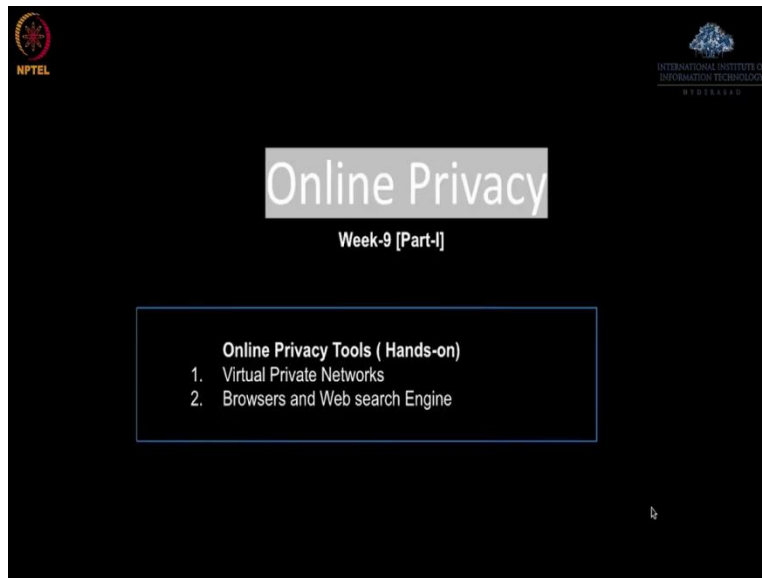


Online Privacy
Week-9 [Part-1]
Online Privacy Tools (Hands-on)
Virtual Private Networks
Browsers and Web search Engine

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Hello, everyone. Welcome to NPTEL Week-9 online privacy course. In this week, we will study different Online Privacy Tools.

So, the first question is why do we need online privacy tools? Someone might say that my life is a open book. So, the answer is, that is why you need to safeguard your privacy online.

So, in this week, we will study about different privacy tools, which already many individuals have adopted, such as Virtual Private Networks, VPNs, Browser Web search Engines, followed by password managers and instant messengers with encryption in more detail in the next section.

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Online Privacy Tools

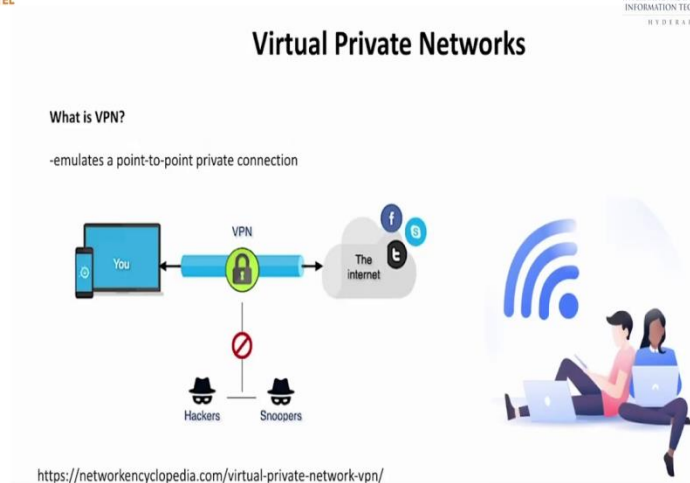
1. **Virtual Private Networks (VPN)**
 - a. What is VPN?
 - b. Types of VPN technologies
 - c. Popular VPN services
 - i. [NordVPN](#)
 - ii. [ExpressVPN](#)
 - iii. [TunnelBear](#)
 - iv. [ProtonVPN](#)
 - d. VPN installation/usage
2. **Is your browser leaving Footprints when you browse on the Web?**
 - a. Recommended Browsers (Hands-on)
 - i. Brave
 - ii. Tor
 - b. Web search engine (Hands-on)
 - i. DuckDuckGo
 - ii. SearX

Now, why do we need these such kind of tools? In the earlier weeks, you already studied about how the advertisers like Google and Facebook, they want to know everything about you, including your web browsing history, location data, contents, and much more. This may make it easier for that to serve your targeted ads and influence your business.

So, in order to keep your family safe guard, we need to adopt some kind of tools which will help you prevent from tracking online, help in preventing your identity theft, safeguard your privacy, and also protect your business from cyber criminals.

So, looking into more detail of it, we will first look at what is VPN? Which are the different types of VPN technologies? What are the popular VPN services? NordVPN, ExpressVPN, TunnelBear, ProtonVPN. How can we actually install and use such kind of VPNs? And is your browser leaving footprints when you browse on the web? That is where we will also look at having a private browsing mechanism using Brave and Tor browsers, web search engines, DuckDuckGo, SearX.

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Now, let us first of all discuss what is VPN. So, VPN are called as Virtual Private Networks, which can be defined as point to point private link.

So, basically, you enclose, a enclose a link or VPN happy to enclose link across the shared network. On the right hand side, you see, there is an internet and left hand side, you can see let us say you want to send some data across the computers connected via public network. And here your VPN it will evaluate a point to point private connection.

Now, what do you mean by evaluating point to point link? So, it means that your data is encapsulated within a hider that provides routing information, allowing you to traverse the share of public internet network to reach its endpoint.

So, encapsulation can be thought of let us say, you want to send somebody a letter, you enclose it inside an envelope, and you write address over it. And this kind of address or information, while sending the packet across the network is routing address. That is how encapsulation is done.

And secondly, to emulate the private connection, this data is being encrypted using some computational keys, and without these keys, you cannot decipher or decrypt these backups. So, therefore, your private data, it is encapsulated and encrypted, that is known as a virtual private network.

Now, the question is what are the different benefits of using VPN? Why should we care about VPN? So, there are a couple of benefits. The first is that you might have realized that during COVID pandemic times or maybe while you are sick or maybe there are some disasters natural disaster that has happened in your area, during those times you are not able to come up to the organization. At that time in order to work remotely VPN connection, it allows you to connect to the organization server using the infrastructure, which is provided by public internet network and it forms a point to point connection between your computer and the organization server.

Therefore, it is keeping you secure, providing total safety, security, then it is also masking your online identity. At the same time, it blocks all the people, who are all the entities who are spying on you stealing your digital assets.

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VPN Technologies

- **Secure VPN**
 - Send encrypted traffic over the public Internet
 - Computationally expensive
- **Trusted VPN**
 - Use private circuits leased from a trusted comm. provider
- **Hybrid VPN**
 - Using a secure VPN over a trusted VPN

Next, let us look at what are the different technologies that can be used with the VPN. So, first is secure VPN. As the name suggests, secure, means all the data the traffic that you will send over the public internet that will be encrypted, and how it will be encrypted using some protocols like IPsec, Internet Protocol Security or SSL, Secure Socket Layer. So, these are secure protocols for sending the information over the information security over the internet.

So, they all are the works on different layer, the IPsec, it works on internet layer, where as SSL, it works on transport and application layer, but this secure VPN, it basically provides security

services. And the second point is that it is computationally expensive. (())(6:04)Can you think why it is computationally expensive? So, the answer is that as you already seen that secure VPN it relies on encryption.

So, relies on encryption, want to do some kind of cryptographic functions, which are heavily computationally expensive and make a heavy load on the server. So, administrator, usually they manage the server load by limiting the number of simultaneous connections that a server can handle.

Next is trusted VPN. So, you might have seen that trusted VPN, the concept before the trusted VPN, there were row privates circuits, which were leased from telecommunication vendors. Now, they have changed to private circuit, which are leased from a trusted communication provider.

So, these kind of technologies which are implemented over trusted VPN, they are APM circuits and Frame Relay Circuits or multi layer multi protocol label switching. So, trusted VPN helps you to provide a particular route for your data.

Now, the hybrid VPN as the name suggests that if you want to use a secure VPN over a trusted VPN that is called as a hybrid VPN, combining two kinds of secure VPN into one gateway for an instance IPsec and Secure Socket layer that is also known as hybrid VPN.

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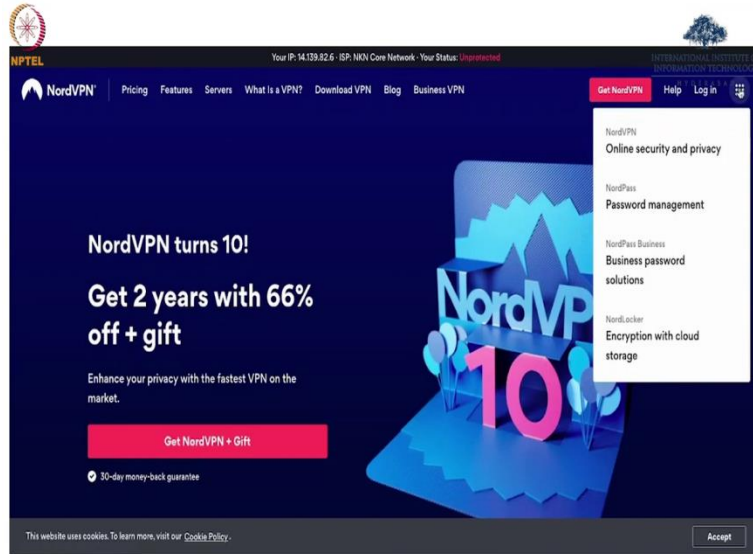
- Developed by **Nord Security**,
- Hide the IP address
- Encrypts all incoming and outgoing data
- Proprietary NordLynx technology
- Scans the dark web to determine if a user's personal credentials have been exposed.
- Sends a real-time alert, prompting the user to change the affected passwords.



Next, let us look at different kinds of popular VPN services. So, we will discuss about 4 different kinds of VPN. The first one we will discuss about is Nord VPN. You can see on the slide that Nord VPN, it is developed by Nord Security. It was developed in 2012. It is based in Panama, with offices located in UK with Union Netherlands, and you can hide your IP address as in Nord VPN, it encrypts all your incoming and outgoing data.

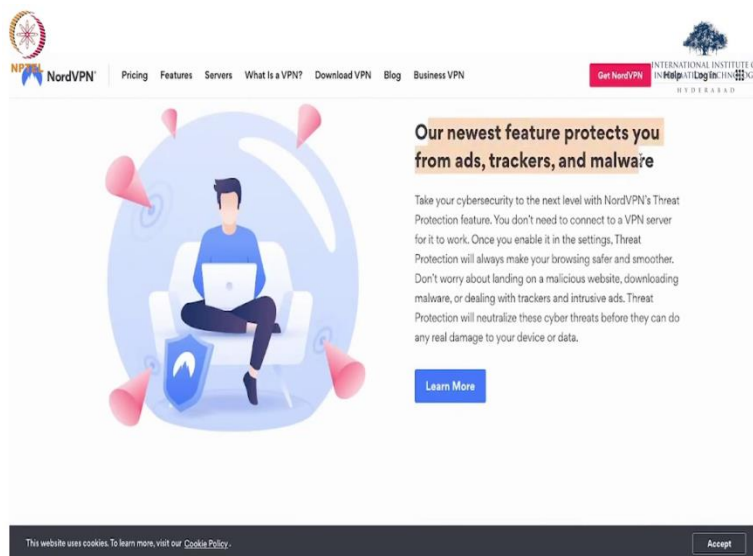
There is a NordLynx technology which is recently introduced by this VPN. It also scans the dark web, which is one of the important features because it comes to the mind that if your personal credentials have been exposed or not. Next, it also sends a real time alert, prompting the user to change the affected passwords.

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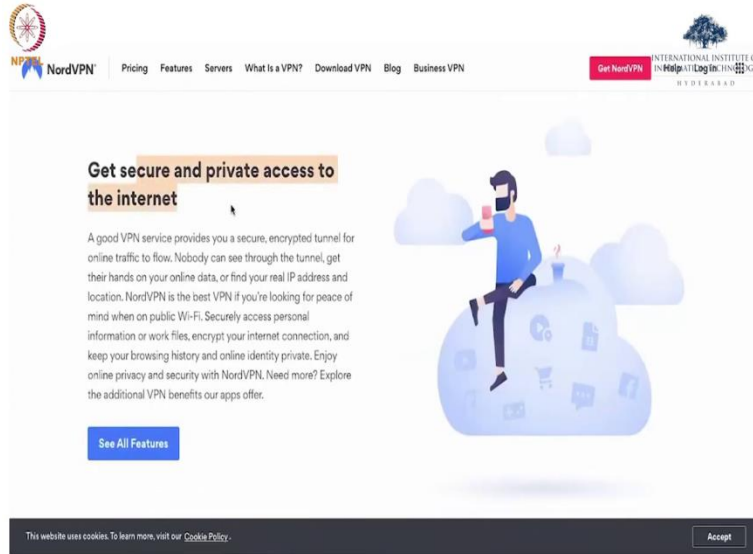
Now, let us have a look at how Nord VPN is being used. I can show you quickly the websites. So, this is Nord VPN dot com. Here you can see that there are different tabs, Pricing, Features, Servers, what is VPN? Download VPN, Blog, Business VPN, and on the right hand side you can see that how can we get Nord VPN and there is login button as well.

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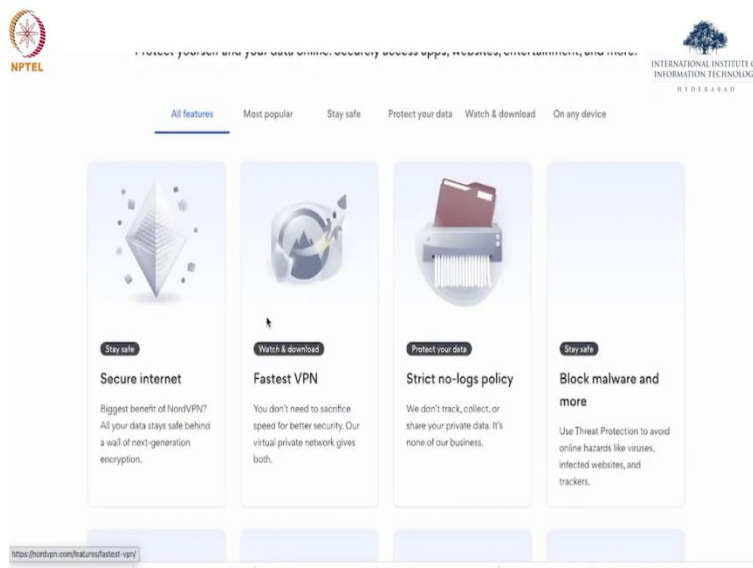
So, you can see here that there are different kind of features that are present here you can see that their newest features is to protect you from ads, trackers and malware.

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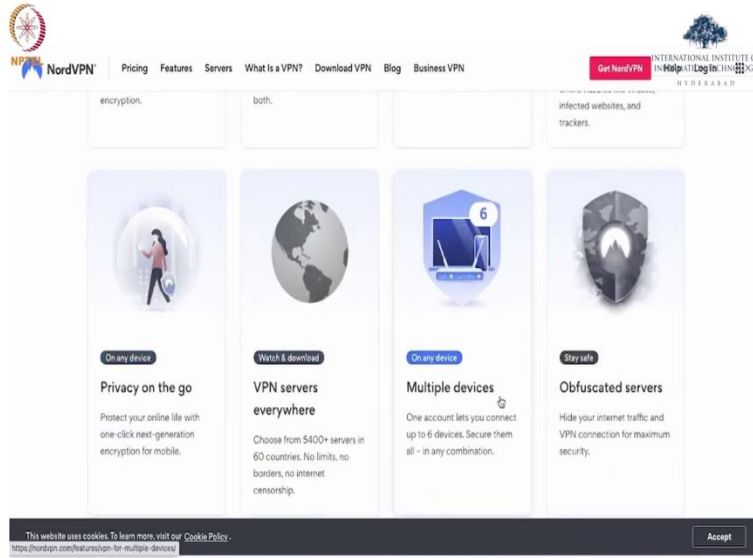
To get secure and private access to the internet, it is useful.

