

2STON™ SPN v2.0

We Secure the Internet of Things with 2STON™ SPN

2ip Inc,
Doc. Revision: 1.5

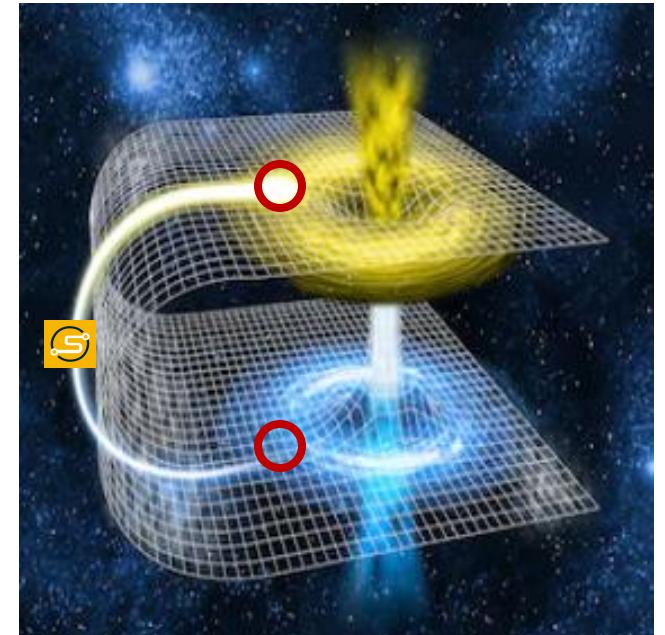
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- 2. 2STON SPN Technology
- 3. 도대체 무엇을 팔아야 하나 ?

wormhole



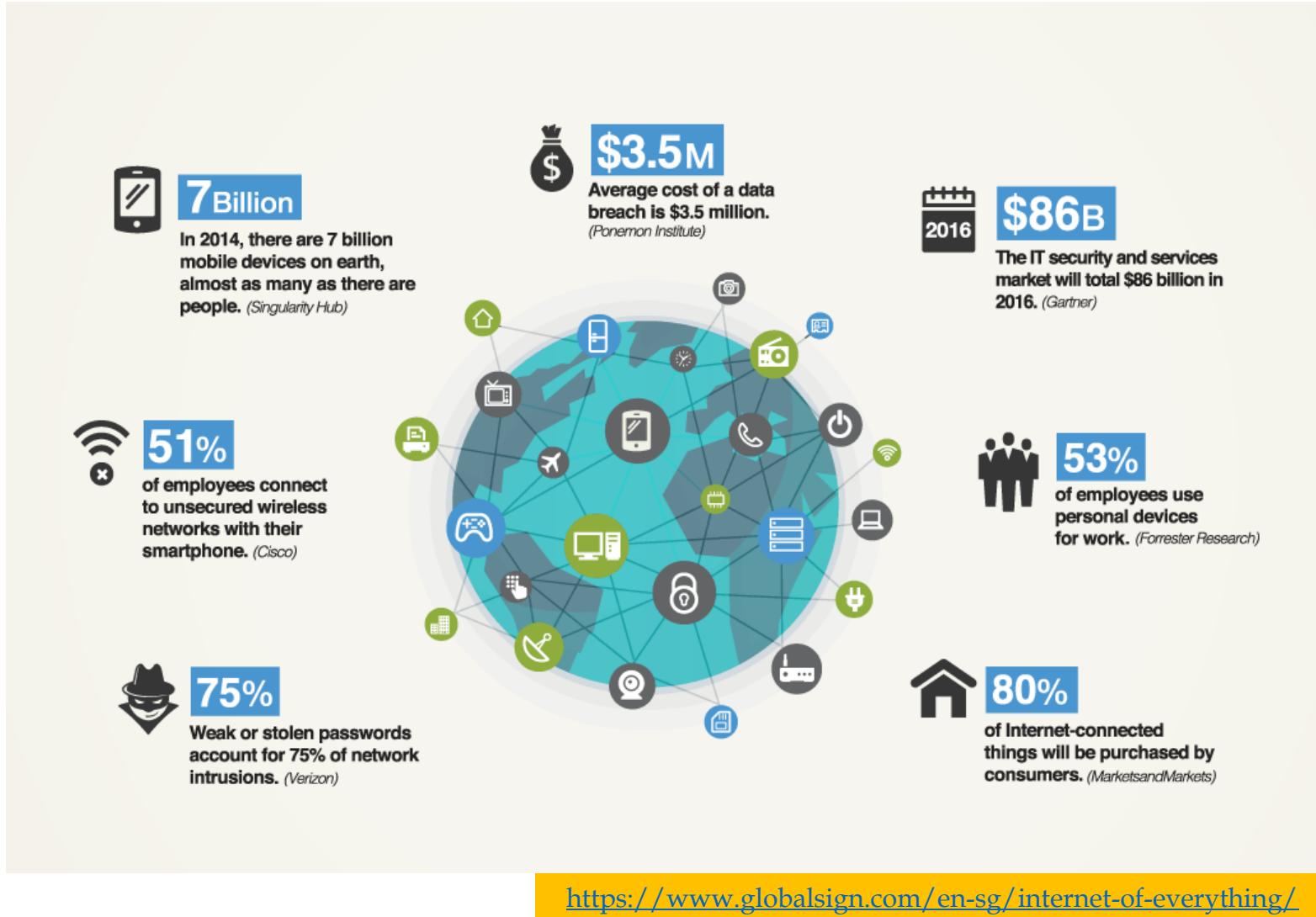
2STON™ SPN is fast, secure and makes easy connections like wormhole.

2STON™ means 2ip Secure Things Of Network.

1. 우리는 왜 SPN을 개발하고 있는가 ?

Why are we developing SPNs ?

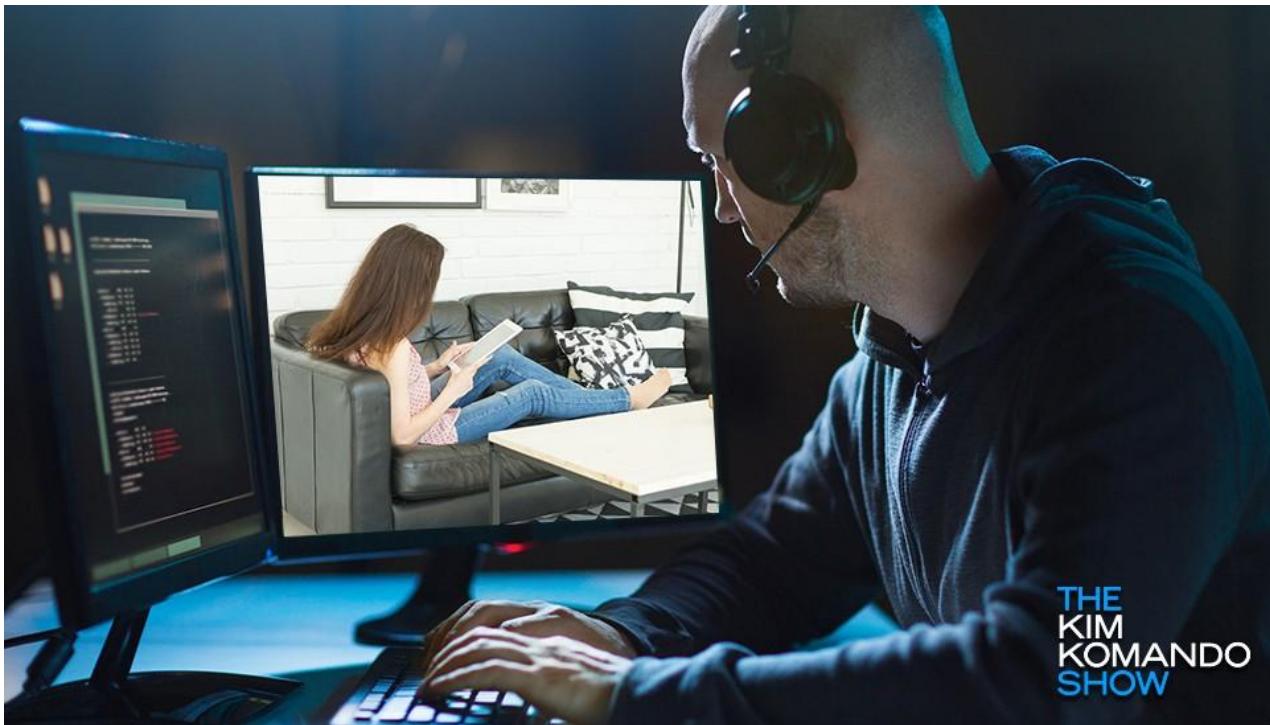
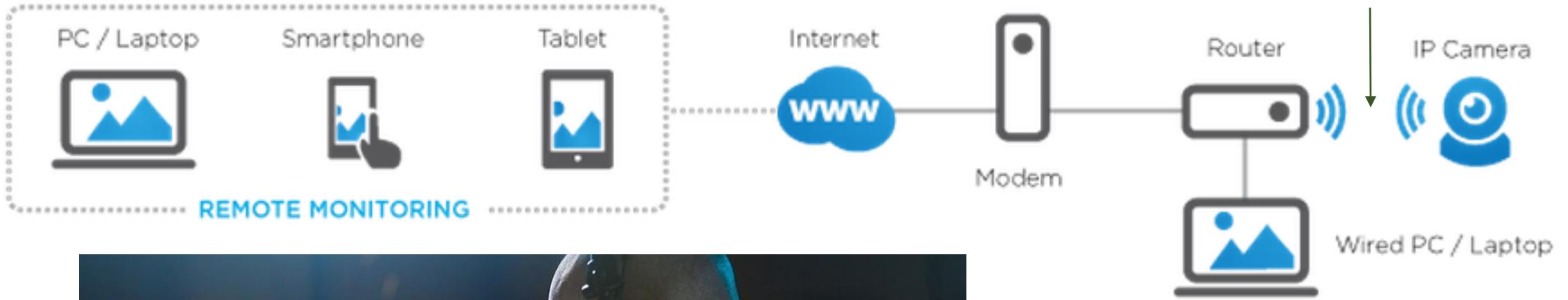
1.1 Internet of Things(1) - IoT & Security



1.1 Internet of Things(2) - IP Camera(1)



1.1 Internet of Things(2) - IP Camera(2)



1.1 Internet of Things(2) - IP Camera(3)



IP카메라 보안위협

IP카메라는 PCL나 모바일에 비해 기능이 경량화, 소형화된 제품으로 보안에 취약하고, 인터넷에 연결된 IP카메라 특성상 IP주소만 알면 카메라에 접근을 시도할 수 있습니다. 해커는 공장 출고 당시 설정된 아이디와 패스워드를 변경하지 않은 IP카메라를 대상으로 해킹을 시도하고, 개인 사생활이 녹화된 영상 탈취하여 인터넷에 노출하고 있습니다.

