SOFTWARE REQUIREMENTS ENGINEERING

Final Project

Software Requirements Specification Doc.

Hotspot Shield VPN

Version 1.0 approved

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Table of Contents

1. Introduction

1.1 Purpose:

This requirements document describes the functional and nonfunctional requirements of the hotspot shield VPN. This document shall be used by all members who are participating in building the service

1.2 Document Conventions:

Standard font for all text is Arial with font size 11, and font Times new roman for all titles with bold and font size 14 for the subtitles and 18 font size for the main ones.

1.3 Intended Audience and Reading Suggestions:

This document shall be read by developers, domain experts, testers and project managers. The best way to read the document is by having a look at the overall description then functional requirement then nonfunctional requirements lastly the interface.

1.4 Product Scope:
The scope of our product is to give users the freedom in surfing the internet, to secure their. Connections and to hide their identity.

1.5 References:

https://www.hotspotshield.com
http://www.wiki-zero.net/index.php?q=aHR0cHM6Ly9lbi53aWtpcGVkaWEub3JnL3dpa2kvSG90c3BvdF9TaGllbGQ
https://www.hotspotshield.com/glossary/protocols/
https://www.hotspotshield.com/resources/how-do-ip-addresses-work/
https://2bb4-downloads.phpnuke.org/en/c09932/hotspot-shield
https://support.hotspotshield.com/hc/en-us/articles/202439284
https://www.tomsguide.com/us/hotspot-shield-vpn,review-5273.html
https://www.anchorfree.com
http://www.wiki-zero.net/index.php?q=aHR0cHM6Ly9lbi53aWtpcGVkaWEub3JnL3dpa2kvTGF5ZXJfMl9UdW5uZWxpbmdfUHJvdG9jb2w
https://www.vpnmentor.com/reviews/hotspot-shield/
https://blogs.technet.microsoft.com/rrasblog/2006/02/15/what-are-the-main-requirements-and-factors-to-configure-vpn-based-remote-access/

https://www.hotspotshield.com/privacy/
https://support.hotspotshield.com/hc/en-us/categories/115001082783-Windows-HSS

2. Overall Description

2.1 Product perspective:

VPN application is basically making a private connection to the internet without the restrictions of regions, governments, policies … etc. (as in figure 1). Hotspot Shield is a VPN that provides that service with some very advanced features, and with the pro version, the customer may get much more protection and speed in browsing online.

*Figure 1

2.2 Hotspot Shield functions:

The functions of this VPN provider are not many, because the duty of it is clear, to provide a Virtual Private Network.
The functions are as the following:

I. Creating virtual IP: it will create the virtual IP on the internet of the connected device, to fake its information.
II. Changing the location of the virtual IP between countries.
III. Making encryption.

2.3 Hotspot Shield Classes and Characters:

VPN User class	Description
Normal user	A normal user is the only user of VPN application, you do not need more than one user and one interface. This user is able to turn on and off the VPN tool, by clicking on the button provided in the user interface.

2.4 Operating Environment:

OE-1: Hotspot Shield should operate with these web browsers as extension: Google Chrome (versions 1, to 12), Firefox Mozilla (versions 10, to 30), Apple Safari (all versions), and Windows Internet Explorer (version 9).

OE-2: It should operate with these OS: Windows (7, Vista, 8, and 10), MacOS (versions 5.0 to 10), and Linux (Ubuntu 7.0).

OE-3: It should also operate with smartphones systems, like Android, IOS, and Windows phone OS.

OE-4: The level of security in the application should be ISMS standard.

2.5 Design and Implementation Constraints:

CO-1: The application design should fit with the least versions of the operating systems outfit.

CO-2: The applications should make fast internet connection (within the range of 25% lake of the original connection speed) and SHOW the difference in the notification part.

2.6 User Documentation:

Connecting Hotspot Shield:
  Click on the "Connection button" on the main interface screen.
Disconnecting Hotspot Shield:
  Click on the "Connection button" on the main interface screen.
Changing the server location:
  go to the main screen, then click on the country name to load dropdown menu, then select the location from the list.
To quit the application:
  Click on the menu button, then click "Quit", then click "Quit" again to confirm the action.