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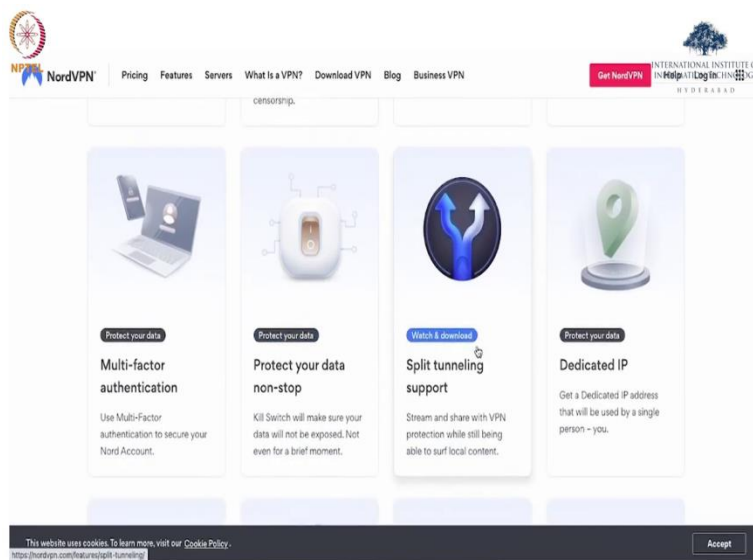
I can go to the Features section to actually walk you through what all different features are there. You can see here that this is one of the Fastest VPN, Strict no-logs policy which means it does not direct track or collect or share your private data, none of your business it blocks malware and more.

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There are also one of the important feature is you can connect multiple devices at a time up to 6 devices you can connect at a time. Now, it is also using some of this VPN server everywhere. They are Obfuscated servers everywhere which hide your internet traffic and VPN connection for maximum security. So, they are across 5400 Plus servers in 60 plus countries.

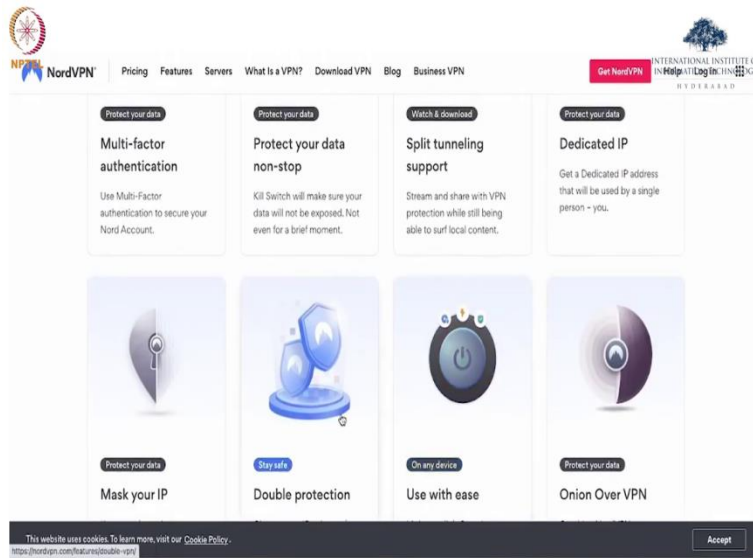
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Now, there are also technologies like you can flawlessly unblock your let us say Netflix, Netflix USA you want to use Nord VPN can unblock it. And it also provides your dedicated IP address

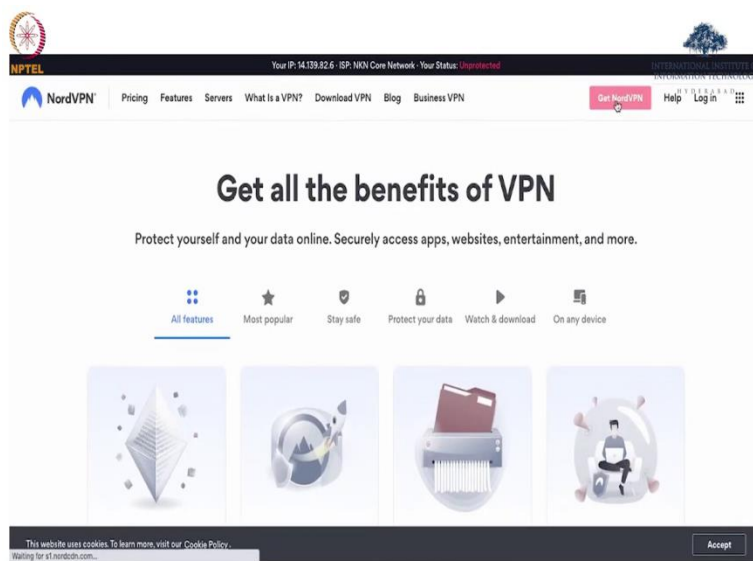
on the right hand side, it is a dedicated IP address. And also advanced leak protection it provides you.

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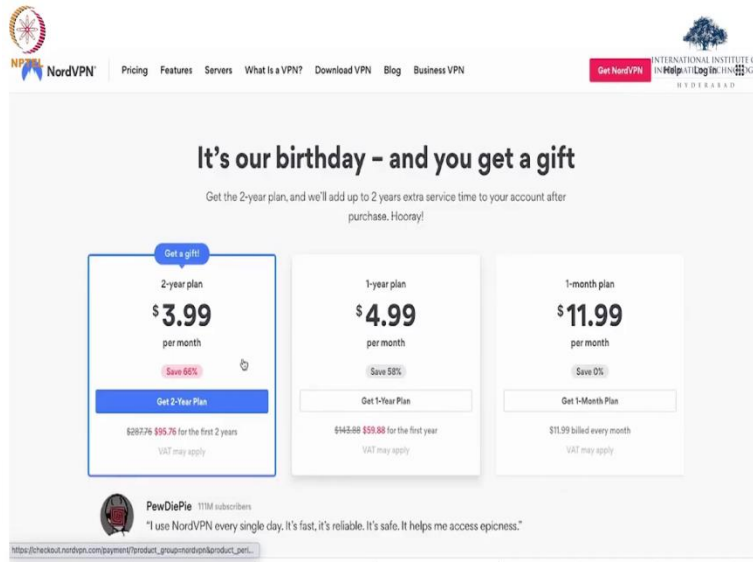
Then there is a double security layer that it has features like Tor, Onion Over VPN means combining this onion router, which helps you to provide anonymity. So, Nord VPN encryption with the anonymity provided by onion router that is one of the most important feature, then it is also it is also easy to use. So, these kinds of features are present with the Nord VPN.

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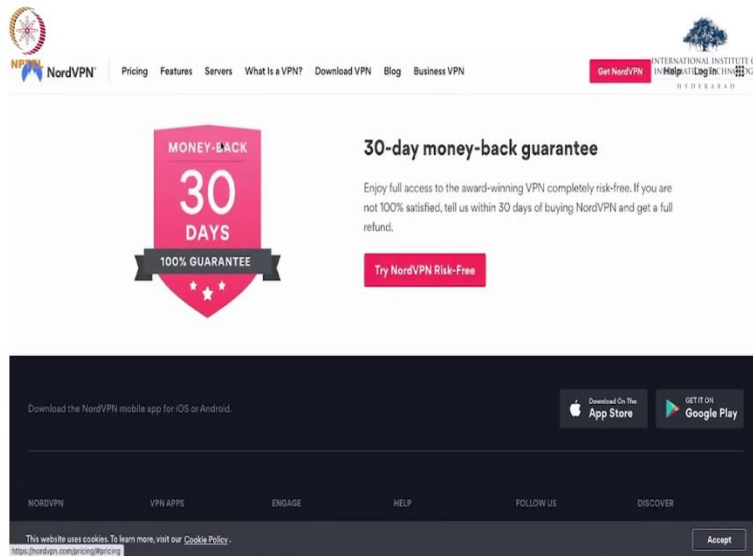
Now, how can you use it actually? You can click on Get Nord VPN on the right hand side.

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And you can see here that there are different plans and recently they have this birthday going on. So, that is why, Yeah, they have these plans that are present here.

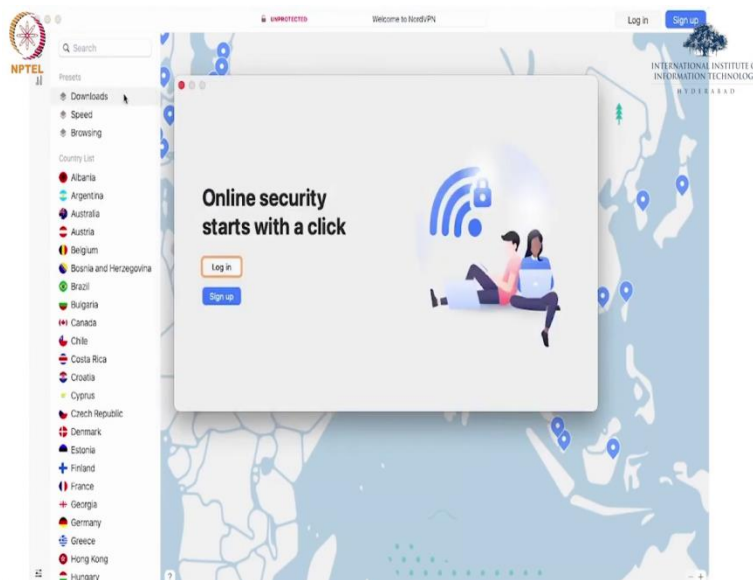
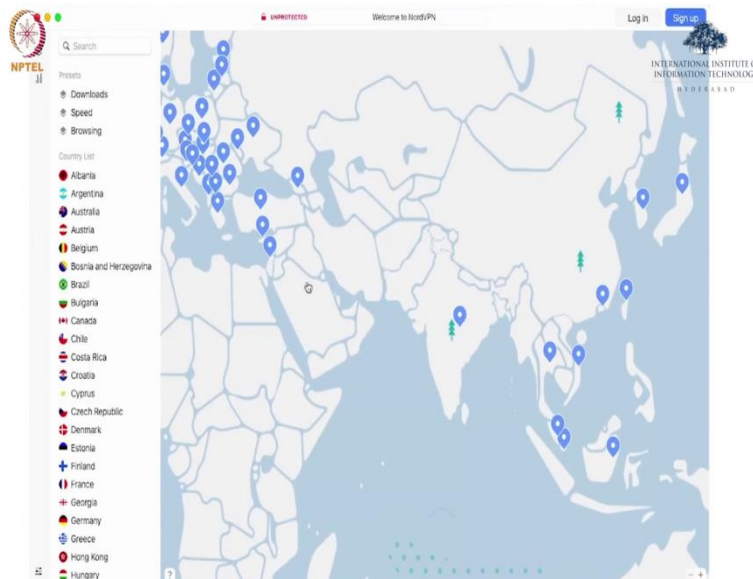
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Now, you can click on Get Nord VPN, there is also one more option that you will see here that you can see here that there is money back 30 days guarantee with the Nord VPN. And you can see here that you can get it on Google Play or as well as download on the App Store.

So, I will, you can click on this button. So, I have already downloaded this. I have already downloaded this Nord VPN. And I can quickly walk you through this.

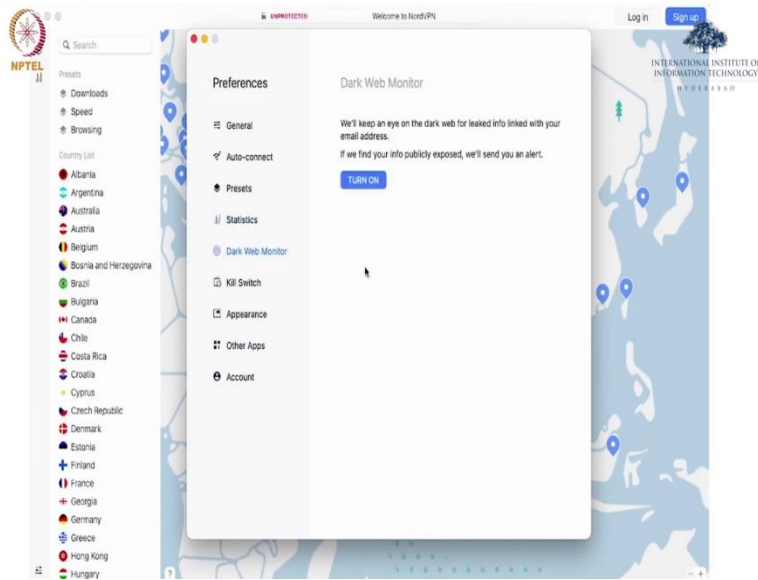
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As you can see here that this is the Nord VPN interface and these are the different countries that you can choose country from the country list, which you want to connect. And then you can log

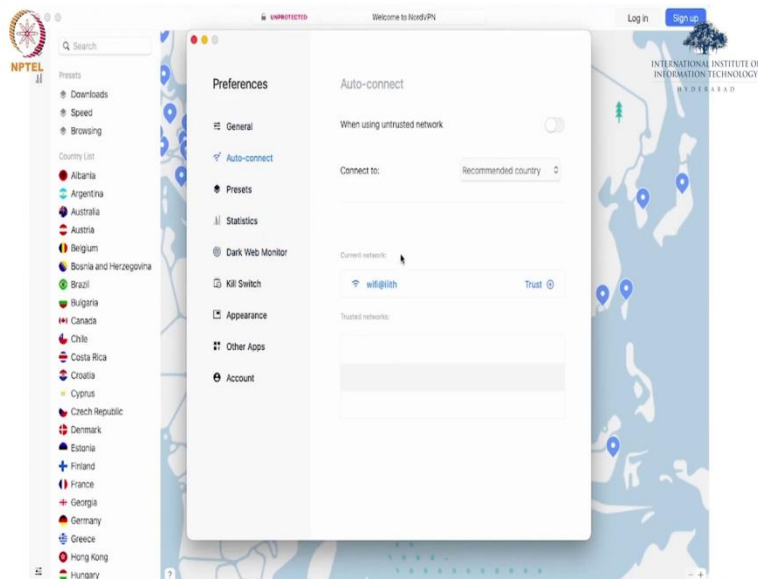
in and here is the this download option, which you also need to log in, then I will show you the statistics.