기능이 경량화, 소형화된 제품으로 보안에 취약

IP주소만 알면 카메라에 접근 시도 가능

개인 사생활이 녹화된 영상 탈취하여 인터넷에 노출

2016년 전 세계 약 7만 3천여 대의 IP카메라가 해킹되어 '인세캠'이라는 사이트를 통해 생중계 되었습니다. '인세캠' 사이트 운영자가 보안 설정의 중요성을 알리기 위해 해킹한 것으로 밝혀졌습니다.

약 7만 3천여 대 IP카메라 해킹

3초면 해킹

보안 설정의 중요성

언론기사: '침실·수영장...전 세계 CCTV 7만3000대 누구나 본다. 비밀번호도 안 바꿔 쉽게 해킹' IP카메라, 3초면 비밀번호 해킹... 사생활 주의보, 국대 IP카메라 해킹한 해커, 페이스북에 해킹 정보와 화면 노출

조치방법 안내 | IP카메라 보안설정

1 IP카메라 접속 패스워드 변경

IP카메라 공장 출고시 설정된 초기 아이디, 패스워드 변경
(단, 특수문자 사용 불가시 특수문자를 제외하고 8자 이상으로 설정)

영문자(대·소문자), 숫자, 특수 문자를 혼합하여 8자 이상으로 패스워드 설정
(단, 특수문자 사용 불가시 특수문자를 제외하고 8자 이상으로 설정)

동일 패스워드를 장기간 사용할 경우 보안에 취약하므로 주기적으로 변경

2 IP카메라 최신 펌웨어 업그레이드

IP카메라의 보안 취약점으로 인한 악성코드 감염, 정보 유출 등을 방지하기 위하여 주기적 최신 펌웨어 업데이트 진행

펌웨어 업그레이드는 많은 시간이 소요될 수 있으며, 업그레이드 중 시스템 종료 금지
(강제 종료 시 단말 고장 발생 가능)

업그레이드 후 아이디, 패스워드 초기화 될 수 있기 때문에 패스워드 재설정 필요

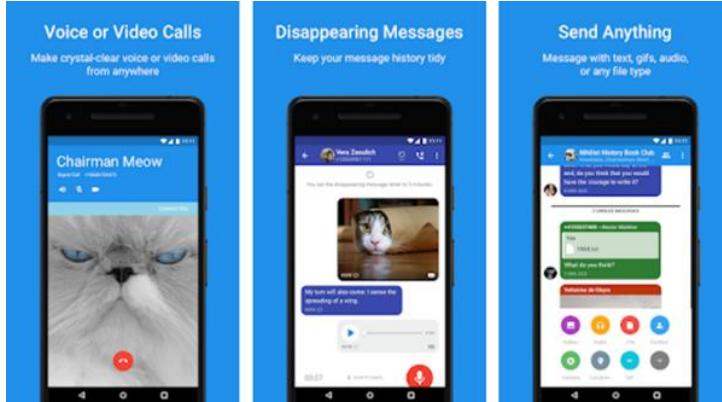
▷ 자세한 사항은 한국인터넷진흥원 보호나라 홈페이지 내 자료실에서 IP카메라 이용수칙을 참고하시기 바랍니다.

<https://www.krcert.or.kr/cyber/ipcamera.do>

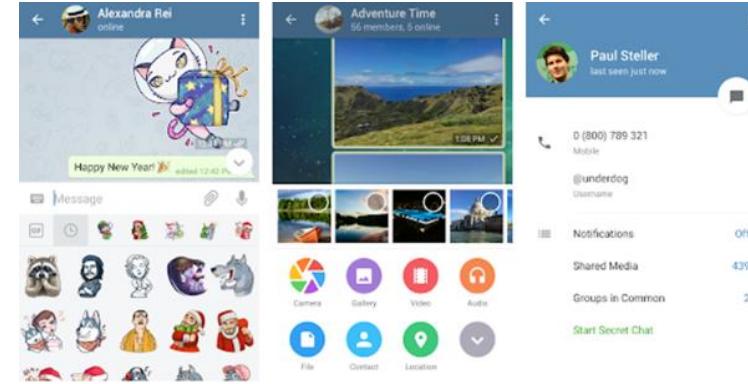
1.1 Internet of Things(3) - Private Messenger(1)

Target [2]

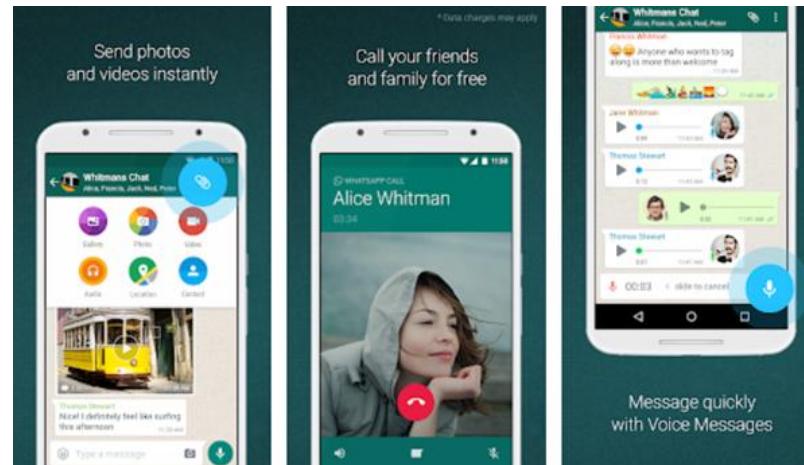
<https://www.jihosoft.com/tips/top-secure-encrypted-messaging-apps.html>