2.7 Assumptions and Dependencies:

DE-1: The VPN connection should be at most for 500 MB per day (Otherwise, for unlimited connection, the customer should pay 5$ a month).

DE-2: The default virtual IP should be to the United States of America every time the application is opened unless the user chooses to make the connection to another country.

DE-3: The Hotspot Shield shall open each time when the operating system starts to work by default (on computers and smartphones OS).

2.8 UML Diagram:
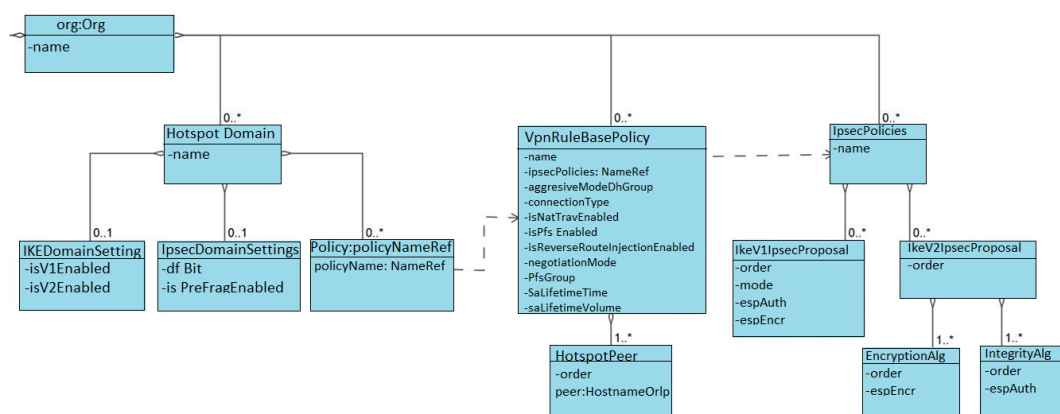
3. External Interface Requirements

3.1 User Interfaces:

This is how hotspot shield looks like after opening it for the first time ,the first thing that you notice is design ,it is simple and attractive and easy to use it eschews any mi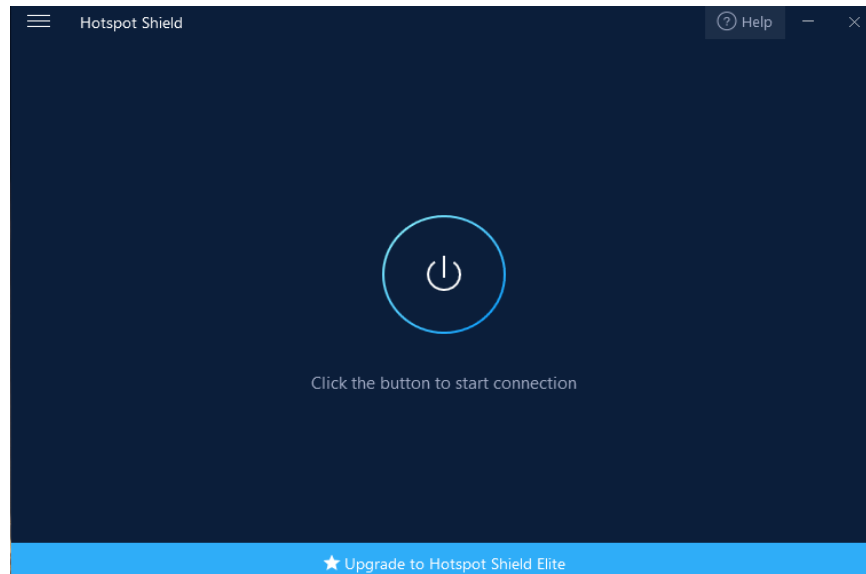sunderstanding