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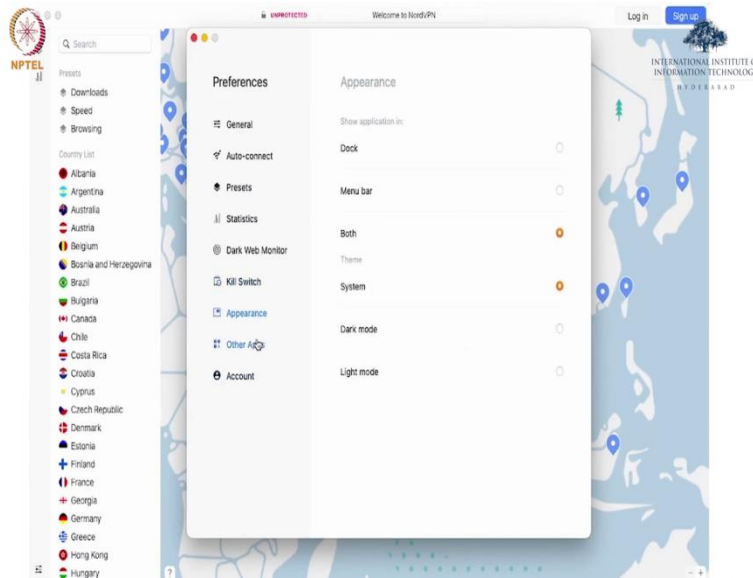
So, these are the different features that you can see here. The Dark Web monitor means if you want to see that whether your data is being leaked over the dark web or not. That is actually Dark Web Monitor function is there in the Nord VPN.

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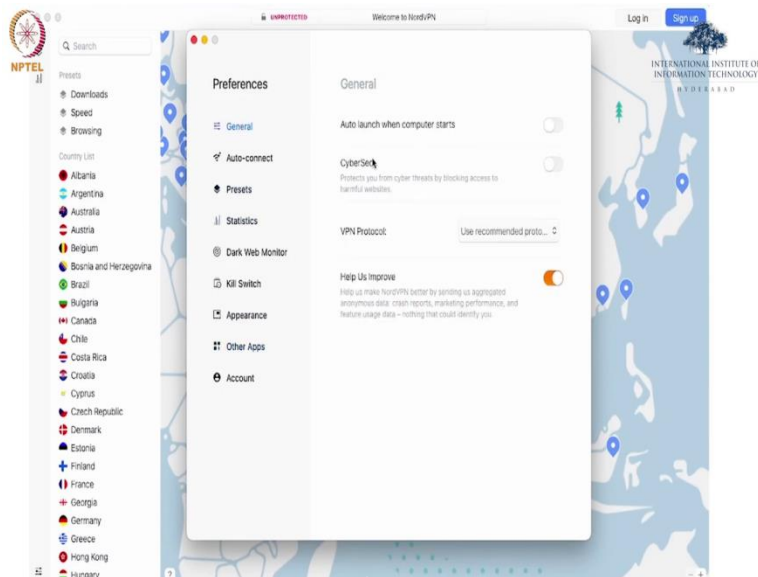
Then there is a Auto-connect feature where you can see that there is if there is a untrusted network, then you can disable or enable this option. Then there is a kill switch option. So, what does kill switch do, it added an extra layer of security which will help you to provide protection against specific IP leaks. And it ensures that you have a security and there is an advanced Kill Switch option as well.

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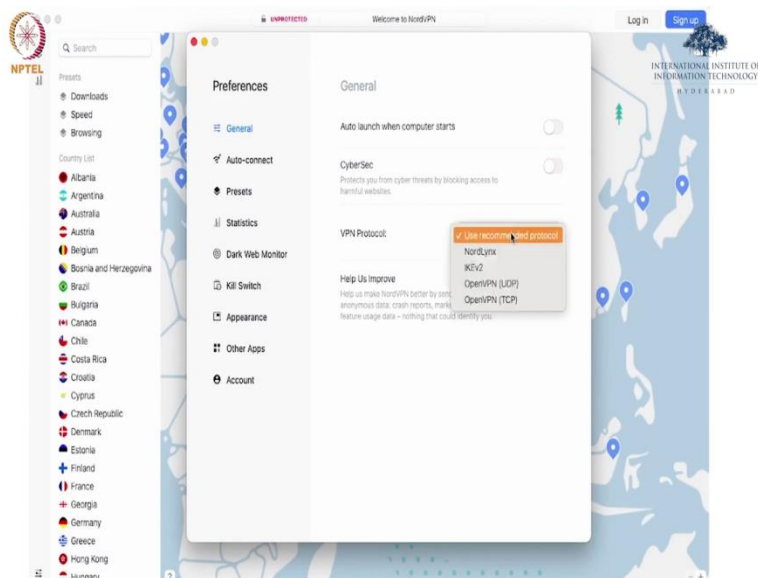
This Appearance, you can choose. And these are the different apps you can use generate store, organize your password NordLocker, these are the different apps that support this. So, these are the options.

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So, also there is this cyber SEC security, security as well, which can protect you from cyber threats by blocking access to harmful website. You can enable it or disable it depending upon you.

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So, these are the different protocols that it can use NordLynx, IKE version 2, OpenVPN ODP, UDP and TCP. So, these are the different technologies in the applications you can choose any of

these technologies depending upon your use case that you want encryption are fast UDP is quite fast TCP than (()) (14:09). So, you can easily easily install this Nord VPN.

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Express VPN

- Company- Express Technologies Ltd.
- As of September 2021, ExpressVPN is owned by Kape Technologies
- Privacy and security tool that encrypts user's web traffic
- Masks IP addresses for users
- 3 million users

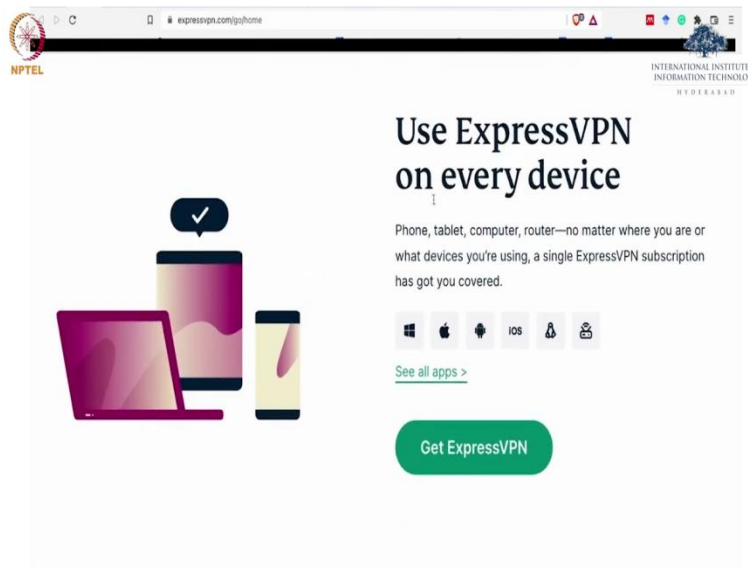
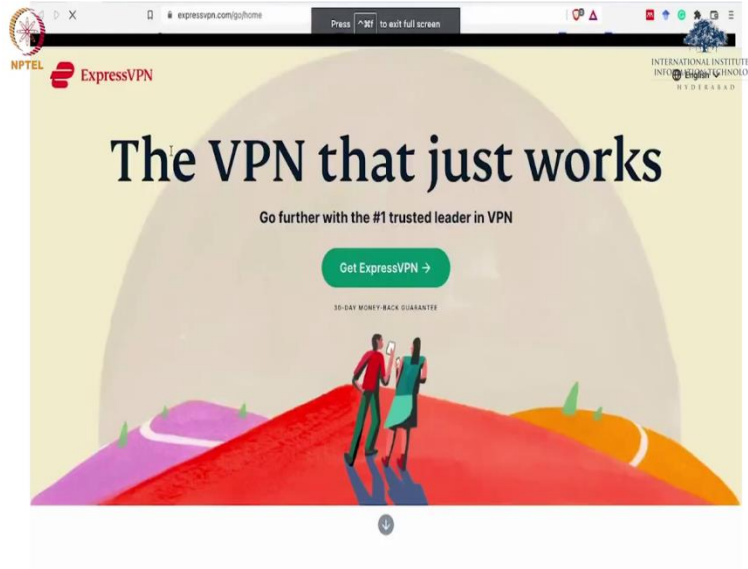
Android iOS Windows Linux Apple

ExpressVPN

And now, let us have a look at the another VPN technology which is the Express VPN. As the name suggests, Express VPN, it is developed by Express Technologies Limited and as of September 2021, it is owned by Kape Technologies.

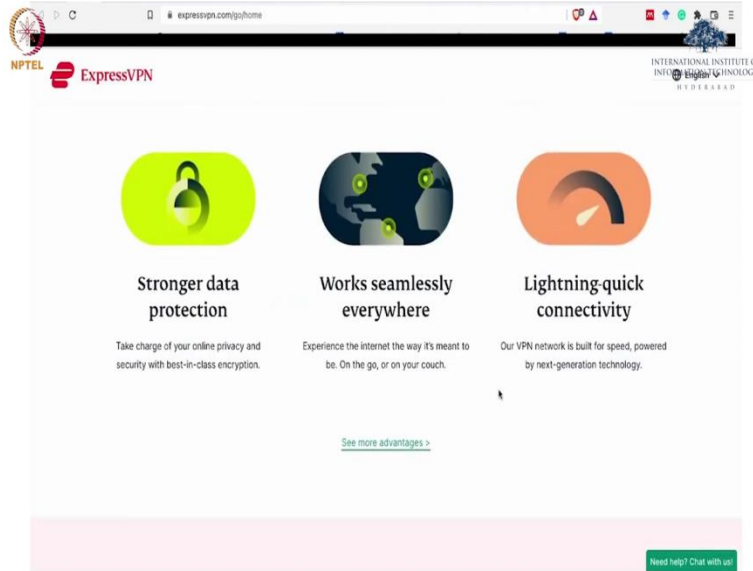
Now, this is one of the privacy and security tool VPN only that encrypts user web traffic. It also masks IP address for the users and frankly, about 3 million plus users it have, it helps. So, this kind of server, they have around. So, Express, as the name suggests, it is quite fast.

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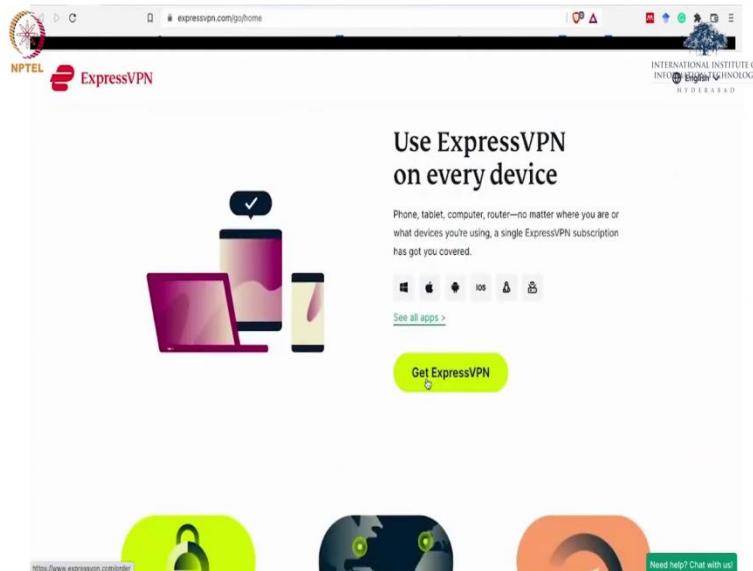
So, I can take you to the website. So, I can take you to the website, you can just see here that the VPN that just works, it is written 30 day money back guarantee, Get Express VPN. And this is quite fast. And you can use it on any device. Here you see windows, see all the apps, Windows, Mac, Android, IOS, then Linux and then router as well.

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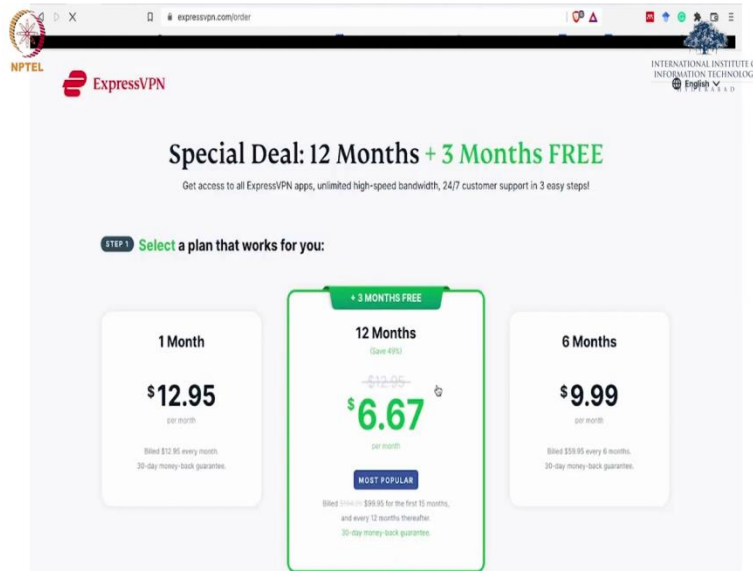
And it has more stronger data connection, one of the thing here is that it is known for its speed building speed powered by next generation technology. And if we talk about the number of servers, they have around 3000 Plus servers in 94 plus countries.

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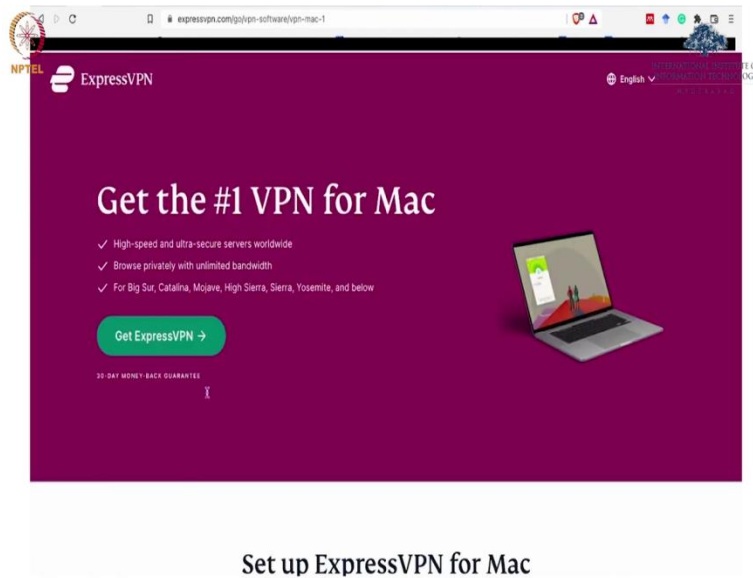
So, you can see here, how can you get the Express VPN, you can click on Get Express VPN.