[1] Signal Private Messenger



[2] Telegram Messenger

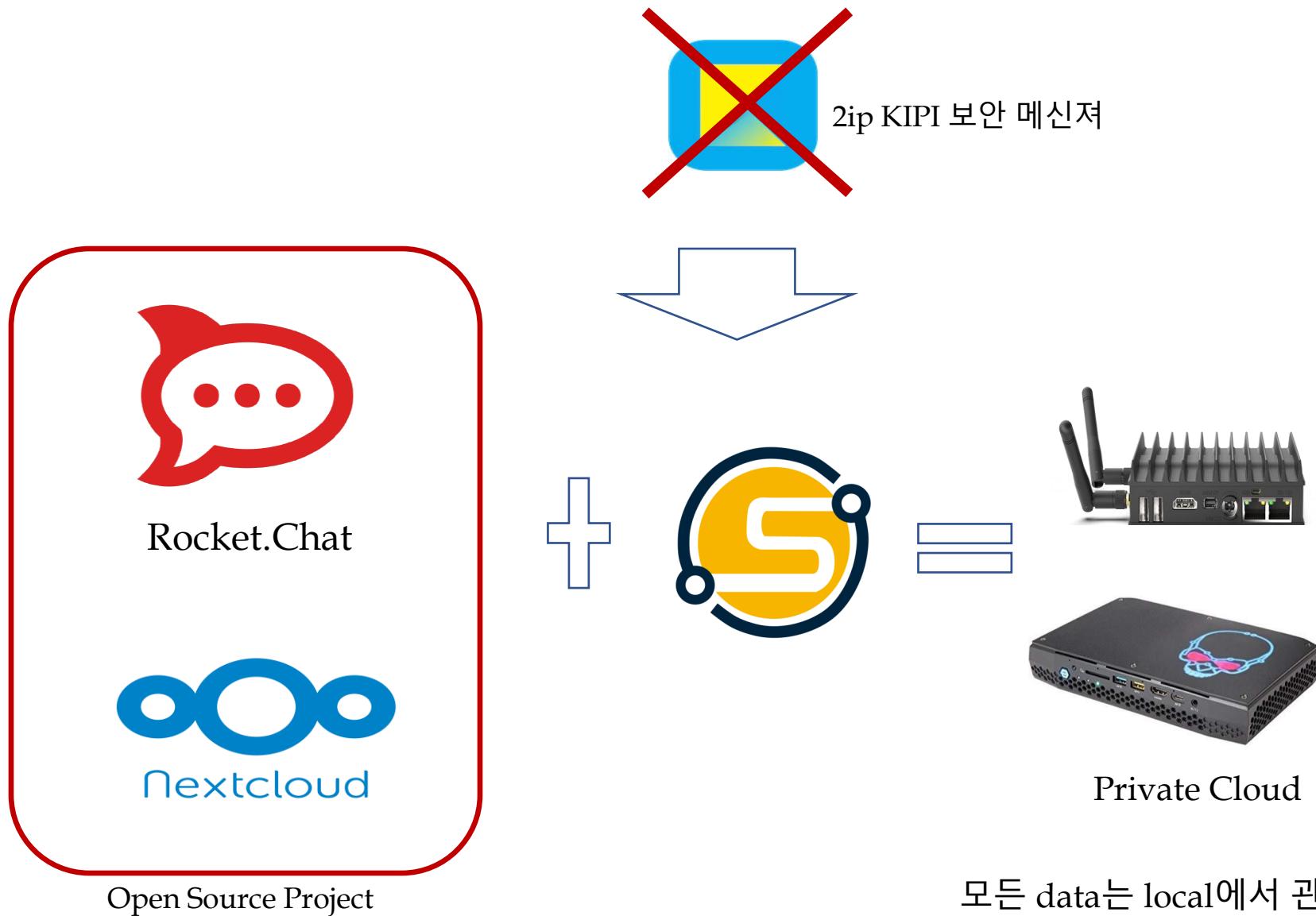


[3] WhatsApp Messenger



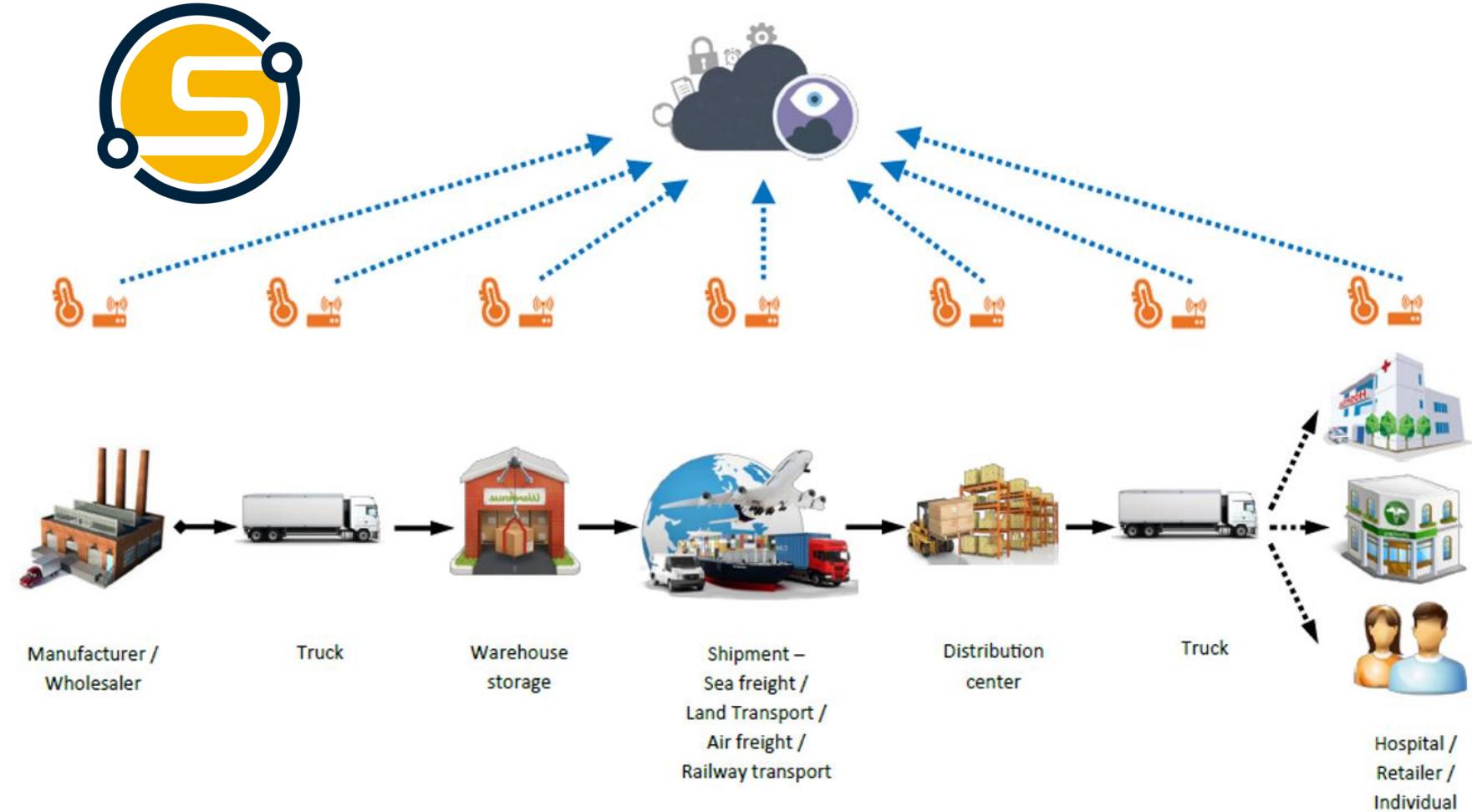
[4] Silence Messenger

1.1 Internet of Things(3) - Private Messenger(2)



1.1 Internet of Things(4) - ColdChain(1)

Target [3]



1.1 Internet of Things(4) - ColdChain(2)

The diagram illustrates the ColdChain system architecture, showing the integration of multiple data sources and user interfaces.

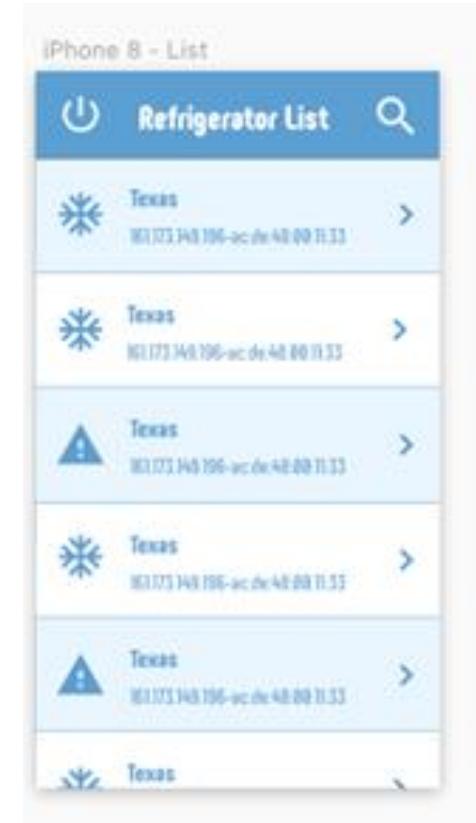
Refrigerator List: This interface displays a list of refrigerator locations across different regions. Each entry includes a small icon, the city name, and an IP address.

- San Antonio (IP: 192.168.1.11-7.02:8082:pgrv78)
- Miami (IP: 192.168.1.10-p.08!ghqtbt:46)
- New Orleans (IP: 192.168.19-q.32!ngjrb:15)
- Detroit (IP: 192.168.1.8-q.84Zungjtb:22)
- Atlanta (IP: 192.168.17-q.8.66:quqqrz:23)
- Dallas (IP: 192.168.1.6-h.0.23:querte:3t44)
- Los Angeles (IP: 192.168.1.5-h.0.11cedf:2b:33)
- Houston (IP: 192.168.14-c.9.33:quurf43b:77)

Refrigerator Location: This interface shows a map of the state of Texas, with the city of San Antonio highlighted. The map displays various roads, cities, and geographical features.

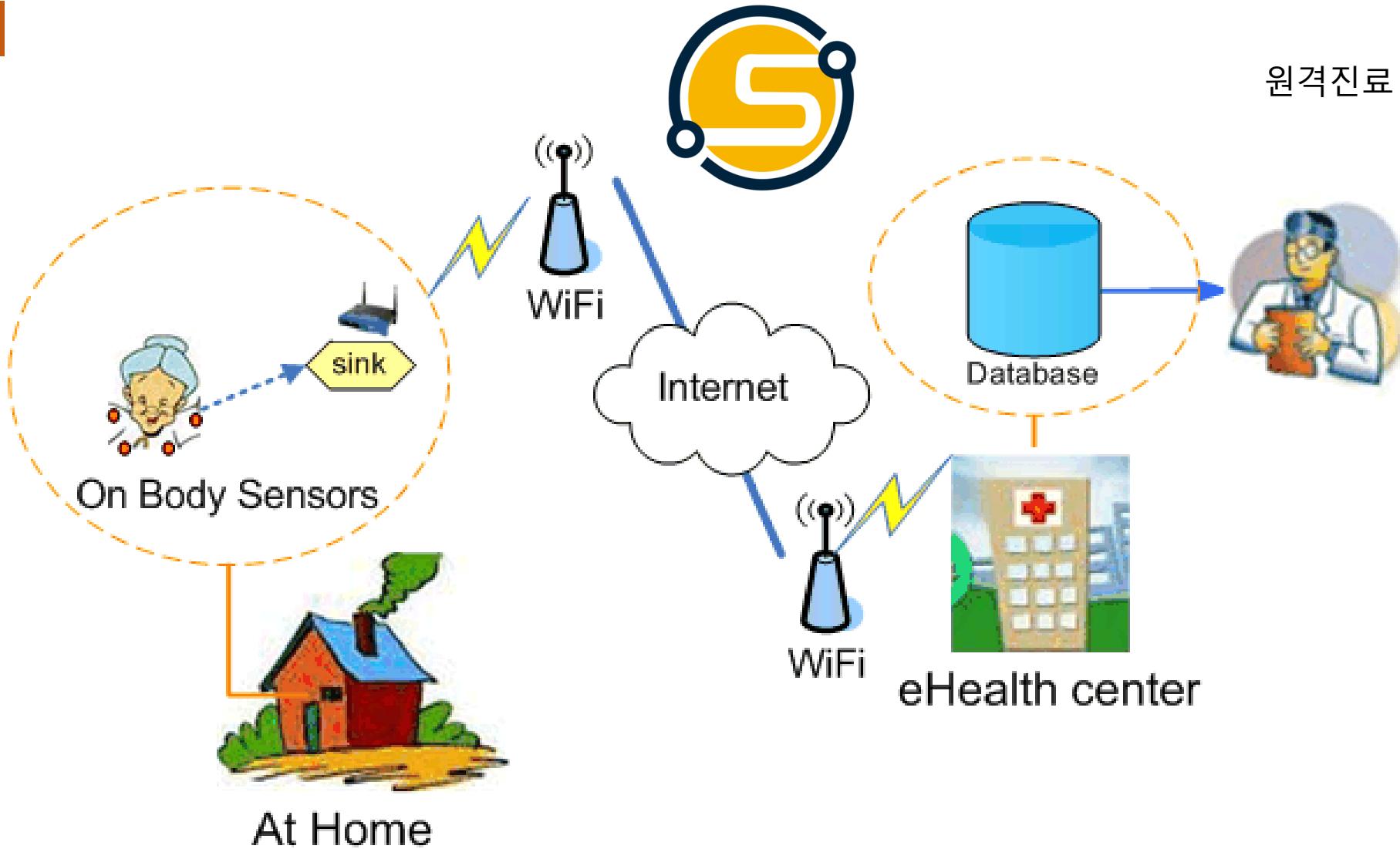
Refrigerator Info: This interface provides detailed information about a specific refrigerator unit located in San Antonio.