by having only one large power button in the middle of the screen and nothing else, if you hit the power button the hotspot shield will connect to the United States server by default or the last connection choice.
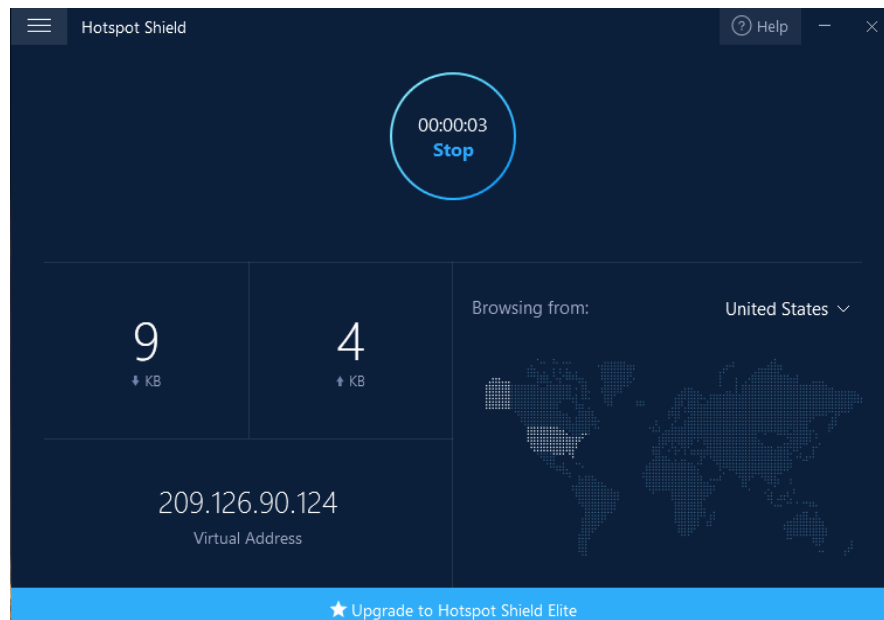
After clicking the startup button you going to notice that the hotspot shield interface has changed to a timer at the top to show you how long you have been connected to its server IP address, the lower half is used for more detailed information including data that's going up and down from your pc,

Software Requirements Specification for Hotspot Shield

and your currently IP address as well, and a small showing which country that you have connected from, it's very simple and clear to understand and to interact with.