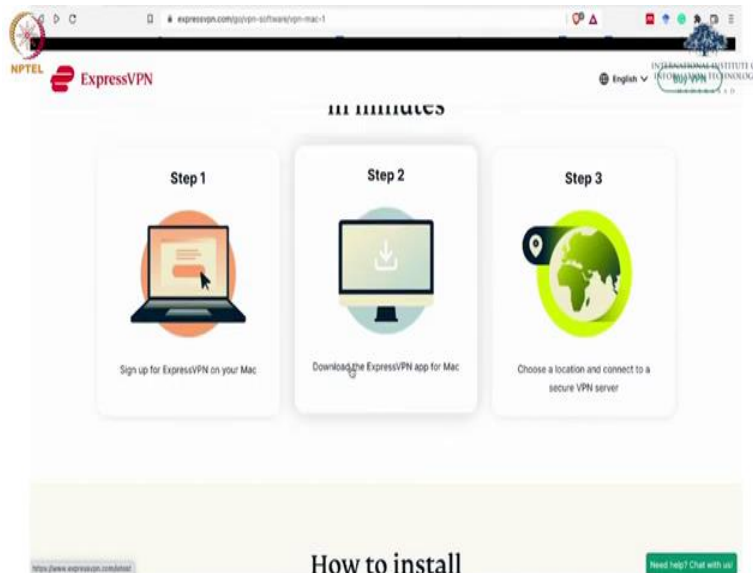
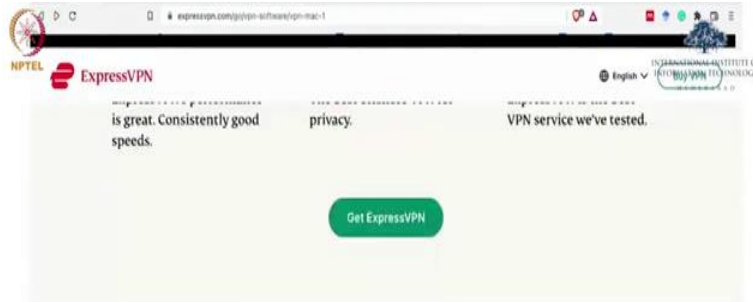
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And when you click on Get Express VPN, you see the different prices here. But you can also download it from the App Store. Now, I have already downloaded it you can get it for your own respective clicking on the device.

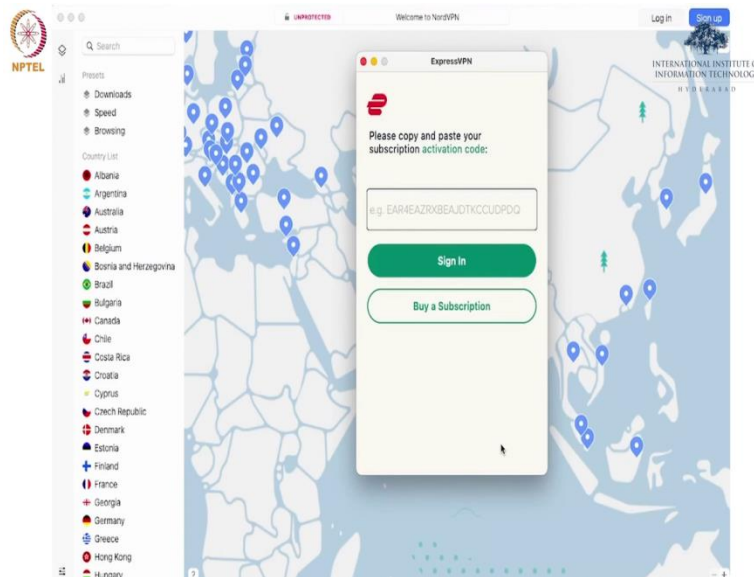
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Let us see in Mac and for the Mac, this is how you can get the Express VPN. So, you can see here that take me to the Plan page. This is get Express VPN let us see, it is taking me to the Plan page somehow. We can, I can show you that, on login, it is written here it, we can sign out and you can download the Express VPN app for the Mac these are the steps that are written for the MAC. And if you want to buy let us say you have a business then you can buy it by pricing.

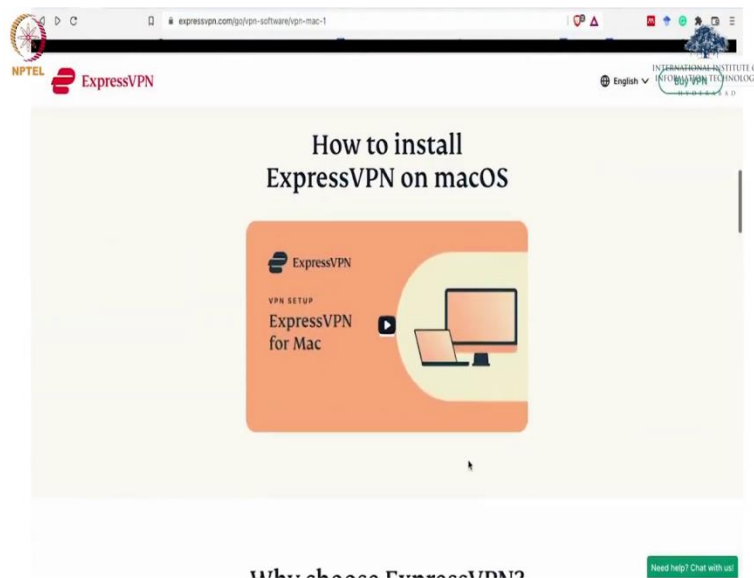
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Now, I can quickly show you, this is the Express VPN you need to provide your subscription code here. It is not a open source. So, after providing the subscription code, you will be able to use this Express VPN.

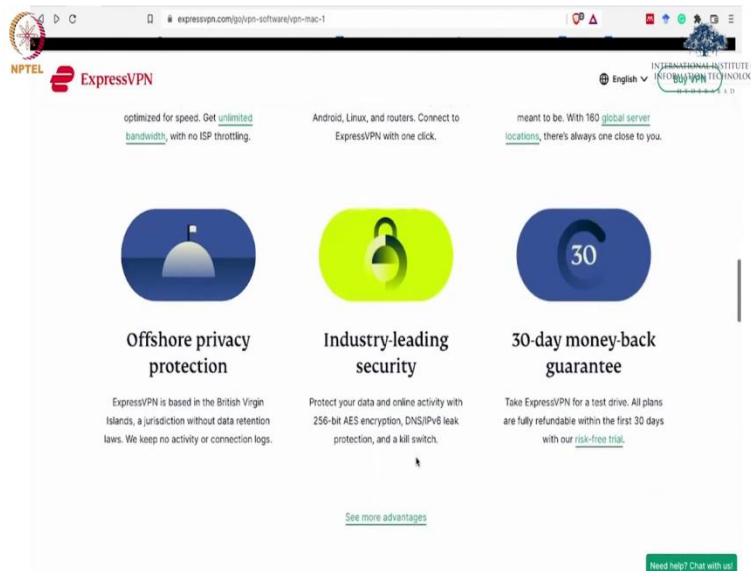
So, they have their own proprietary protocol lightway, which works in countries that restrict the access to internet and allows torrenting on all its servers. So, that is one of the main features of the Express VPN and it also possess split tunneling feature private DNS.

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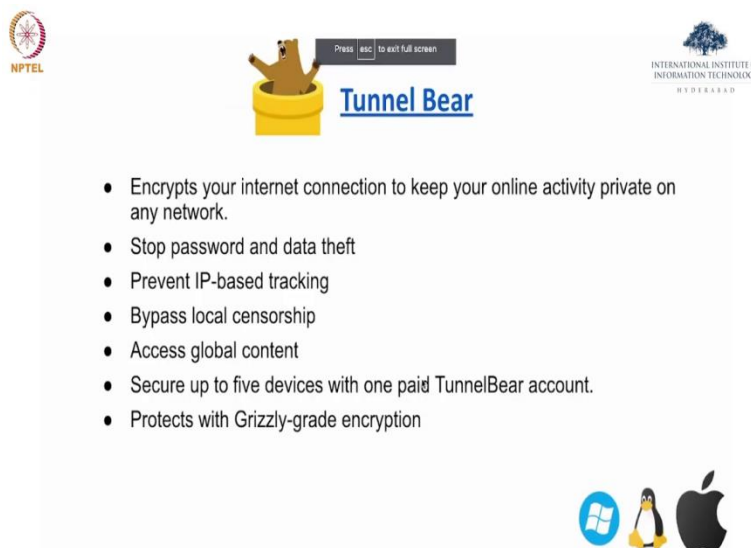
So, I will show you here you can, you can see here that how can you install Express VPN on Mac OS.

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And there are different industry leading security, offshore privacy protection is there and the protocols like lightway and all these are released which are quite fast relatively fast, fast, being fast is one of the important characteristics of Express VPN.

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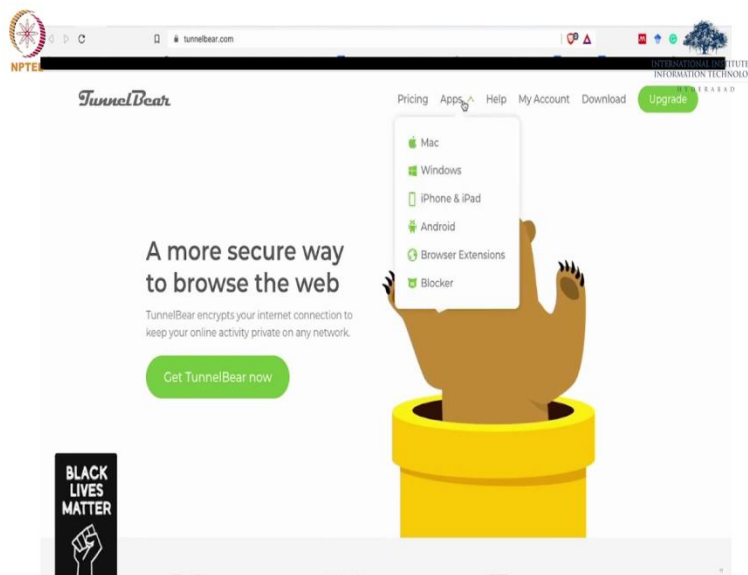


Next, let us see have a look at a Tunnel Bear. So, Tunnel Bear is again a different type of a VPN, it encrypts your internet connection to keep your online activity private on any of your network, it stopped password and data theft. So, mostly most of the features you will see overlapping in different kinds of VPNs but these are more popular VPNs that we are studying quickly.

And now, you can also prevent IP-based tracking using Tunnel Bear then there is a censorship Bypass local censorship bypass by Tunnel Bear. You can access the access the global content using this VPN and the most important the Nord VPN, it was able to connect to the 6 devices whereas Tunnel Bear, it can secure up to 5 devices with 1 paid tunnel bear account you have to pay this to the tunnel bear company to actually.

Now, it is also encrypts your message using Grizzly, this using this Grizzly Grizzly-grade encryption. So, basically you can have some combinations and permutations that you can use to accomplish this kind of encryption. So, tunnel bear basically secure you through this military Grizzly-grade encryption. So, I can go to the tunnel bear website and you can see that what it is actually.

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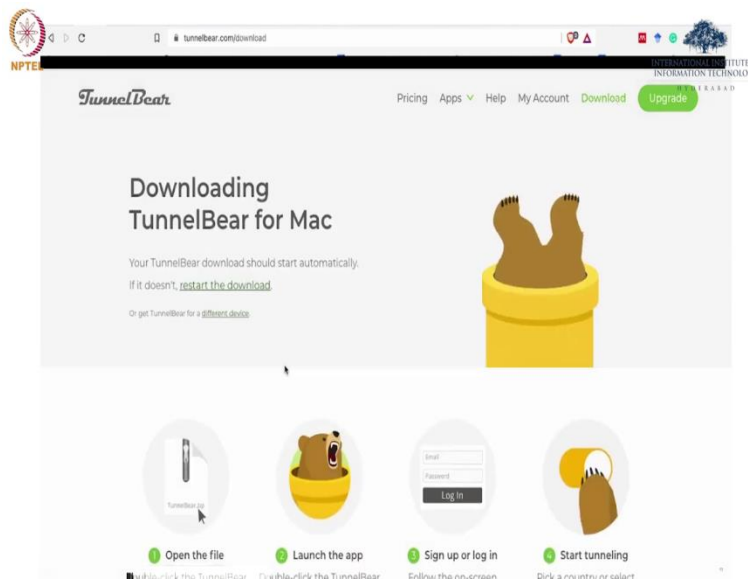


As you can see here, as you can see here, there are different apps that it is present. So, going into the detail of what I said here, the Grizzly Grizzly-grade encryption. Grizzly-grade encryption is this actually essentially means we go here, let me go to the tunnel bear here. So, if you see that

this means that if your internet service provider or a network owner, even a hacker who tries to snoop all your browsing activity, they will see unreadable junk.

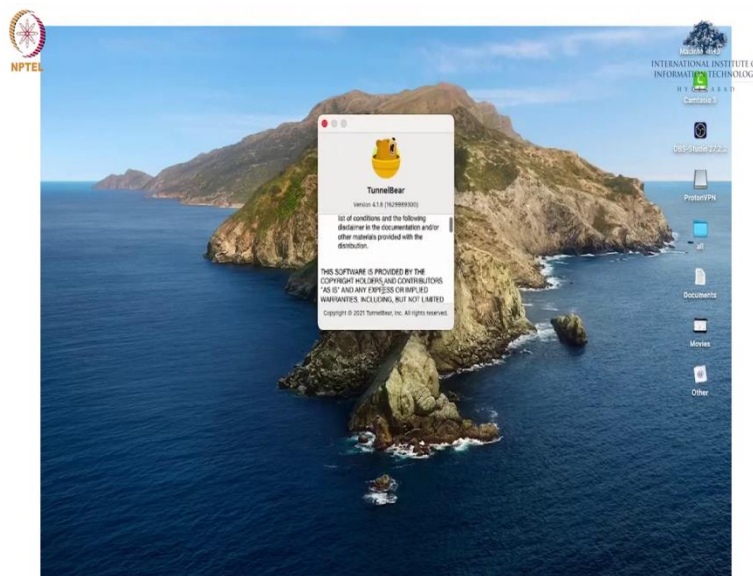
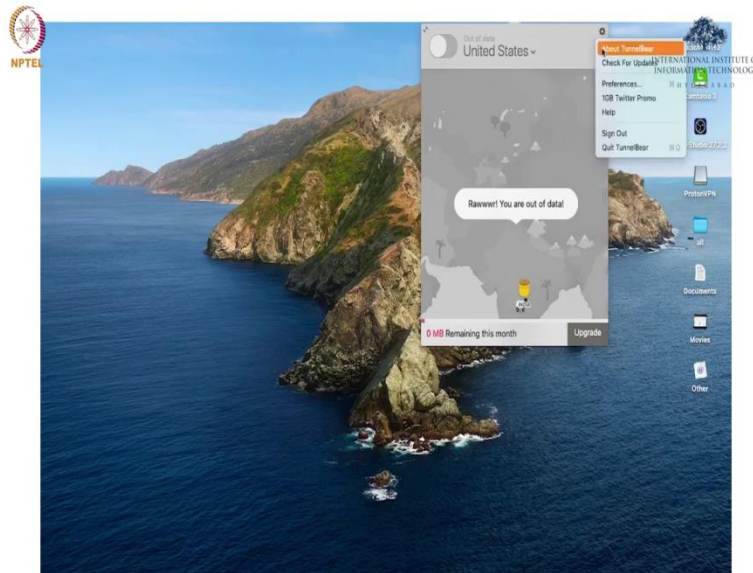
So, that is a Grizzly-grade encryption, the benefit of using it and also they changes your IP address to stop anyone seeing your physical location and what activity you are trying to do. So, no one can see this is one of the encryption that the tunnel bear use, and it is important.