ID	Model	Region	IP
12	Texaking_E05-BT	San Antonio	192.168.11-47.02:8082:pgrv78
			10.11.1 / 192.168.1.11

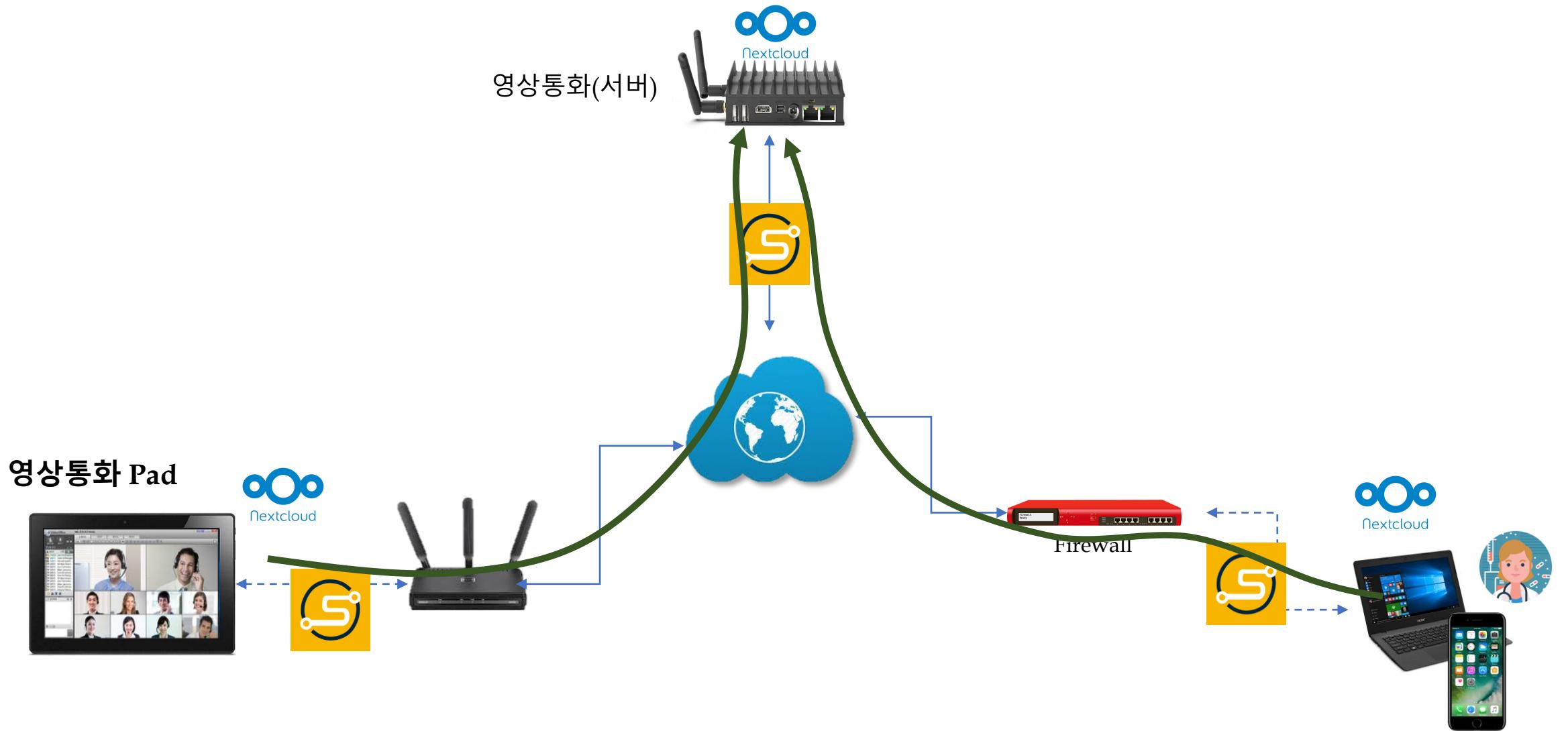


1.1 Internet of Things(5) - Medical Health Care(1)

Target [4]