If you would like to change your current location IP address click on the drop-down menu square in the lower right and you can switch to different 24 country locations.
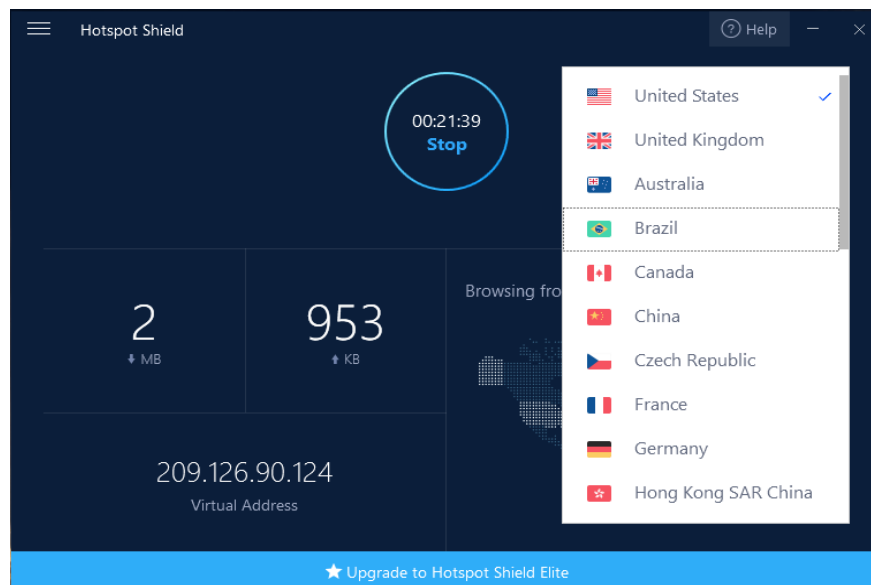
To reach hotspot shields settings click on the corner upper left-icon, and select settings from it.
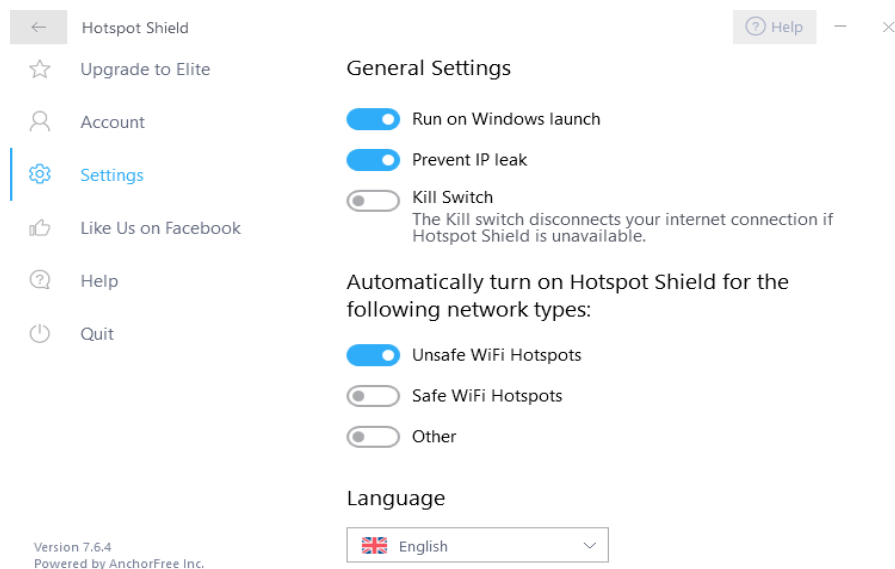
As have you noticed there's a various options to tell hotspot shield when it should automatically connect to the VPN server, the prevent ip leak option makes the IP address becoming harder to detect, the kill switch option is off by default it is used for disconnecting internet connection if there's a problem with connecting to hotspot shield server and it is used for extra security , by default, hotspot shield will connect when it detects unsafe wifi such as open

Wi-Fi networks and you can activate the safe Wi-Fi hotspot option as well so that you connect to hotspot shield all the time automatically, and the option 'Other' setting it covers any other possible internet connection, below that you will find that there's a language section setting if you'd rather the app to be in other languages and it offers 9 languages more.

← Hotspot Shield		⑦ Help — ✕
☆ Upgrade to Elite	**General Settings**	
🧑 Account	🔵 Run on Windows launch	
⚙ Settings	🔵 Prevent IP leak	
👍 Like Us on Facebook	⚪ Kill Switch	
	The Kill switch disconnects your internet connection if Hotspot Shield is unavailable.	

English
Русский
Deutsch
Español
Türkçe
Français
العربية
日本語
한국어
Português

Shield for the

Version 7.6.4
Powered by AnchorFree Inc.

There's a bit differences between elite (paid version) and free mode of hotspot shield and for that reason I will include a schedule that shows the differences between them.

Features/Benefits	Hotspot Shield Elite	Hotspot Shield Free
Bandwidth Cap	Unlimited	500 MB per day
Virtual Locations	24	1 (US)
Ad-free browsing	Yes	No
Dedicated Support Team	Yes - 24/7 Chat support (coming soon) and priority email support	Email support
Unlimited access to geo-restricted sites	Yes	No
Ability to link up to 5 devices to one Elite account	Yes	No
Data encryption	Yes	Yes

3.2 Hardware Interfaces:

Supported devices:

Hotspot shield is compatible with the most used device's software and can be downloaded for the devices in the list below

IOS devices running iOS 9.0 or later including:

- iPhone
- iPad & iPad mini
- iPod Touch

Android devices running android OS 4.0 or later including:

- All android tablets and phones with VPN support

Mac desktops running Mac OS x 10.6 or later including:

- MacBook Air, MacBook & MacBook Pro
- iMac & Mac Pro
- Mac mini

Windows desktop running Windows 7 or later including:

- All windows desktops and laptops

Browsers extensions available:

- Chrome Browser
- Firefox Browser

Not supported devices:

- Windows phones
- Routers
- Kindle tables
- Smart TV
- Apple TV
- Android TV box
- Roku
- Chromecast
- XMBC or Kodi
- Amazon Fire TV Stick
- Windows phones
- Kindle devices
- Blackberry phones
- Rooted or jailbroken devices
- Linux OS
- Game consoles

Unsupported services:

- Custom router configurations
- Direct VPN connectivity

Used protocol:

- Hotspot shield is owned by AnchorFree which is a software company that provides a virtual private network for secure browsing, this company has created its new private protocol and uses it exclusively it's called Catapult

Hydra, as long as hotspot shield is owned by that company it uses its own private protocol as well, this protocol uses open ssl (secure sockets layer) library which is the standard security technology for establishing an encrypted link between a web server and a browser to encrypt the data, the new protocol is simply an enhancement of the transport protocol.

3.3 Software Interfaces:

The hotspot shield interface should:

- Provide a secure browsing for internet by hiding IP address from the server after clicking on the power button.
- Follow the requested country ip connection and connect to it after the user chooses the country that he wants to use its IP address.
- Solve the problem directly if its application has stopped working or cannot open on the supported software.
- Show the running IP address.
- Show the download speed and upload speed.
- Count the time when the connection starts.
- Give some options to control when the app should run (run on windows launch).
- Should totally change its language depending on the user preference.
- Provide some extra functionality for elit user (paid version user) like providing faster and more secure connection.
- Provide a help section if the user needed any help.
- Provide a stop button if the user wanted to end the connection to the VPN.

3.4 Communications Interfaces:

Communications functions required by hotspot shield:

- The hotspot shield should send a request to recover a new IP address from the server and replacing the normal pc IP address with the one that has recovered it from the server and for doing that, for sure, internet access is required, if the normal user (free version user) had any problem or needed any support he can ask for it only by directly emailing the hotspot shield support, if the elite user (paid version user) had any problem with connection to the hotspot shield server or other problems and needed any help he can ask for it by either the chat support which is not available 24/7 for now or he can directly emailing the hotspot shield support as same as the free version user but he will get the priority to respond.

Network server communications protocols & communications standards:

- Hotspot shield elite offers users an OpenVPN connection, which compared to PPTP (point-to-point tunneling protocol) which uses TCP IP and LT2P (layer 2

tunneling protocol), is more stable and secure, and for encrypt all of the traffic between the device and their servers they use TSL 1.2 (transport layer security)with forward security ECDHE (elliptic-curve Diffie-hellman) which is an anonymous key agreement protocol, and 128-bit AES (advanced encryption standard) data encryption and HMAC (hashed message authentication code) message authentication.

4. System Features

4.1 Browsing the internet securely:

4.1.1 Description:

By turning on the VPN service it directly encrypts all the transferred data between your device and the server using TLS 1.2 with perfect forward secrecy, 128-bit AES data encryption. Priority = High

4.2 Unblock website:

4.2.1 Description:

By turning on the VPN service the browser will provide a virtual location to the websites and servers where you can access any blocked website smoothly and securely. Priority = High

4.3 Browse the internet anonymously:

4.3.1 Description:

The user identity must be hidden after connecting to our VPN server where nobody can know how you are and where are you connecting from by changing your IP.

4.3.2 Functional Requirements:

Account	Has an account or not?
Signing up Ways:	If the user doesn't have an account he has to sign up first
	He has two way either downloading the app and sign up using the app
	Or signing up using the web platform

Subscription:	**Free or Elite**
Trial:	Every user is given a 7-day free trial as an elite user.
Packages:	The system shall provide 3 different packages for the user after the trial is over or he can roll back to the free service
Choosing:	The user has to choose one package of the 3 packages after his free trail is over or he has to cancel his elite trial subscription.

