents that match the operator	+<operator>	+site:youtube.com

Operator	Description	Syntax	Example
	Logical <i>OR-Operator</i> . Only one operator needs to match in order for the overall expression to match	<operator> <operator>	"google" "yahoo"
~	Search for synonyms of the given word. Not supported by Google	~<word>	~book
@	Perform a search only on the given social media platform. Rather use site	@<socialmedia>	@instagram
after	Search for documents published / indexed after the given date	after:<yy(-mm-dd)>	after:2020-06-03
allintitle	Same as intitle but allows multiple keywords separated by a space	allintitle:<keywords>	allintitle:dog cat
allinurl	Same as inurl but allows multiple keywords separated by a space	allinurl:<keywords>	allinurl:search com

Operator	Description	Syntax	Example
allintext	Same as intext but allows multiple keywords separated by a space	allintext:<keywords>	allintext:math science university
AROUND	Search for documents in which the first word is up to n words away from the second word and vice versa	<word1> AROUND(<n>) <word2>	google AROUND(10) good
author	Search for articles written by the given author if applicable	author:<name>	author:Max
before	Search for documents published / indexed before the given date	before:<yy(-mm-dd)>	before:2020-06-03
cache	Search on the cached version of the given website. Uses Google's cache to do so	cache:<domain>	cache:google.com
contains	Search for documents that link to the given filetype. Not supported by Google	contains:<filetype>	contains:pdf

Operator	Description	Syntax	Example
date	Search for documents published within the past n months. Not supported by Google	date:<number>	date:3
define	Search for the definition of the given word	define:<word>	define:funny
ext	Search for a specific filetype	ext:<documenttype>	ext:pdf
filetype	Refer to ext	filetype:<documenttype>	filetype:pdf
inanchor	Search for the given keyword in a website's anchors	inanchor:<keyword>	inanchor:security
index of	Search for documents containing direct downloads	index of:<term>	index of:mp4 videos
info	Search for information about a website	info:<domain>	info:google.com
intext	Keyword needs to be in the text of the document	intext:<keyword>	intext:news

Operator	Description	Syntax	Example
intitle	Keyword needs to be in the title of the document	intitle:<keyword>	intitle:money
inurl	Keyword needs to be in the URL of the document	inurl:<keyword>	inurl:sheet
link / links	Search for documents whose links contain the given keyword. Useful for finding documents that link to a specific website	link:<keyword>	link:google
location	Show documents based on the given location	location:<location>	location:USA
numrange	Refer to m..n	numrange:<number>-<number>	numrange:1-100
OR	Refer to	<operator> OR <operator>	"google" OR "yahoo"
phonebook	Search for related phone numbers associated with the given name	phonebook:<name>	phonebook:"william smith"

Operator	Description	Syntax	Example
relate / related	Search for documents that are related to the given website	relate:<domain>	relate:google.com
safesearch	Exclude adult content such as pornographic videos	safesearch:<keyword>	safesearch:sex
source	Search on a specific news site. Rather use site	source:<news>	source:theguardian
site	Search on the given site. Given argument might also be just a TLD such as com, net , etc	site:<domain>	site:google.com
stock	Search for information about a market stock	stock:<stock>	stock:dax
weather	Search for information about the weather of the given location	weather:<location>	weather:Miami