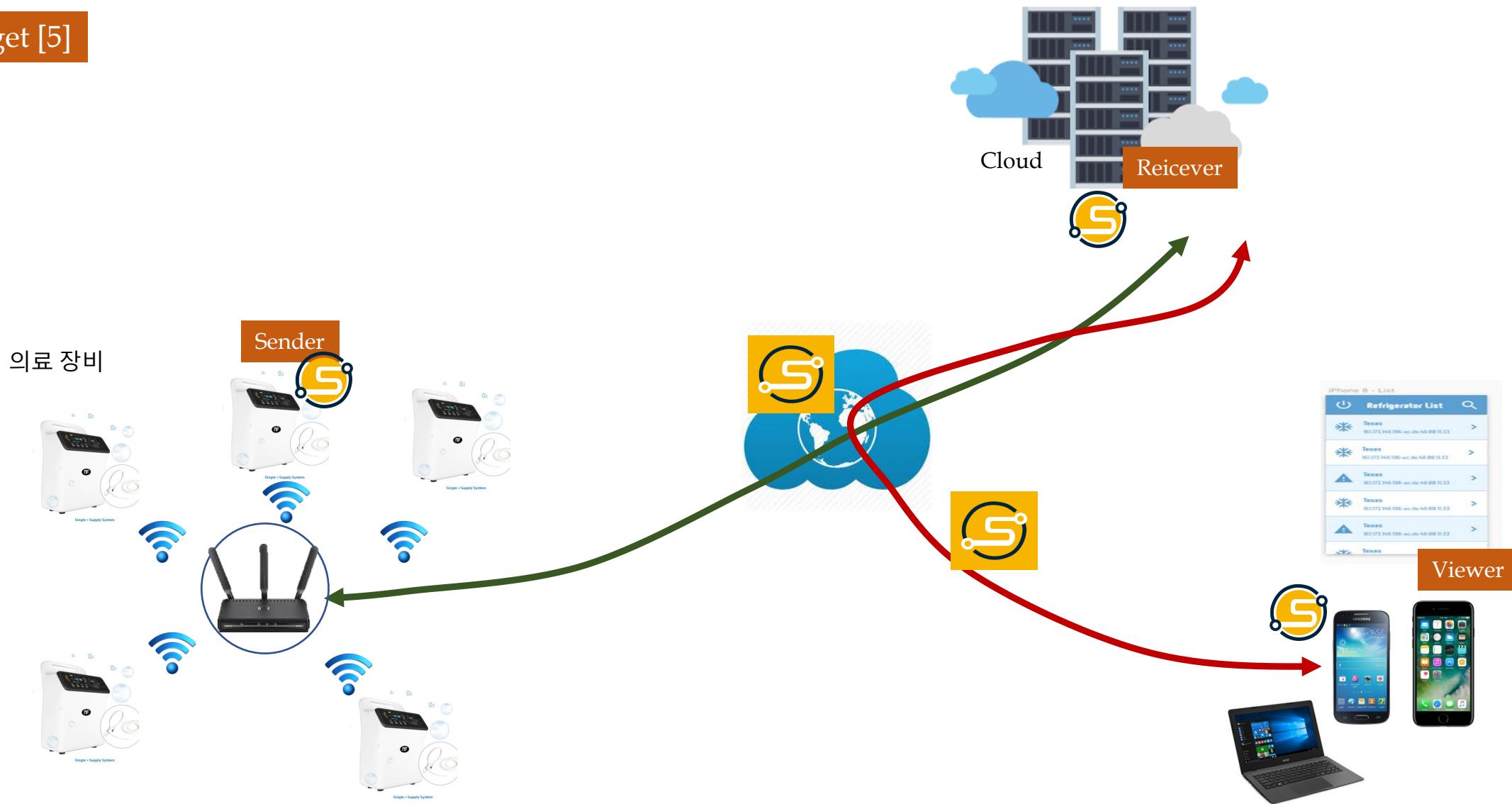


1.1 Internet of Things(5) - Medical Health Care(2)

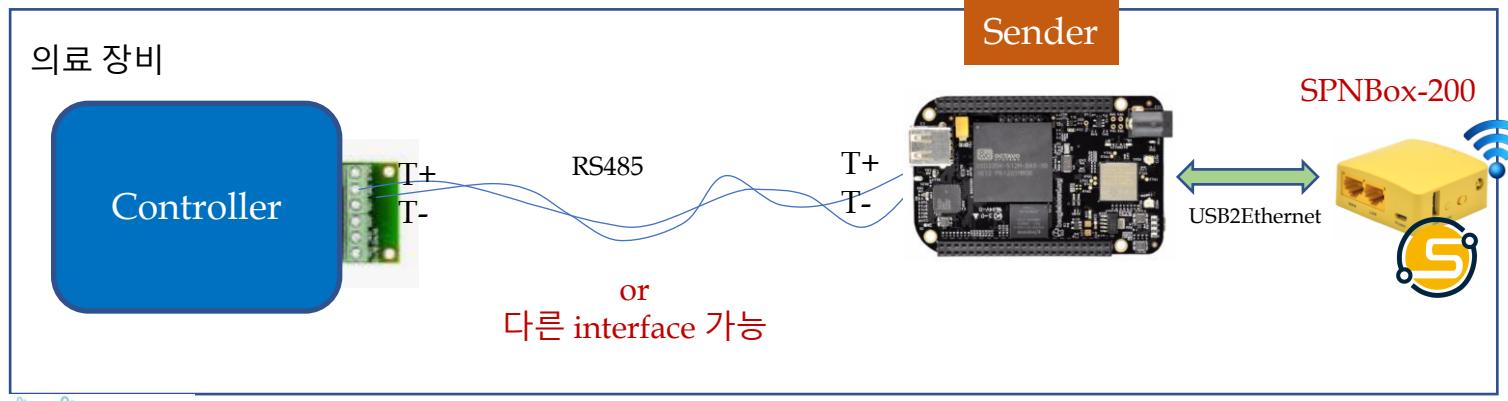


1.1 Internet of Things(6) - Medical 장비 Security(1)

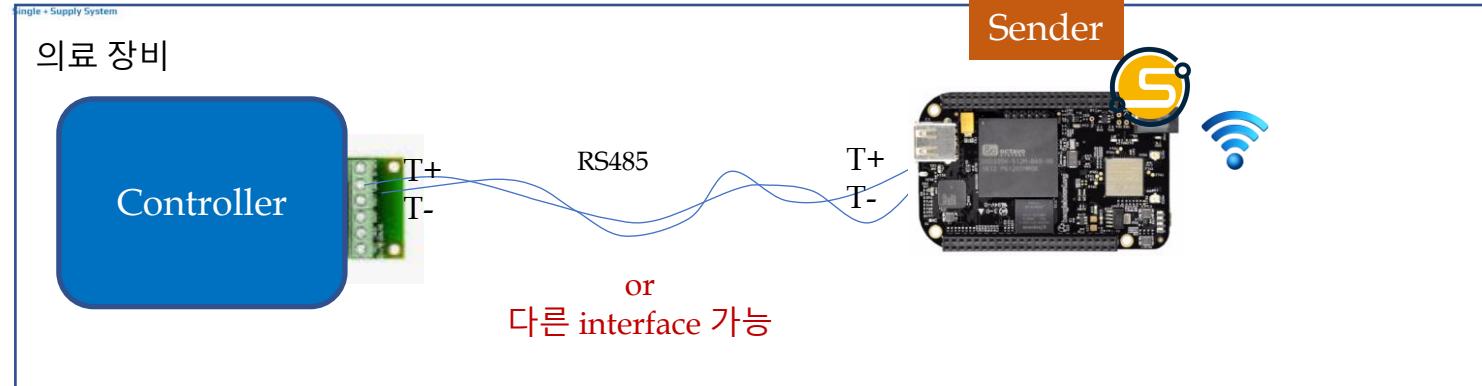
Target [5]



1.1 Internet of Things(6) - Medical 장비 Security(2)



or



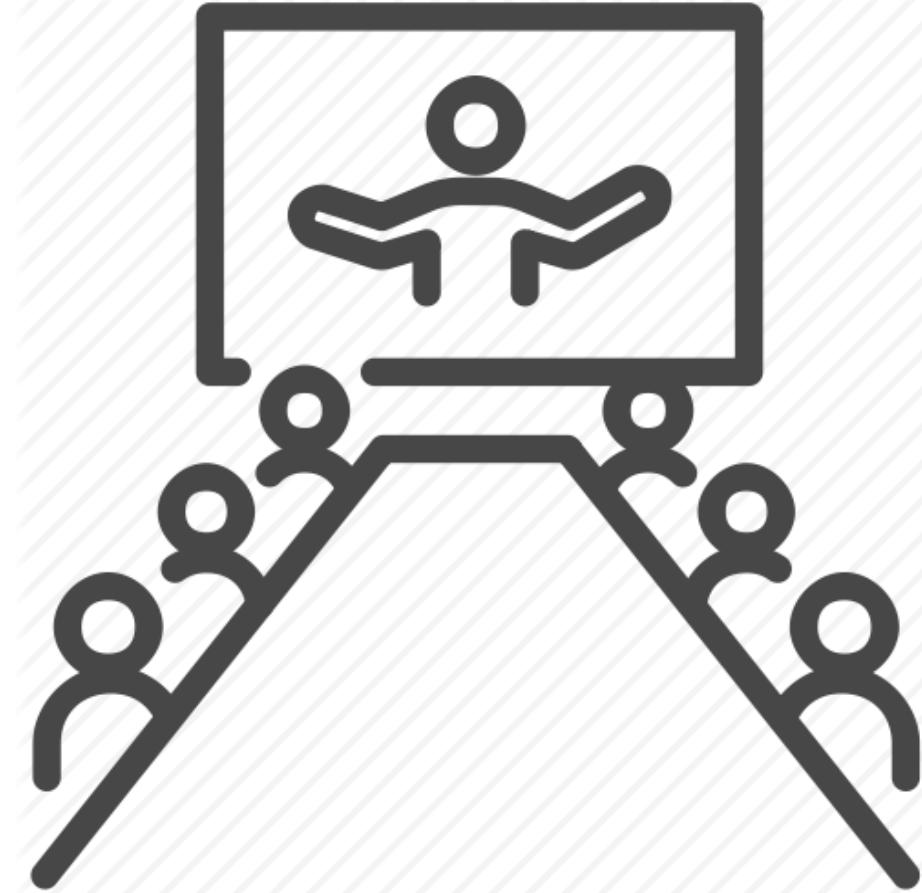
1.1 Internet of Things(7) - Remote Presentation

Target [6]



Remote Presentation

IP 설정 불가 서비스



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1.2 2STON SPN(1) - 2IP IoT Security Story