Payment	**Chosen package payment**
Method:	After choosing the package the system will ask the user for choosing the payment method.
Accepted: Rejected:	If the payment has been done successfully the user is now an elite user.
	If the user payment was rejected the user is rolled back to the free service and will be given an error message and be asked again to choose a package
Automatically charged	After the user's first payment he will be automatically charged, however, the user can cancel his subscription at any time.

Order Date	**Date of subscription**
Registering	Record the date the user subscribed to a package
Charge the user:	
Accepted	If we could automatically charge the user after his subscription is over
Rejected	Then the user remains an elite subscriber
	If the operation was rejected the user will be rolled back to the free service and he will be asked to pay to re-new his service using other payment methods

Connection Location	**Germany or France?**
Select:	The user must have the chance to choose from different 24 freedom countries as being an elite user if he is subscribed to the free service he will be connected to the USA server
Unblock content	The user shall be able to access websites that are blocked in his country by connecting to a virtual server in another country.

Multi devices	**One or more?**
	The user must be able to use his account on 5 different devices if he is an elite user.

Anonymous	**Hiding your IP**
	The user must connect to the server and be anonymous as no one can know his identity.

Privacy	**Not sharing any info about the user**
	The system mustn't leak any information about our users

5. Other Non-functional Requirements:

5.1 Performance Requirements:

Usually, Hotspot shield speed differs from country to country as it offers connection in 24 countries all around the world. For example a pre-connection download speed of 41.81 Mbps was managed to 37.08 Mbps after tunneling traffic through Russia, Similarly 42.17 Mbps through Germany and 22.17 Mbps through the United States. It provides flexibility with an encryption of 256 bit. System response and upload also differs country to country Some of the examples are United stated is the slowest as it pings 183ms at 100 Mbps internet connection, Asia server at 141ms and UK server pings at 53ms at the same internet speed. On one side Asian and European servers performs about 10 Mbps faster than any other virtual private network software and on the other hand, United States servers are almost twice as slow as other VPN softwares. Similarly, upload speed differs from server to server. It displays a connected message within an average of 3 seconds after user connects.

5.1.1 Factors affecting requirements:

Encryption: because encrypting and decrypting process requires extra power.
Bandwidth: The more crowded a VPN server is the slower it will be.
Protocol: Some protocols are faster others. For example, PPTP 128 bit encryption is faster than L2TP/IPSEC 256-bit.

Comparison of performance with different servers at 100 Mbps internet connection.

Software Requirements Specification for Hotspot Shield

Servers	United States	European Union	Asian	United Kingdom
Ping	183ms	54ms	141ms	53ms
Download	28.66mbps	92.28Mbps	80.00Mbps	95.55Mbps
Upload	13.74Mbps	45.09Mbps	19.60Mbps	46.45Mbps

5.2 Safety Requirements:

Mostly VPN services are by default a man in the middle. The data or information can be accessed by software developers. In terms of safety commercial VPN is more preferable over a free one. Personal information should not be shared using express version.

VPN is declared illegal in some countries like Russia, China, etc. therefore it is important to study whether the software is banned in the country or not. While hotspot shield might be legal but doing an illegal activity with them is not acceptable such as copyright material, spreading viruses etc.

5.3 Security Requirements:

All the traffic is encrypted between the device and the server using TLS 1.2 protocol with perfect security, 128-bit AES data encryption and HMAC message authentication.
Web traffic on unsecured networks such as cafes, hotels etc. are securely encrypted.
The true IP address is not logged, stored or shared after the session is closed.
Personal information is not associated while using hotspot shield. For example email, credit card info, etc.
It is also not shared with third parties other than service providers.
Ads are not based on the users personal information.
Certain physical organizational and technical safeguards are designed to maintain the integrity and security of the data or information but security measures cannot be perfect therefore the security of the data cannot be guaranteed.

5.1.2 Third Party Advertising:

Hotspot shield cannot control what other websites or applications collect from the device. It cannot stop what cookies are placed in the browser by other websites which can allow them to collect information about the browsing history.