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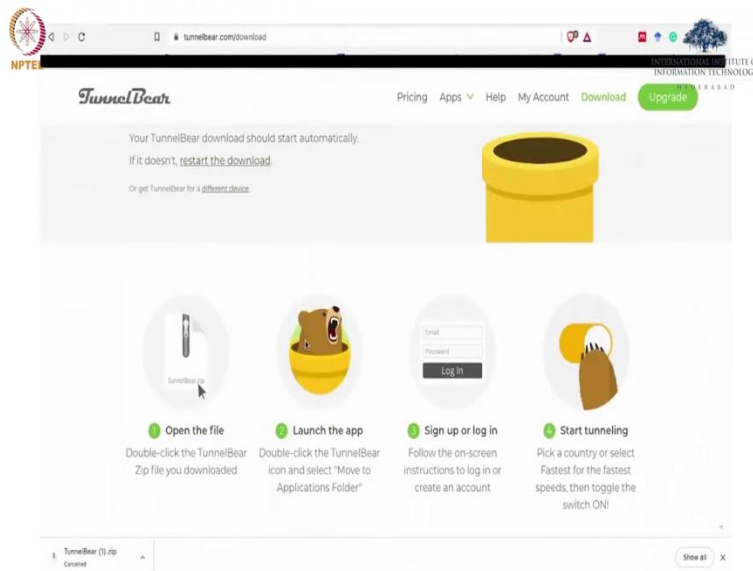
And you can click on the download button. And you can see here, the downloading tunnel bear for Mac systems similarly for your different kinds of (())(21:15) right now, I am canceling this because I already have this tunnel bear app. And on top you can see that I can have this tunnel bear icon here. So, this is the Express VPN icon here. And you can see here that this is tunnel bear icon here. It is showing me out of data for India location.

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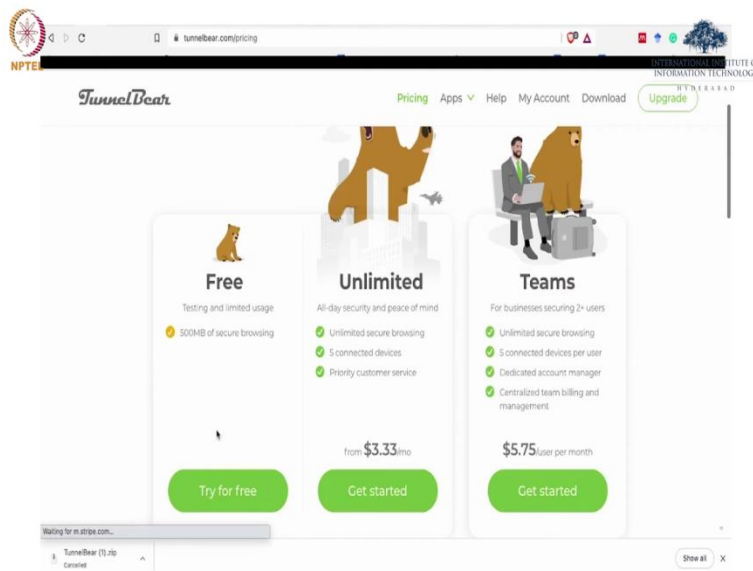
I may need to upgrade, let us say US. And in the settings, you can see About tunnel Bear. So, I do not have licensed version of it. It is a free version. That is why it is showing me this, so you can see here, my version is 4.1.8.

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And I can just help you see that you can open the file tunnel bear dot zip. As you can see on the bottom, I have just cancelled the download. So, once you download this zip file, you can launch this tunnel bear and you have to log in. So, right now I have not log in for all the VPNs but you can log in your email and password and that you can start tunneling by picking up countries you can select the fastest speed network that you want to connect on.

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So, there are different pricings also available. So, it is, you can see here you can try it for free. (())(22:42) Now, there might be the question that would be coming in your mind that which VPN should I use? Should I go ahead with Tunnel Bear or should I go ahead with Express or maybe this Nord VPN. So, there is no correct answer to this which you which you want to use. All the VPNs have different kind of properties. So, if you, we talk about the tunnel bear features, so it comes with, it is basically acquired by McAfee in March 2018 and it is based in Toronto, Canada.

So, on starting they provide a free bonus of 500MB for a start. And that is why when I clicked on this icon, it was showing me that is out of data remaining for this 500 MB is already over for secure browsing.

Now, it has also extensions for some of the search engines like Opera and Google. So, depending upon your use case, you can decide whether which one is good for you. But, if we compare this tunnel bear with basically the Nord VPN, you will see that it offers only shared IPs, whereas Nord VPN it was offering the dedicated IP and then another thing is that on basis of that, this geo notation you are able to unblock websites like Netflix USA, but tunnel bear, it has some struggle to do the same.

The double VPN technologies encryption technology that is one of the features that is present in both the previous ones and this one also. Otherwise tunnel bear it is a well known for small network of around 20 Plus servers in the same number of countries. You can decide on your use case.

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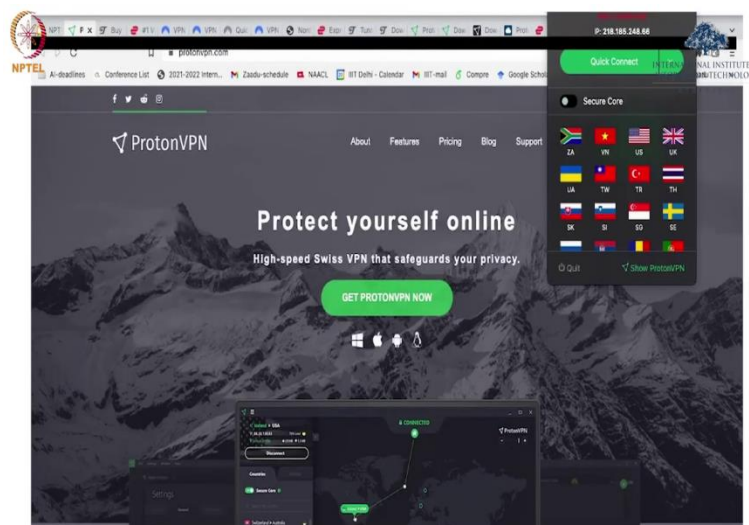


The slide features the NPTEL logo on the top left and the International Institute of Information Technology logo on the top right. The Proton VPN logo is centered at the top. Below the logo is a bulleted list of features and capabilities. At the bottom right, there are icons for Android, Windows, Linux, and macOS.

- Operated by Swiss company Proton Technologies AG.
- Main focus- Security
- Secure Core
- Perfect forward secrecy
- Ad Blocker (NetShield)
- No-logs policy
- Tor over VPN
- Can be installed on a Wireless Router.
- Added WireGuard protocol as beta version.

Next we will have a look at, next we will have a look at Proton VPN. So, proton VPN, it is operated by Swiss company Proton Technologies AG. And the main focus of this company is or a VPN is security. You have to secure core Perfect Forward Secrecy, Ad Blockers are there, No-logs policy same as a Nord VPN, Tor over VPN is there it can also be installed on wireless router and there is a wire guard protocol which is added as a beta version.

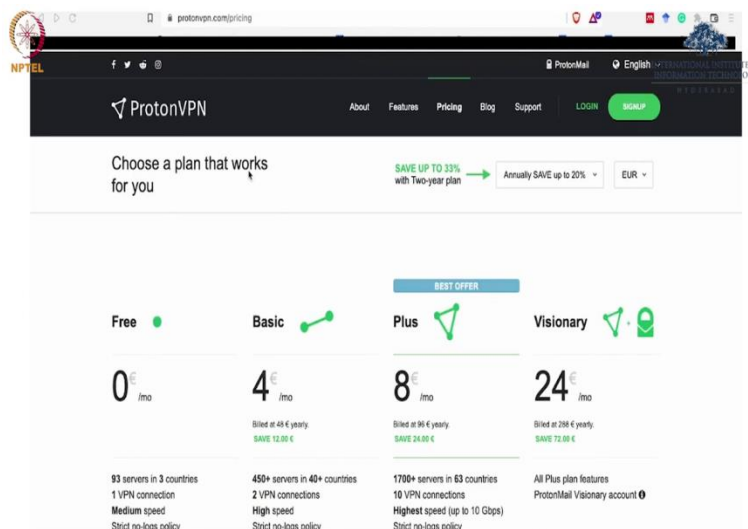
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The screenshot shows the ProtonVPN website in a browser window. The main heading reads "Protect yourself online" with the subtext "High-speed Swiss VPN that safeguards your privacy." A prominent green button says "GET PROTONVPN NOW". Below this, there are icons for Windows, Android, and Linux. On the right side, a "Quick Connect" panel is open, displaying a "Secure Core" section with a grid of country flags for selection. The browser's address bar shows "protonvpn.com".

Now, let me take you to the proton VPN website and meanwhile I can also show you that how can we connect to Proton VPN. So, you can see my screen right. Here you will see that I have clicked on proton VPN dot com and on the right hand side you will see that About, Features, Pricing, Blog, Support and on the middle you will see the option GET PROTONVPN NOW, if I click this option, this internet is not working somehow maybe because I have connected to this proton VPN, I am connecting here let me just cancel it. Now, it is working.

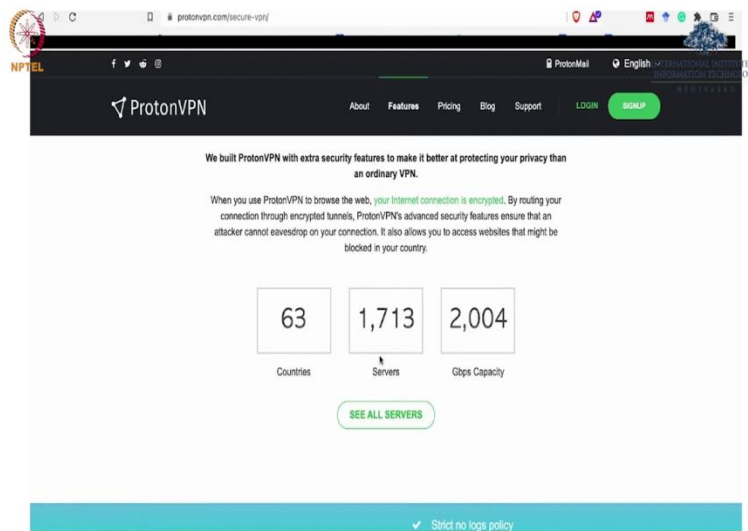
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So, you can see here that you can see a plan that can work for you if you choose the free plan, 96 servers will be available in 3 countries and medium speed this VPN these kinds of features are available depending upon your plan Basic, Plus and Visionary the features will start improving.

Now, this Proton VPN it has similar features as we have seen in the previous VPNs as well, I will just tell you, which ones are different.

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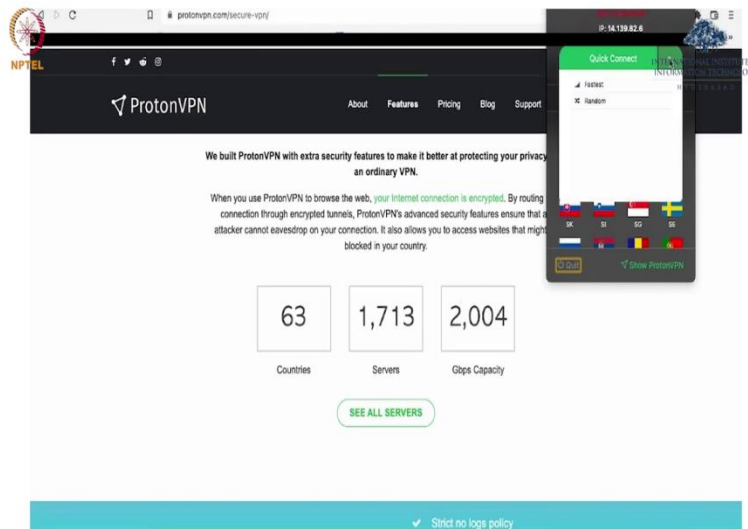


So, if you will see here they are 1,713 servers in 63 countries with 2,004 Gbps capacity. So, it has extra security features. So, one of the prominent advantage of using Proton VPN is that it has where, it has extra features, it comes with extra features and it is solid split tunneling. Also at the same time, it also has advanced server architecture and provides an ad blocker.

So, basically, it helps you it helps you with the more strict no logs policy it retains basically your email address payment, it retains only your email address payment information and a timestamp of last login attempt but it does not collect any identifiable information.

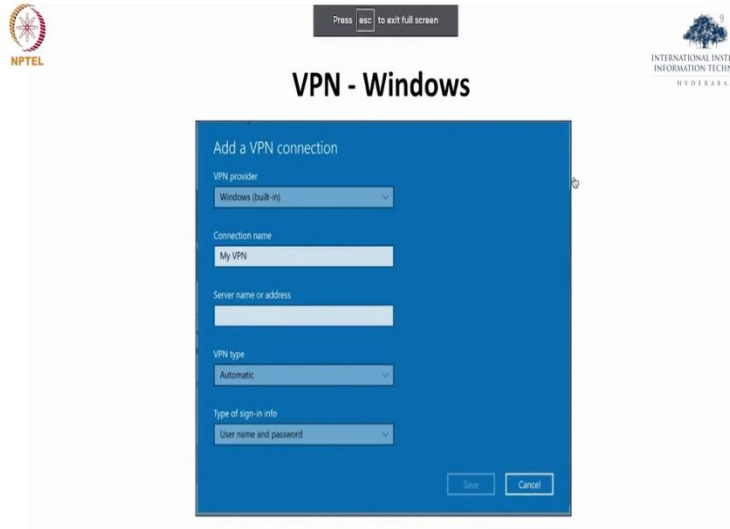
So, if you want to stay anonymous as possible as you can pay for the service with Bitcoin or even cash. But, if you want some transparency reports that show you all the request you receives for user information from law enforcement and proves that it does not comply with the requests. So, the feature of Proton VPN split tunneling it is better than the Express VPN split tunneling feature. So, you can explore its website and since I have already installed it, I can walk you through.

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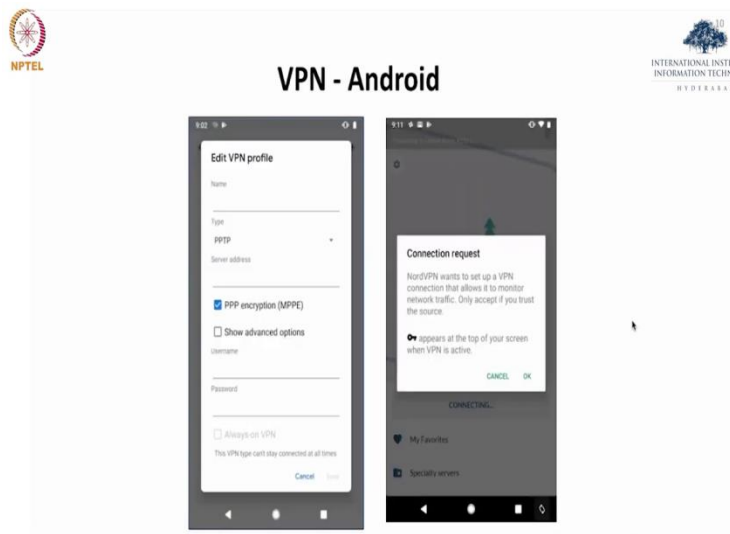
You can have a quick connect here you can see on the right hand side it is fastest or random you can choose which mode you want to choose in the Proton VPN. Then if I show you Proton VPN, you can see here that on the, here I can manage the profiles, then right now IP is showing as 14.139.82.6. But you can do quick connect right now it is disconnected. It is quite easy. If you want to connect the fastest one you will connect and it will show you that connecting to Netherlands just and if you want random ones randomly it will connect you to some US. So, that is how you can connect to different servers.