1.2 2STON SPN(2) - SPN 정의

Secure Private Network

Secure Point-to-point Network

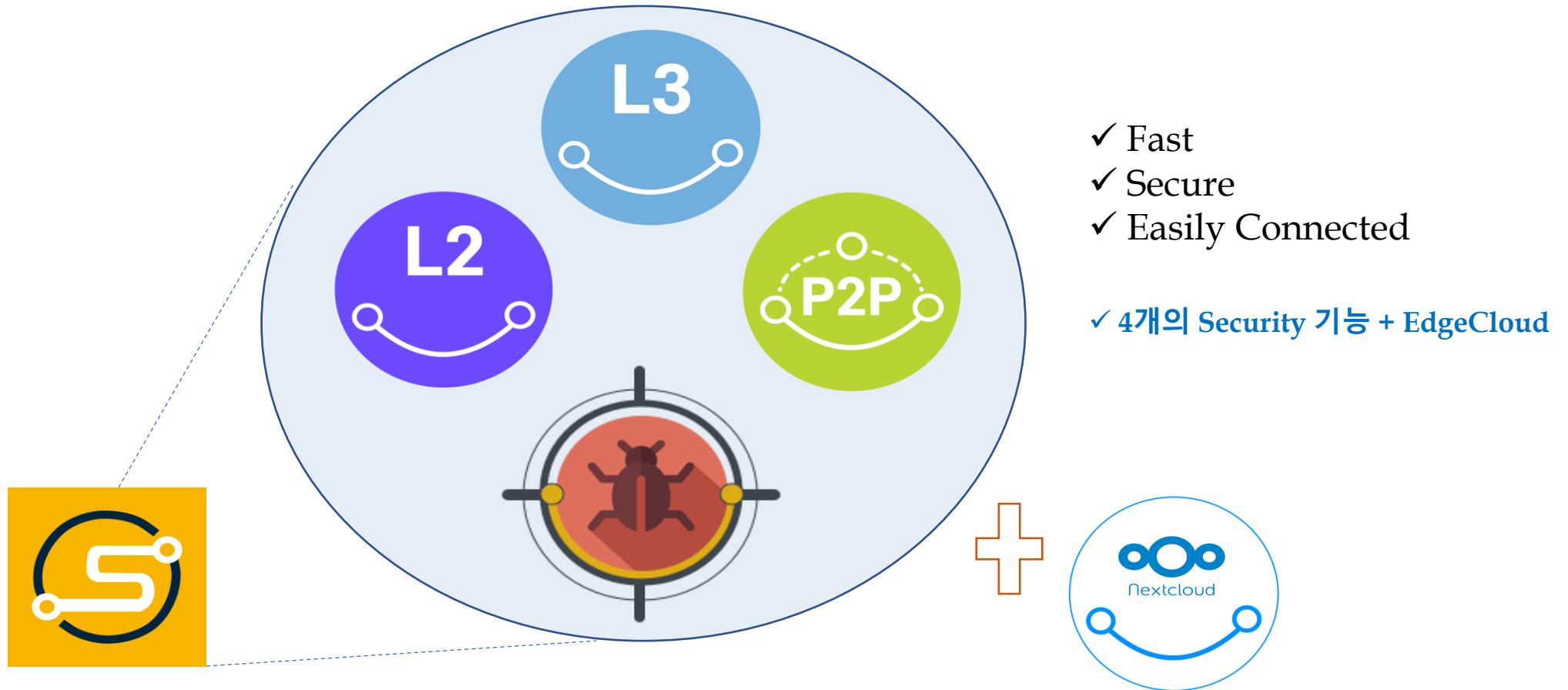
Secure Peer-to-peer Network

Secure Pliant Network

SPN is Surely not VPN

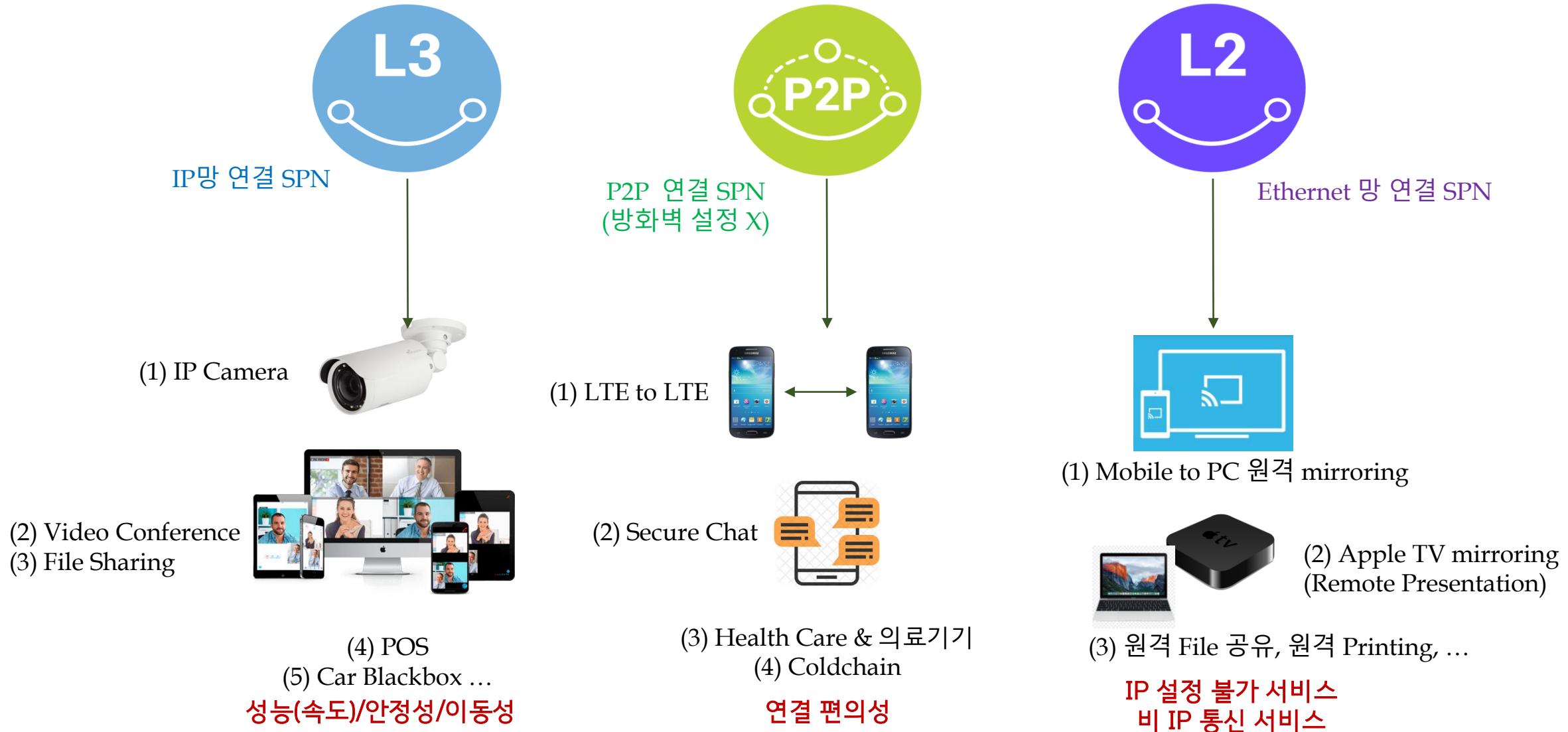


1.2 2STON SPN(3) - We Secure the Internet of Things(1)

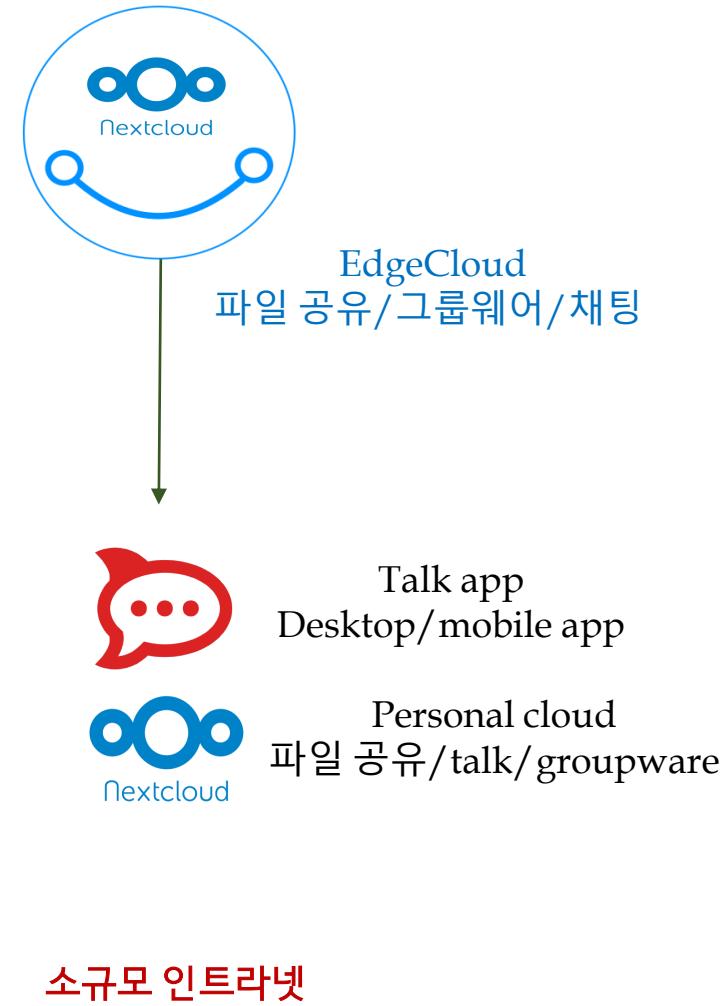
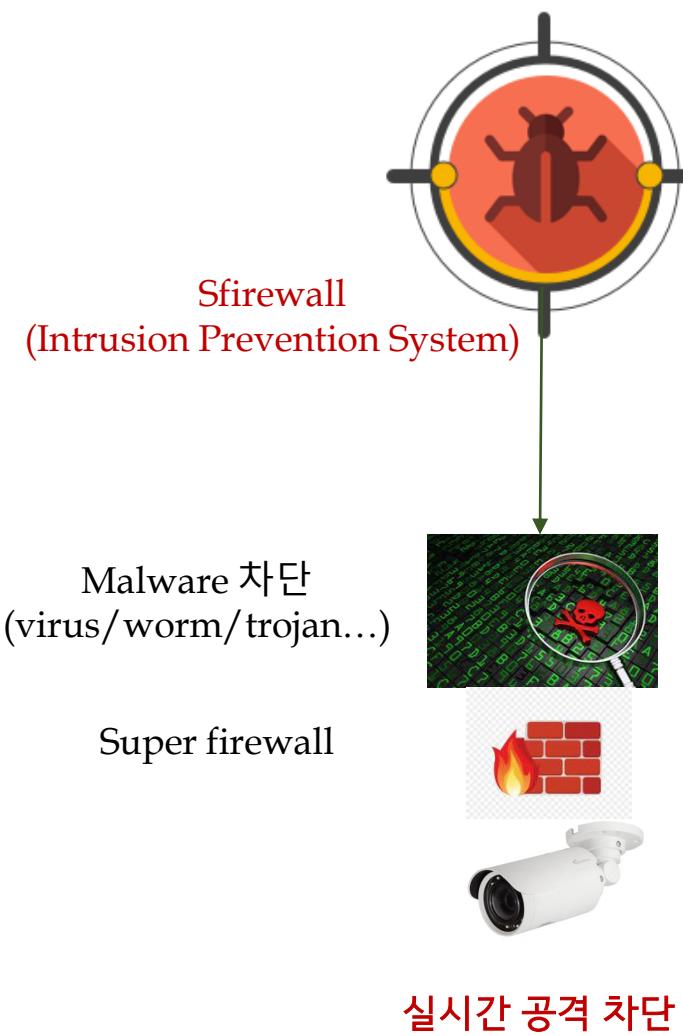


2STON SPN = L3, L2 SPN and P2P SPN
사명 : 모든 IoT 기기를 안전하게 연결하자 !

1.2 2STON SPN(3) - We Secure the Internet of Things(2)



1.2 2STON SPN(3) - We Secure the Internet of Things(3)