5.4 Software Quality Attributes:

5.4.1   Reliability:

Generally paid hotspot shield is more reliable in terms of consistency and trustworthy over the free version. The system does not crash easily and sharing personal information is only used to provide amazing products and services to the user.

5.4.2   Flexibility:

Up to five simultaneous connections are assisted by hotspot shield. It works on the major systems and devices both. Even though Some of the basic qualities may have not ascent to all platforms but the core technology and ease of use is impressive.

5.4.3   Availability:

An Elite account is required to be signed in to change the virtual location. By default it is set to the US and can also be used by the free users.
Virtual location availability alters depending on the platform the software is used.
The virtual location feature offers a list of countries such as US, UK, Australia, India, etc.

5.4.4   Compatibility:

It is compatible and can be installed for the major famous devices but it does not support every device for example It does not support Android TV box or game stations. Compatibility problems may sometimes appear with certain devices.

5.4.5   Usability:

The software is easy to install and set up into any platform for example windows, android, iOS, mac etc. After organizing the software into any platform the user is asked to enter their credentials before installing. Users can connect by just clicking the connect button. It has a 7-day free trial option as elite subscription for new users. Customer is supported with guides, tutorials etc.

5.4.6   Robustness:

If connection is broken. Users are able to reconnect and start from the same place it disconnected. For example if the user is downloading a file and the

Software Requirements Specification for Hotspot Shield

connection crashes , after reconnecting the file should start re-downloading from the place it was broken.

5.5 Business Rules:

ID	Rule definition	Type of rule	Static or dynamic	Source
1	Installation takes approximately 2 mins	Fact	Dynamic	Software developer
2	Purchase can be done online	Fact	Static	Software Policy
3	Customers can request a refund within 45 days from purchase date	Fact	Static	Software Policy
4	Helpline must be available 24/7	Constraint	Dynamic	Software policy
5	Subscription date is recorded	Fact	Static	Software policy
6	Elite users can choose connection location	Fact	Static	Software policy
7	Elite users can use the account on 5 different devices	Fact	Dynamic	Software policy
8	Discounts can be given to customers at times	Fact	Dynamic	Software policy
9	Only software developers and owners can alter subscription packages	Fact	Static	Software developer
10	Free users should not have more than one option of location connection	Constraint	Dynamic	Software developer

6. Other Requirements

6.1 Glossary:

VPN Virtual Private Network is a server that makes the connection of the product to the internet with fake information, or with a different place of your true one.

Encryption is the translation of data into unreadable code sequence to allow the secure transferal of information.

OpenVPN (virtual private network) is an open-source software application used for creating VPN's and it's an open source it means that anyone can edit it or use it.

Port forwarding a process of redirecting incoming data to a different port than it was originally intended, ports are used to protect networks and providing them a new basic level of security.

Protocols a set of rules that end points in a network or telecommunications connection use when transferring data or communicating, it defines how a piece of data should be identified in the servers.

Router is a device or software that is responsible for the forwarding of packets of data between computer networks, it performs the traffic directing functions on the internet.

SSL (secure sockets layer) it's the standard security technology for establishing an encrypted link between a web server and a browser, this link ensures that all data passed between the web server and browser remain private and integral.

SSTP (secure socket tunneling protocol) is a protocol used in VPN tunneling on Microsoft Windows operating systems, it uses SSL 3.0 (secure socket layer) to send data across a VPN network.

Tunneling protocols it is used for the transferal of data over a network in a secure way, it transports multiple standard protocols over a network and also allows for encryption of such connections as VPN networks.

UDP stands for user datagram protocol it is a communication protocol that is an alternative to TCP protocol (transmission control protocol).
Its main use to lower the loss of connection and latency toleration connection between the connected devices.

VPS (virtual private server) it does not have any physical location and has restricted access to those who have the correct authorization, it will install a virtual private server on an actual physical device and work in the same way that a physical device would.

FTP (file transfer protocol) its a standard network protocol used for the transfer of computer files between a client and server on a computer network.

END.