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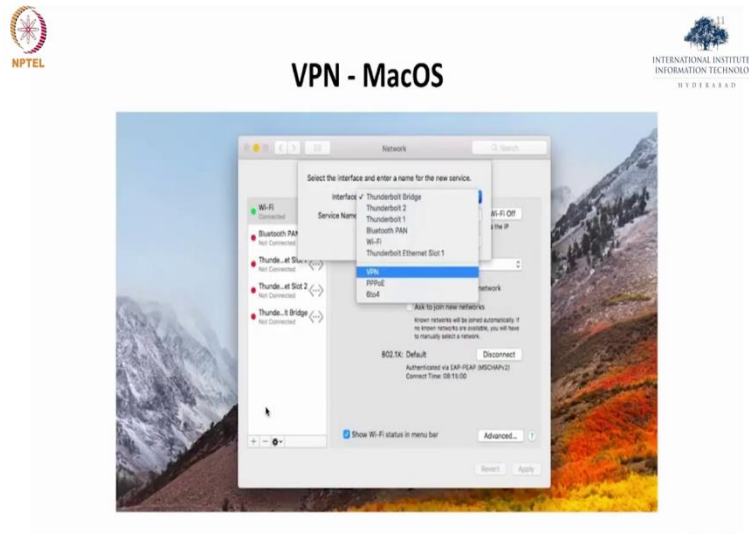
Now, let us have a look at how can you get install VPN for the windows. So, if you have VPN Windows system, you will see how can you add a VPN connection. You just have to need a VPN name that the server that you want to server address will be provided by your organization where the VPN is installed, and then you can choose the VPN type and you can provide a username and password so these in after giving this information you will be able to connect to the VPN servers.

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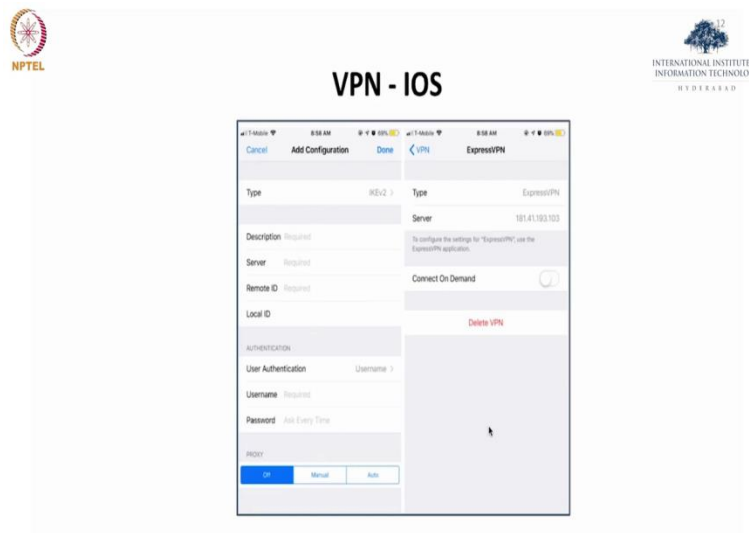
Then and for the Android, similarly, you can see here for the Android you need to give the name, server address, then the type, type you can choose different types that I have shown you for the Nord VPN, and username and password, the same information Android.

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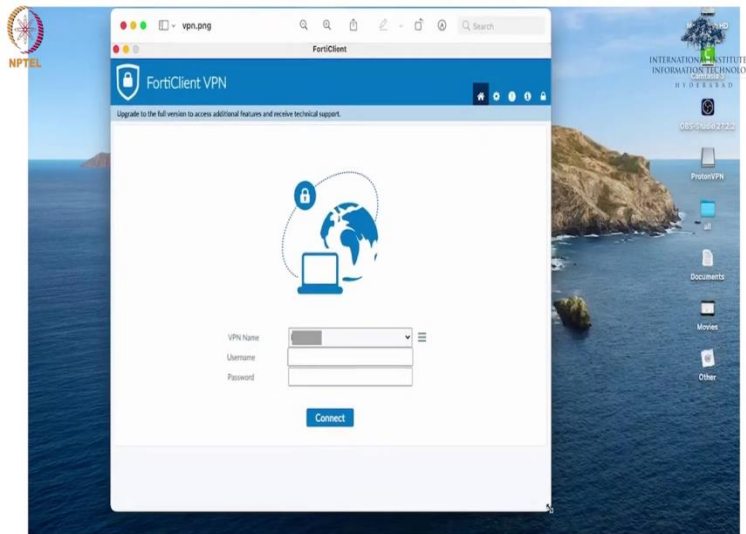
Similarly, for the MacOS, you will see here that in the System Preferences, you will see there a Network tab and in the Network tab, you can click on Wi Fi, and here you will see that you want to connect through VPN, then you can choose the VPN, route your traffic thoroughly.

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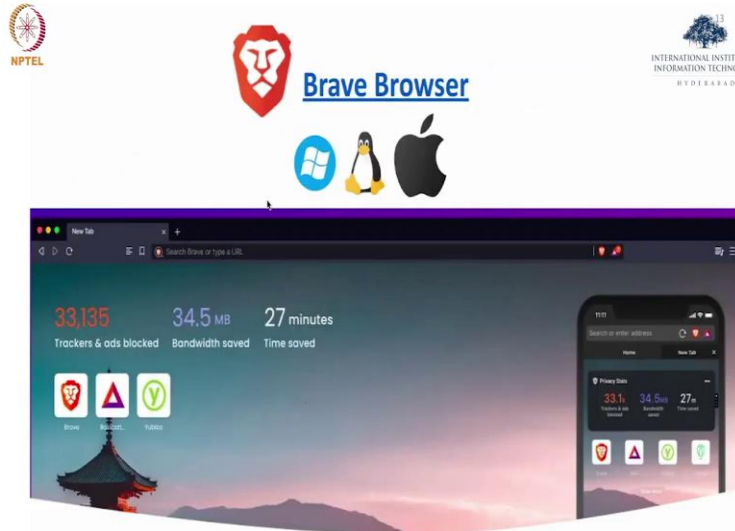
Then similarly for the IOS, you will see Type, Descriptions, Server, Remote ID required. Now, I can quickly show you, so I used to connect to my organization server or organization VPN through FortiClient VPN. So, I show you how I do it. I will just minimize it.

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And here, you can see that this is a FortiClient VPN that I use. So, I can also open it for you. But, let us see, I guess it is taking time, but no worries. It is taking time. So, you can see here that you have to put a VPN name here and then 3 lines, straight lines you see and when you click these 3 lines, it will ask you for the VPN address or the domain name and then you can give port number IP addresses as well and then you have need to enter username and password which are provided by your organization and then you can connect through the VPN. So, you will be, so whenever you will be browsing now, you are on the VPN network, you are doing very private and safe browsing.

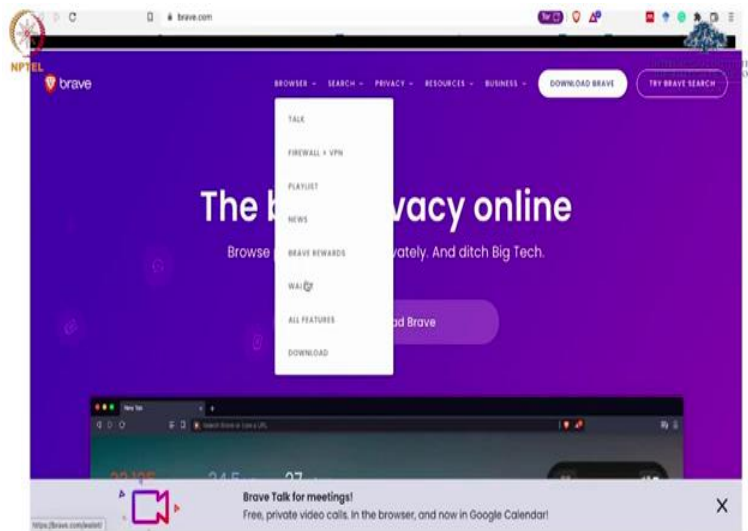
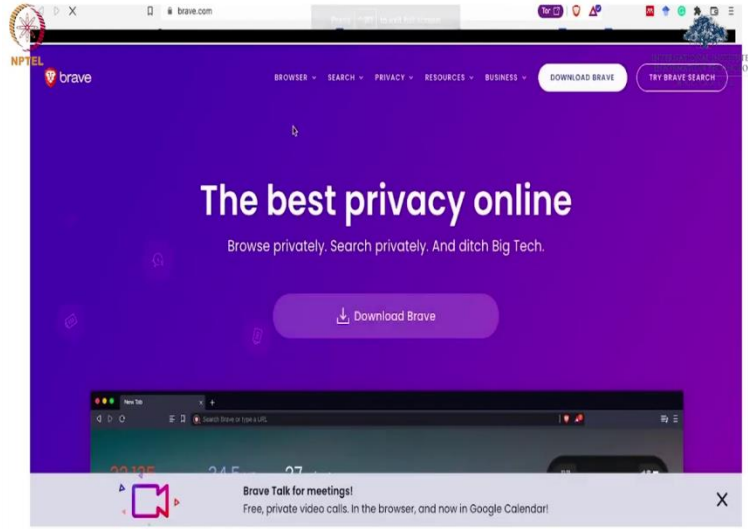
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Now, let us move towards the browsers, the private browsers, which is Brave Browser. Now, before going to the private browsers things, I would like to see that why do we need private browsing, so in order to safeguard your data, or prevent you from getting targeted advertising, and people should not spy on you. One of the popular and the safest browser is Brave Browser.

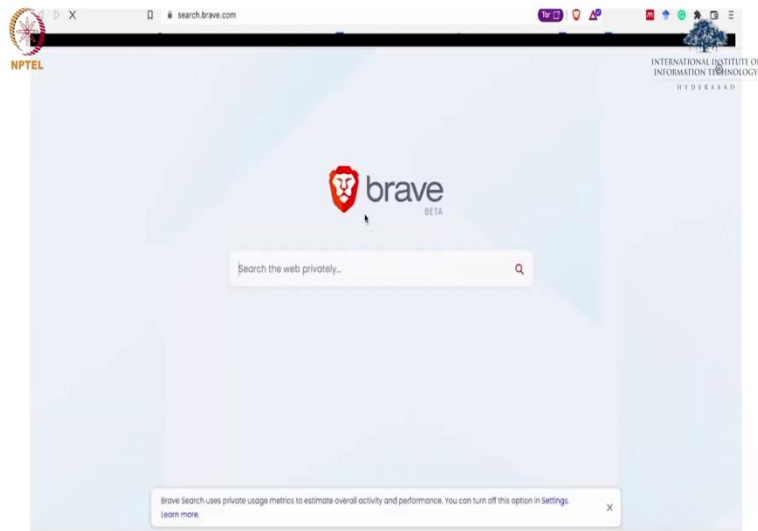
So, this brave browser, it is available for Windows, Linux and Mac systems currently. So, you can in the snapshot, you can see here that this kind of browser helps you given the details that you have 33,135 trackers ad blocked, and then bandwidth, this much bandwidth you have already saved and this much time you have saved.

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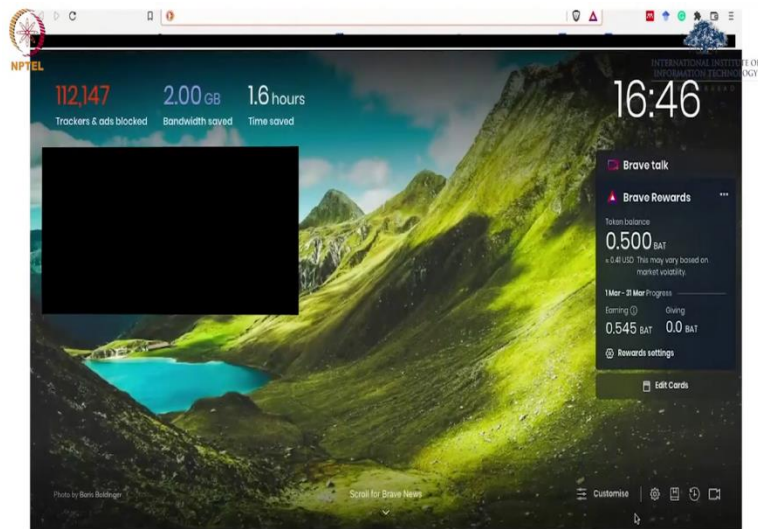
Now, I can take you to Brave Browser. So, you see the website of this brave browser brave dot com, you can easily download, click on Download Brave and download it from here. And it is the best privacy online you can see here browse privately. So, different kind of browsers, which are available TALK, FIREWALL plus VPN, BRAVE REWARDS, WALLET search is there, search the web privacy, some resources are there and then business tab is also.

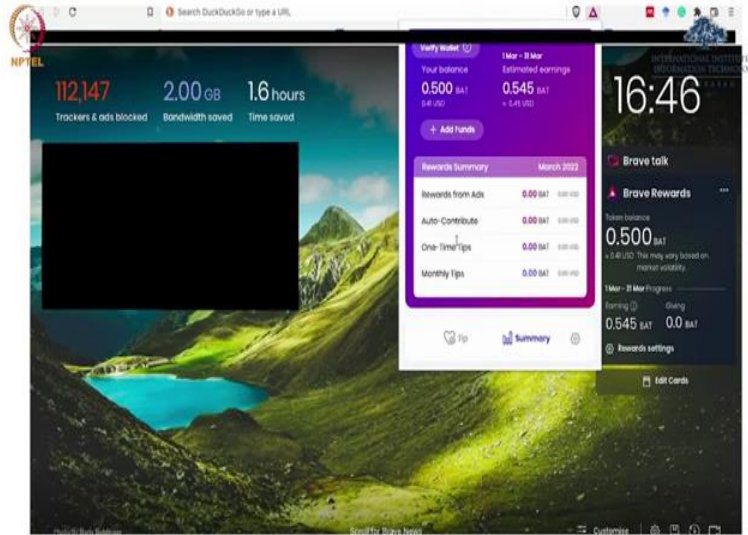
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You can also try brave search. So, search engine is also currently available search dot brave dot com, you can search the web privately, nobody is tracking you.