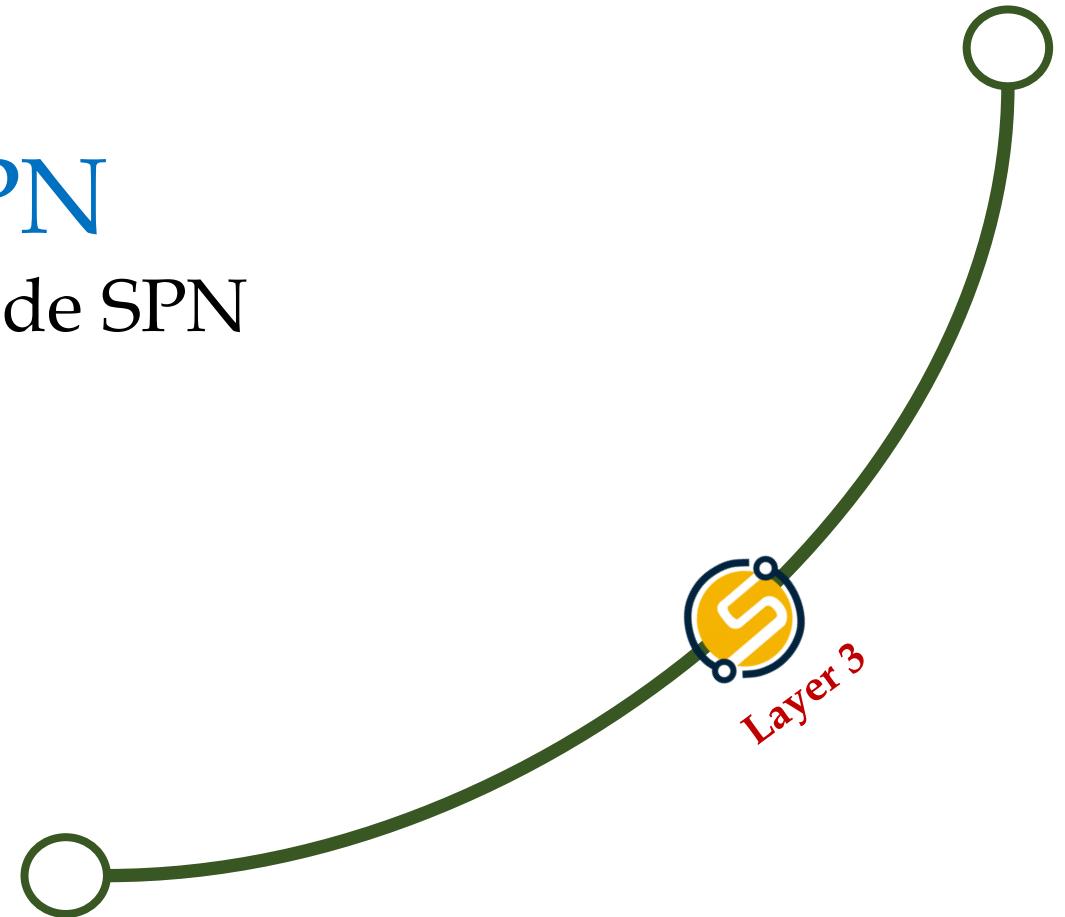
1.2 2STON SPN(4) - 제품 구성



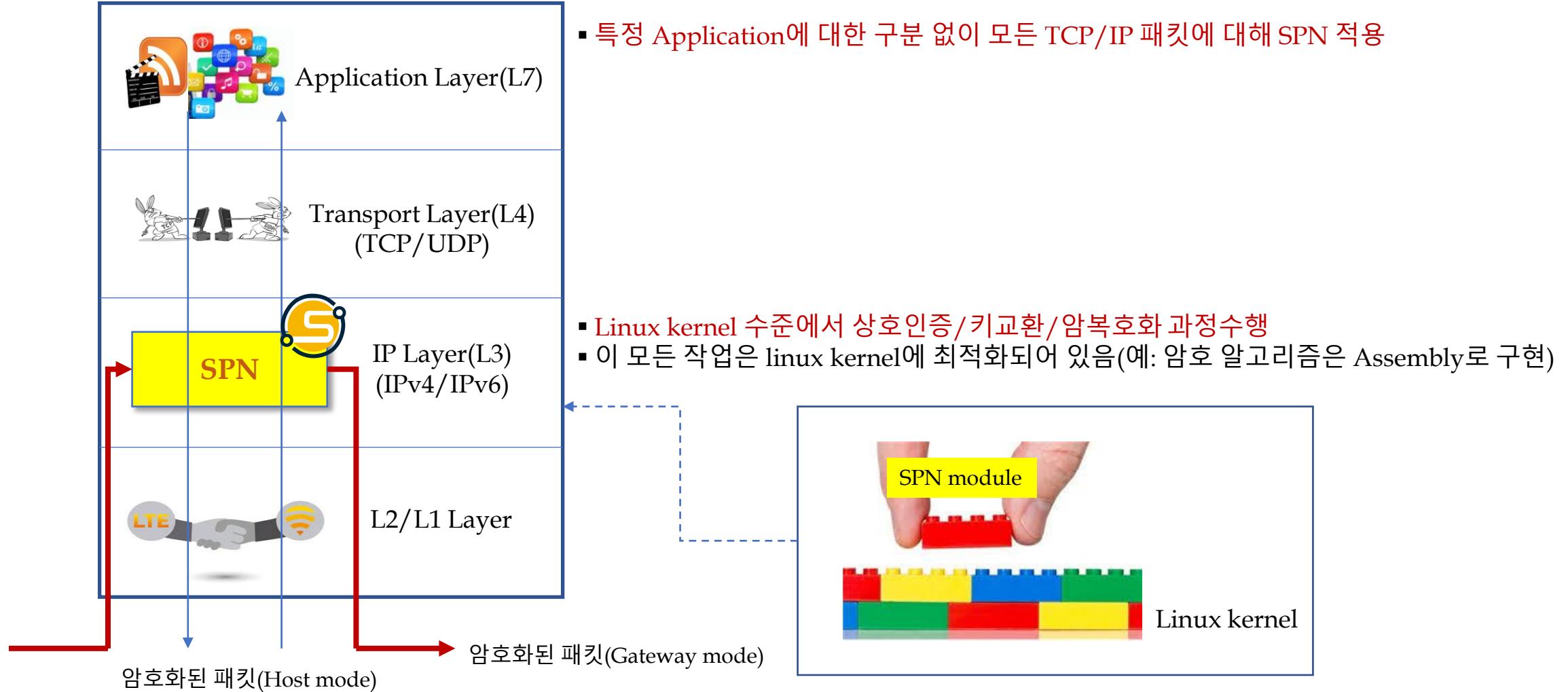
2. 2STON SPN Technology



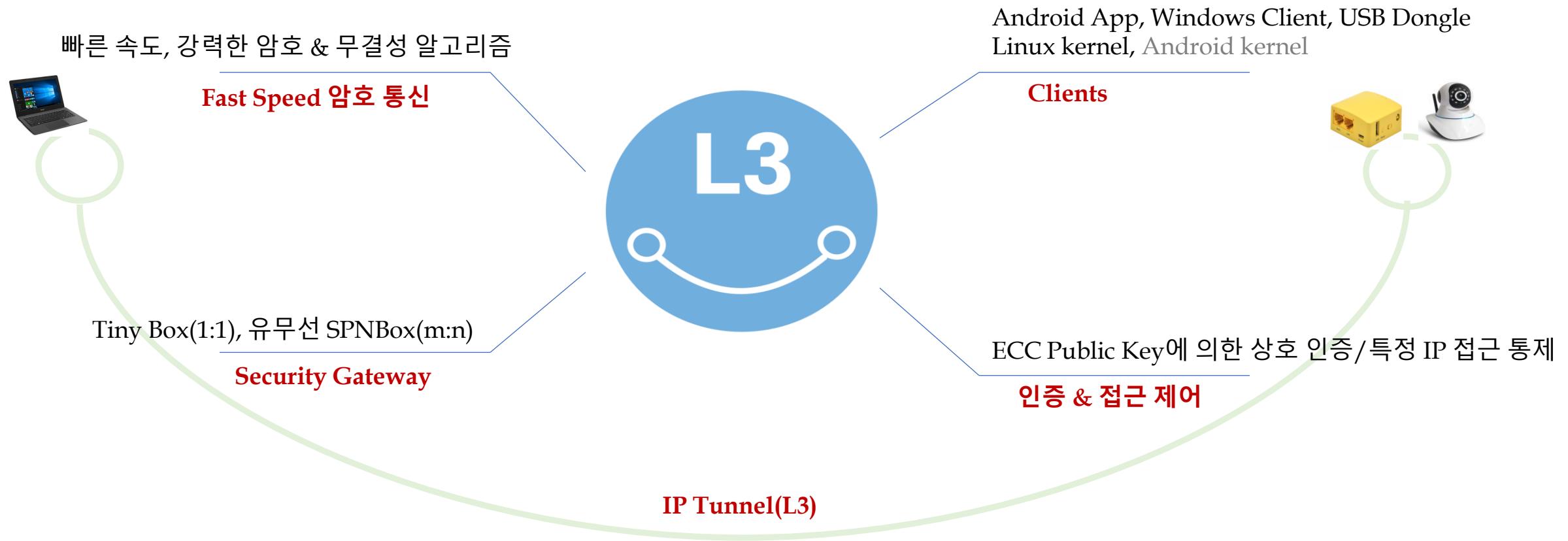
L3 SPN
: Kernel Mode SPN



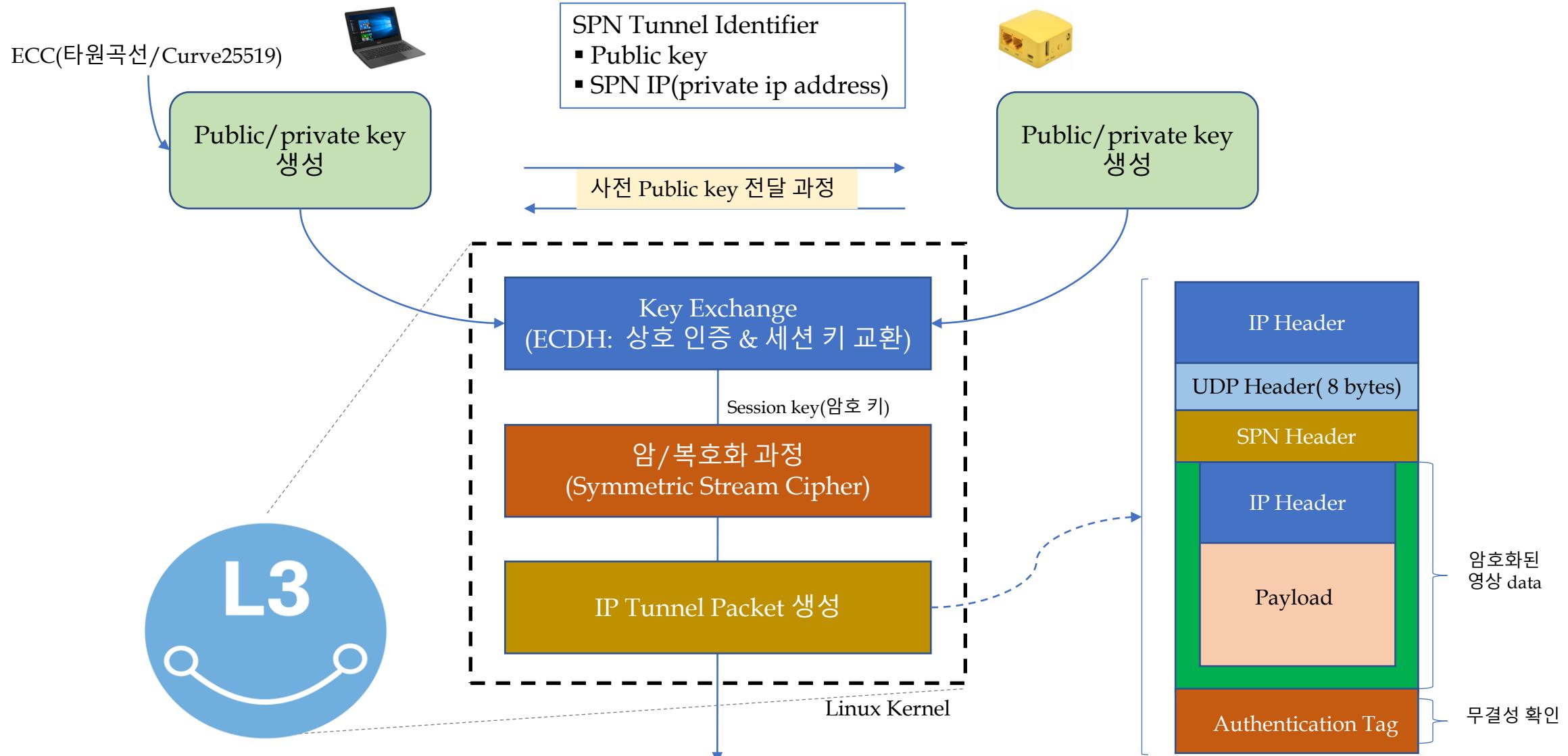