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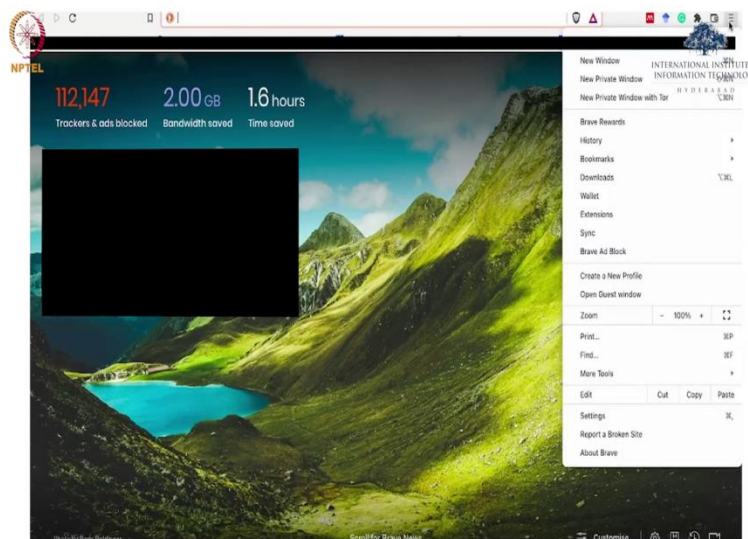




You can also see here that my browser is Brave Browser, I am using the Brave Browser in my Mac system. And you will see here that it has blocked 112,147 trackers and ads for me. Similarly, you will see here that, 2, I saved 2 GB of bandwidth till now. Because, there are a lot of videos and ads which are there on different web pages that Brave browser just blocked.

And I have also saved 1.6 hours of time. And when I click on the right hand side, you can see here that I am also getting this brave rewards, which are rewards when it blocked from the ads Auto-Contribute, One-Time Tips, Monthly-Tips are there. And it also shows me this brave icon.

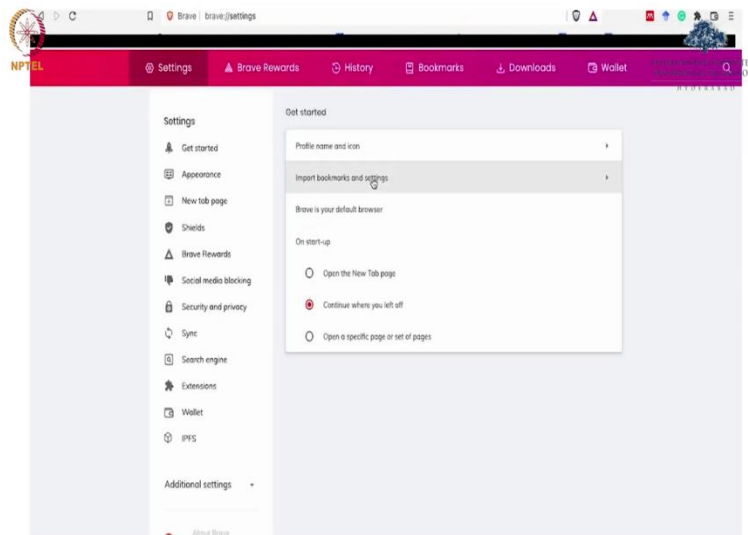
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So, now, if I show you so, brave browser, the functionality or the flexibility, or you can say the user experience is similar to using Google Chrome, as we become habitual of using Google Chrome. It is not much very different from it. Yet almost similar to it.

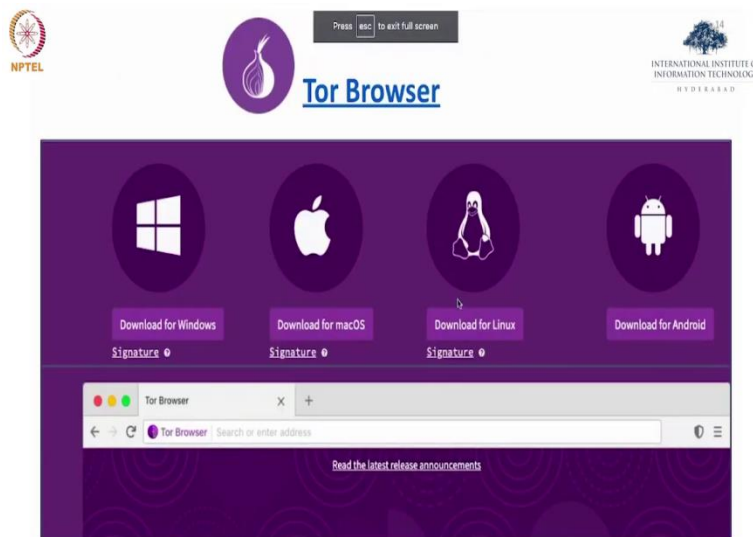
And you can see here different options that you can have new tab new window, new private window as well. Then new private window with Tor, history you can see and then About Brave and Brave ad blocker you can know and the settings are also there.

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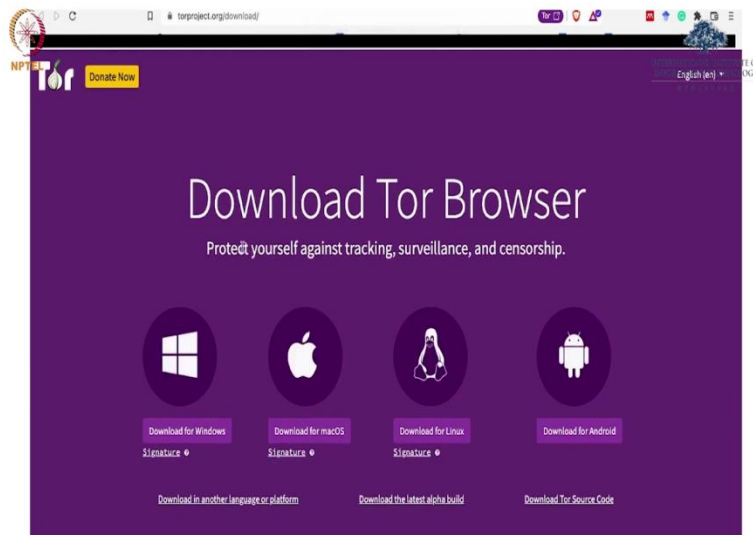
Let me just go to the settings. You can see here different search engines extensions that you can use additional settings that you have, and so on.

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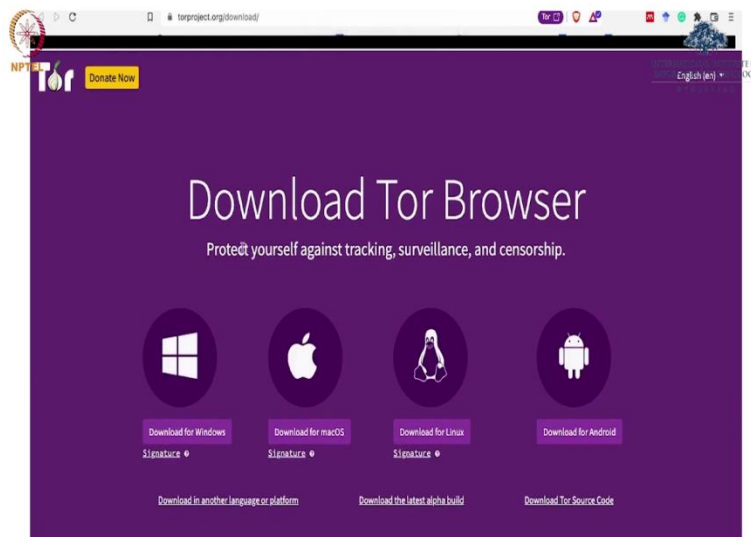
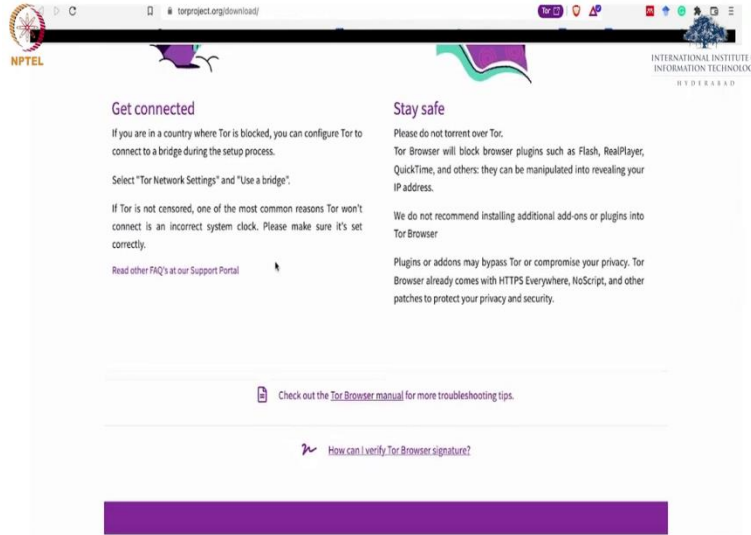
I let you explore the Brave Browser and then I will move to Tor browser. So, Tor Browser is also one of the safest browser.

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So, you can see here that to protect yourself completely from tracking surveillance and censorship. You have a Tor browser so tor may, in Tor you will see the O is written as the symbol it looks like onion so, it uses onion routing, many layers of security.

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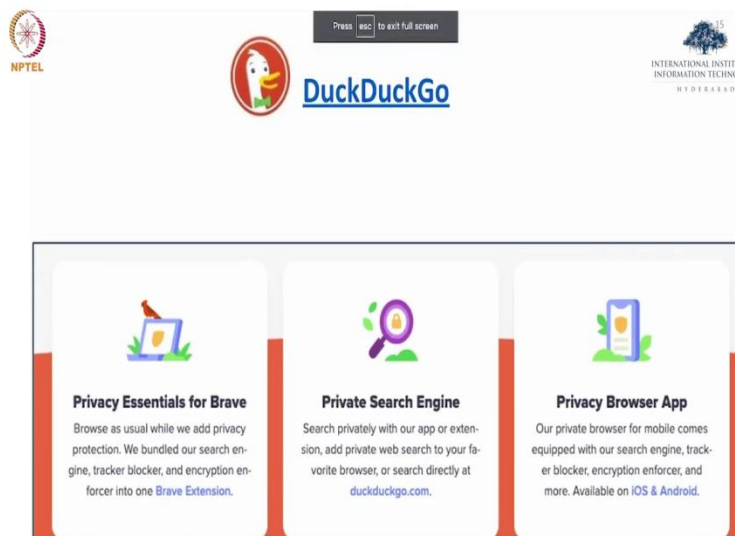
So, stay safe using this Tor browser, and this Tor browser, this have different APKs, which are available for Windows system. And then it is also available on Google, Google Play. Now, when you have you can download this Tor browser for Windows and for MacOS as well and then you can use it. So, Tor browser is Tor Browser is bit, bit beneficent than Brave Browser, in the sense that it provides you multi layer encryption and anti spy protection as well.

And also, it maintains the most important thing it maintains your anonymity by guiding your data traffic through different servers located all over the world, it always ensures that your IP address

changes at every server NORD, making it way harder for the website to track back where your data which leads. Whenever you want to hide yourself, you can use this Tor Browser.

One of the disadvantage of using such kind of private browser is that connections are bit slow. And basically, a single request it goes through multiple layer of Nord, using this network really slows down your connection. So, that is one of the disadvantage but there is always as we say, a trade of between privacy and having fast network.

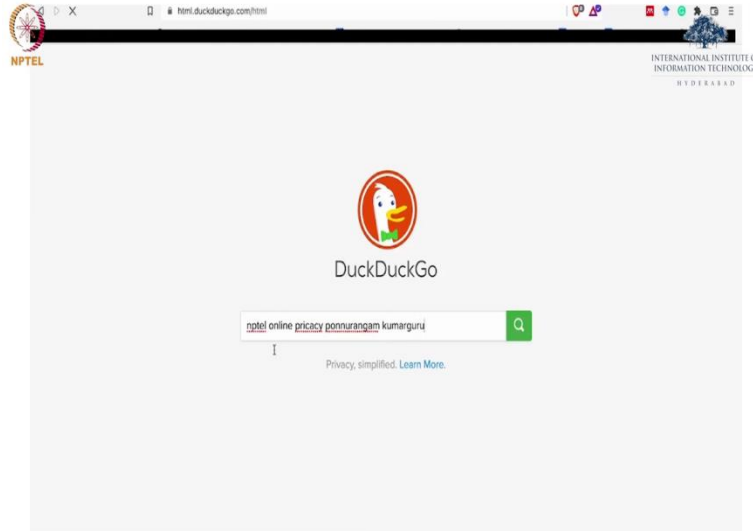
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Along those lines, we also have a very good private web search engine, which is DuckDuckGo. And now, why should we use these kind of private search engines, when Google search engine is doing very great how, why do we I switch to DuckDuckGo?

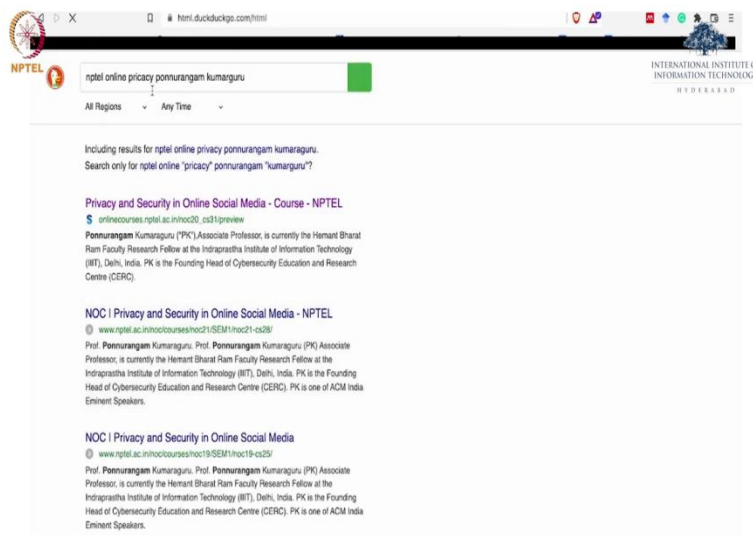
Now, just think of the last thing that you searched online. When you realize that most of the things, that you search online, these are really boring and obvious. As soon as you realize that you do not really need Google in your life. So, I searched the last thing is something like convert 500 Euros to Rupees. So, that was a very, not a very much required search at that ID. But, DuckDuckGo, it works in a similar way as Google does.

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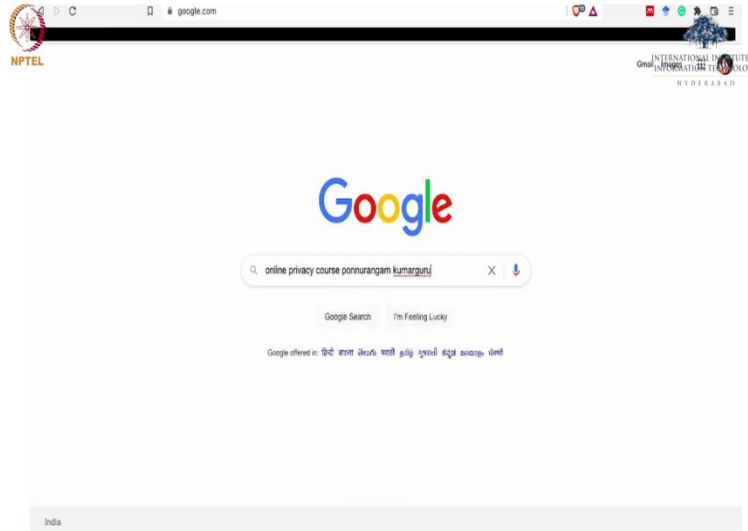
So, I will just go walk you through the website of the DuckDuckGo quickly. So, if you will see a duckduck dot go dot com, and privacy simplified, let us say search for NPTEL online privacy course ponnurangam kumarguru.

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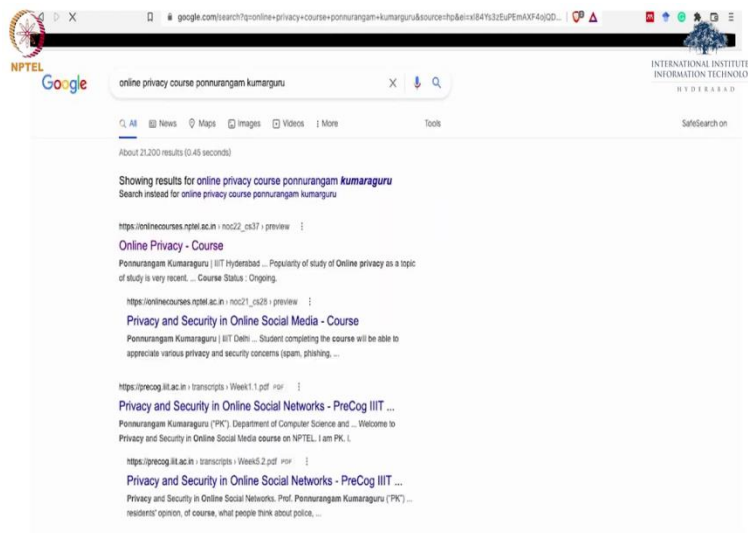
So, I am just showing you how the DuckDuckGo results. He wrote the the misspelled privacy, but still it is able to return me best of the results. And now, I can show you going to Google dot com, let us see.

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Let me type here again, online privacy course ponnurangam kumarguru.

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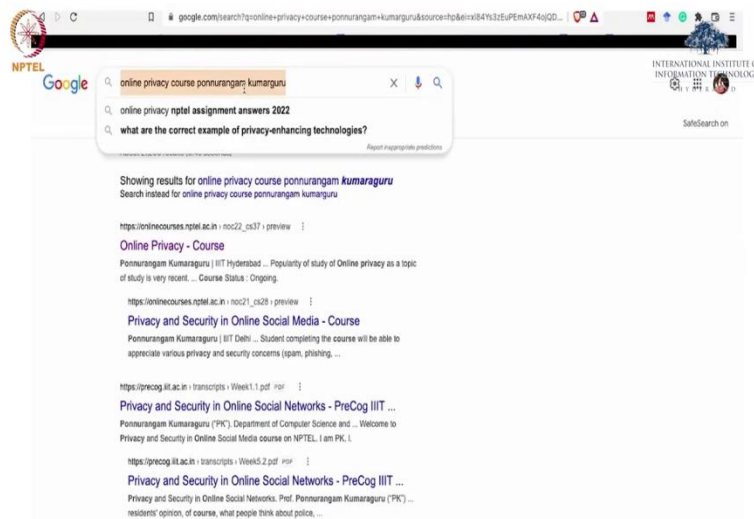


You can see here the results of DuckDuckGo are like this, privacy and security in online social media. And then NPTEL course is showing you all the list of the online privacy course, all the links that are written. And similarly, Google has also written although the number of the results of Google are more 21,200. And the number of results it has written is quite less I not able to see the number. But, almost all the results are similar. And it works in same way the Google works.

So, it combines data from 100 of sources like (()) (40:29) Alpha, Wikipedia, Bing, and its own web crawler to surface most of the relevant results.

So, results are definitely relevant. But what makes its different from Google. Now, DuckDuckGo never store your IP address or any user information. Obviously, Google is a giant and it has around 3.5 billion searches per day and DuckDuckGo has around 1.5 plus billion searches every month which is, which obviously says that Google already has a more of data, more data. But if you will see the difference, let us say I search for Iron man let us check. So, Ironman and searching Ironman 2 on DuckDuckGo, it will just return me the links of Batata, I am giving ratings of Iron man 2, and then Rotten Tomatoes. 'Marvel Studios' Iron man 2.

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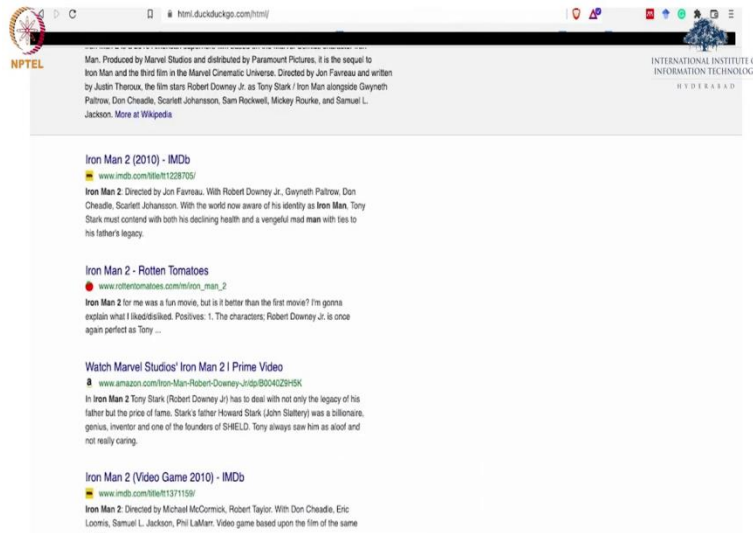


And if I search on Google for Iron man 2, let us see here. So, searching on Google Iron man 2, you can see here, on the right hand side, it started suggesting me that how can I buy this movie? It quickly gave me all the links, IMDb and all, but at the same time, it is selling me the selling me how can I buy this from YouTube or Hotstar, Apple TV? How many of people like this something?

So, it will suggest also me to play the trailer of the, trailer of this movie watch, watch is here. How can I get the trailer? Now, how does Google know everything, every information about it? So, definitely the Google it is serving you ads and Google product and services and personalized

recommendations. So, you need not to be dragged and targeted to work out the name of this particular search.

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And therefore DuckDuckGo, it helps you to find in same way as the Google does, but it will not track or target your data.

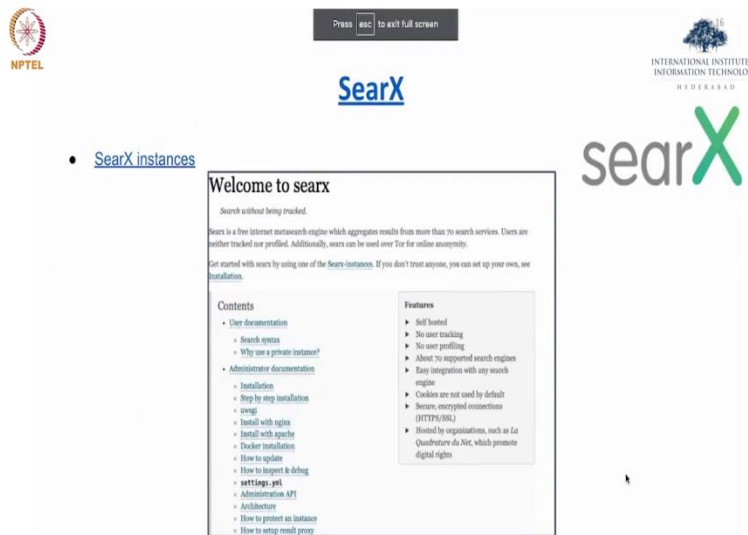
So, basically, to ensure most, more privacy, the more important thing for you that you want to, you do not want to get spied, like Google knows everything about you your IP address, date and time, your query search terms your cookie ID, everything, everything is on your browsers. So, if you want to refrain your browser to get hold of all this information, you should definitely try out DuckDuckGo.

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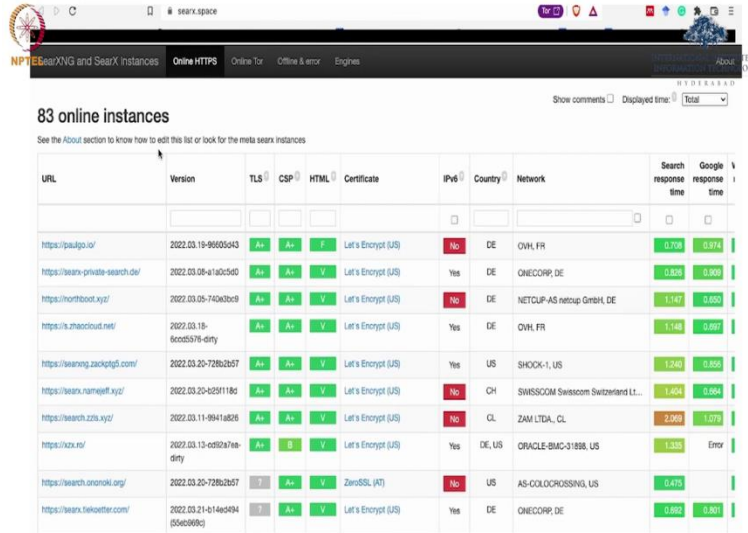
As you can see, privacy, its privacy private search engine privacy browser app is there and it is available for IOS and Android.

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Now, the next browser along the line is SearX and the SearX, it is a free internet meta search engine, and I can take you to the SearX website.

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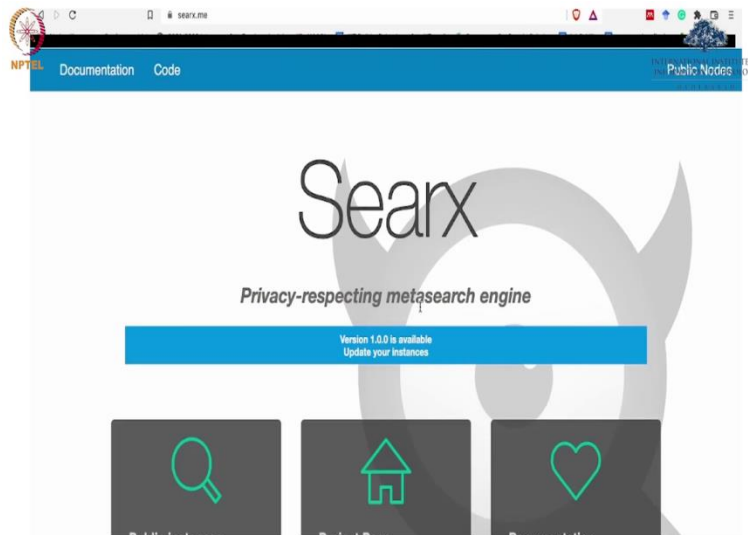
83 online instances

See the About section to know how to edit this list or look for the meta searx instances

URL	Version	TLS	CSP	HTML	Certificate	IPv6	Country	Network	Search response time	Google response time
https://bailigo.io/	2022.03.19-9605043	A+	A+	F	Let's Encrypt (US)	No	DE	OVH, FR	0.759	0.974
https://searx-private-search.de/	2022.03.06-a1a0c5d0	A+	A+	V	Let's Encrypt (US)	Yes	DE	ONECORP, DE	0.808	0.909
https://northboot.xyz/	2022.03.05-740a3bc9	A+	A+	V	Let's Encrypt (US)	No	DE	NETCUP-AS netcup GmbH, DE	1.167	0.850
https://s.zhaocloud.net/	2022.03.18-6c0d5376-dirty	A+	A+	V	Let's Encrypt (US)	Yes	DE	OVH, FR	1.148	0.887
https://searxg.zackkgg.com/	2022.03.20-728b2b57	A+	A+	V	Let's Encrypt (US)	Yes	US	SHOCK-1, US	1.240	0.856
https://searx.namejet.xyz/	2022.03.20-8251118c	A+	A+	V	Let's Encrypt (US)	No	CH	SWISSCOM Swisscom Switzerland Lt...	1.454	0.864
https://searx.z2s.xyz/	2022.03.11-9941a806	A+	A+	V	Let's Encrypt (US)	No	CL	ZAM LTDA, CL	2.069	1.078
https://srx.ro/	2022.03.13-ed92477e-dirty	A+	A+	V	Let's Encrypt (US)	Yes	DE, US	ORACLE-BMC-31888, US	1.435	Error
https://searx.ononoki.org/	2022.03.20-728b2b57	A+	A+	V	ZeroSSL (AT)	No	US	AS-COLOCROSSING, US	0.475	
https://searx.trekoetter.com/	2022.03.21-61494394 (506e990c)	A+	A+	V	Let's Encrypt (US)	Yes	DE	ONECORP, DE	0.882	0.801

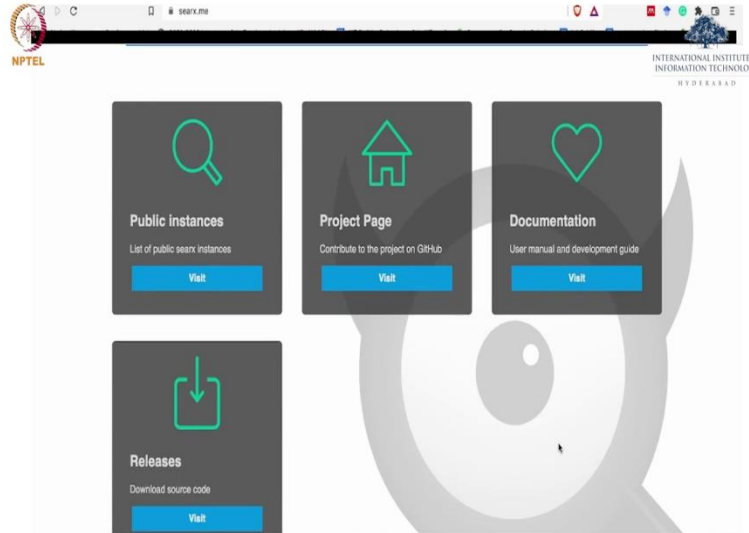
So, this is the website of the SearX and it is a, you can see that there are 83 online instances of SearX is SearX dot space and I can also take you to the SearX dot me.

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So, it is kind of a public, public and self meta search engine privacy respecting meta search engine.

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Their Public instances, Documentation, Project page, it is there and SearX, it is really about running your own instance, it is a meta search engine, 100 percent it assured that no logs would be kept.

So, basically, it leverages the results from large number of search engines and user can change which search engines are used. So, you can choose that your searches could be filtered by social media videos, new signs, any filter by times there are no ads, Wikipedia entries are available on the right hand side. And search results can be downloaded as CSV, JSON, different types of, and search results are as good as you select that engine.

So, you can select any of the engine let us say you select choose Bing, Google Wikipedia, it will search those engines and then help you return those results. So, such suggestions are not info and there are no ads, no search suggestions, nothing. So, it is open source project, which is run by volunteers and there is no on site advertising, no affiliate marketing that is done by this kind of SearX and it helps you to completely preserve your privacy.

And you should be, you can request a security report. You can look at SSL lab security report for SearX dot me to look at how it is respecting your privacy. So, that is all for this tutorial, thank you.