2.1 L3 SPN(1) - Application Transparency 보장



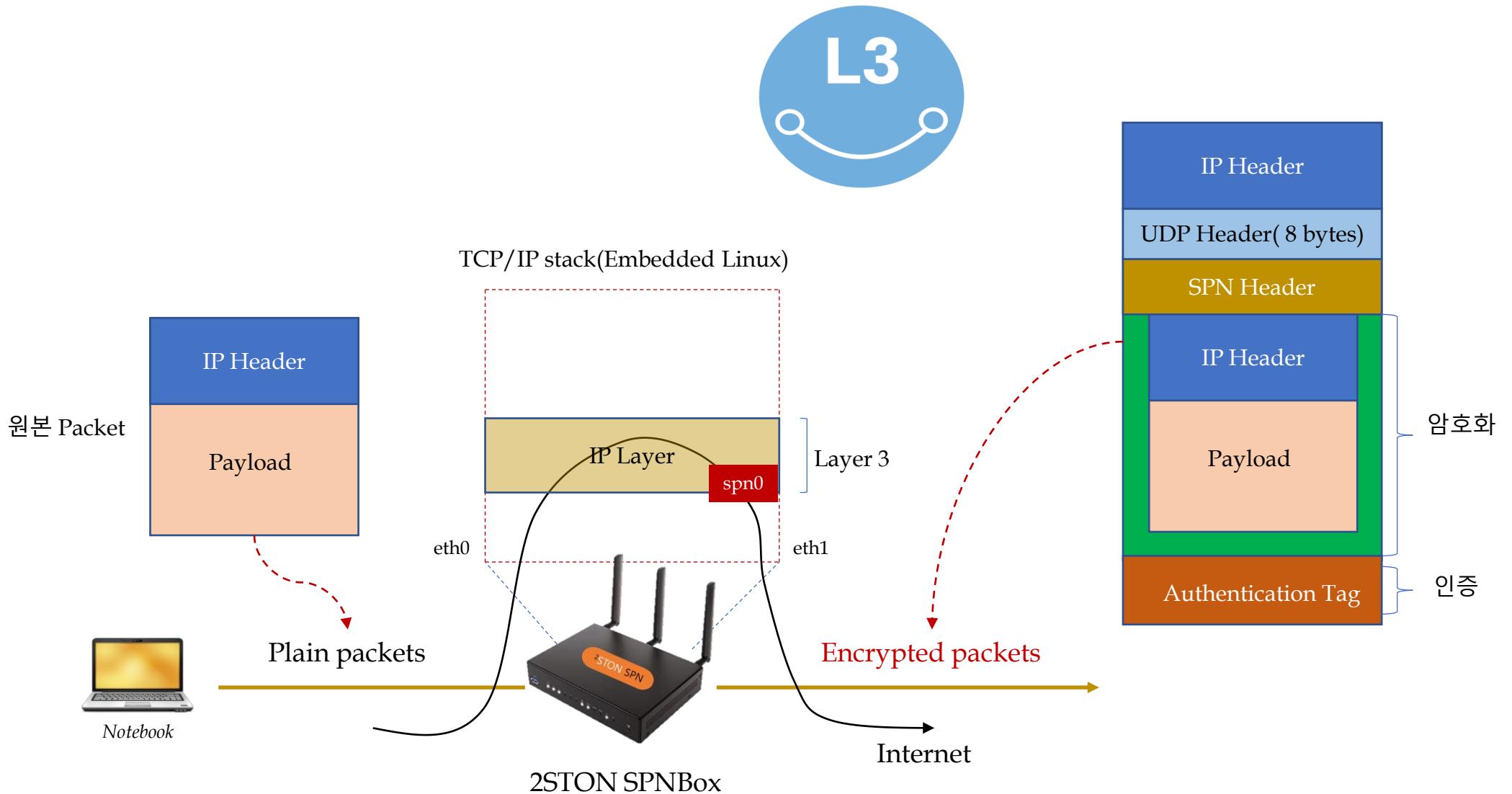
2.1 L3 SPN(2) - Overview



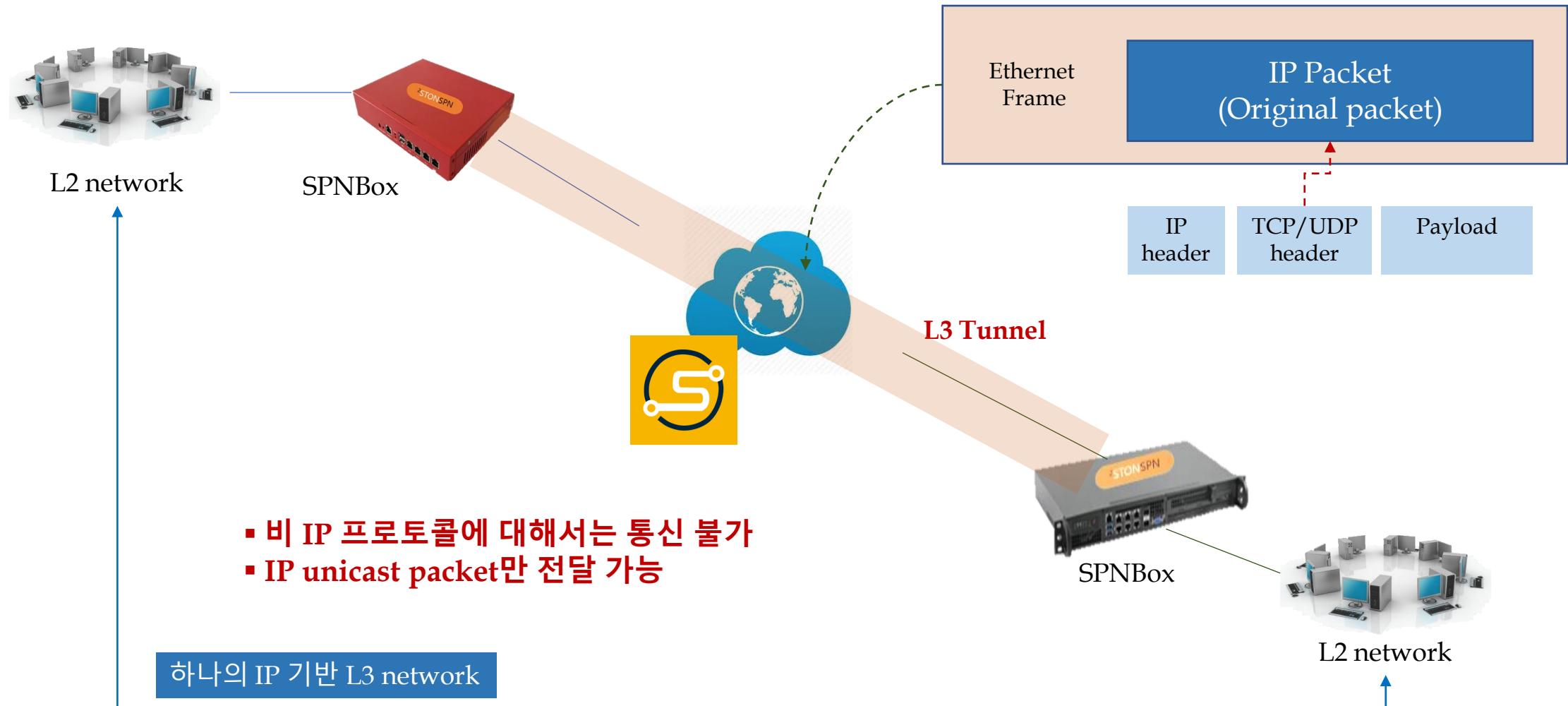
2.1 L3 SPN(3) - IP Tunnel(1)



2.1 L3 SPN(3) - IP Tunnel(2)

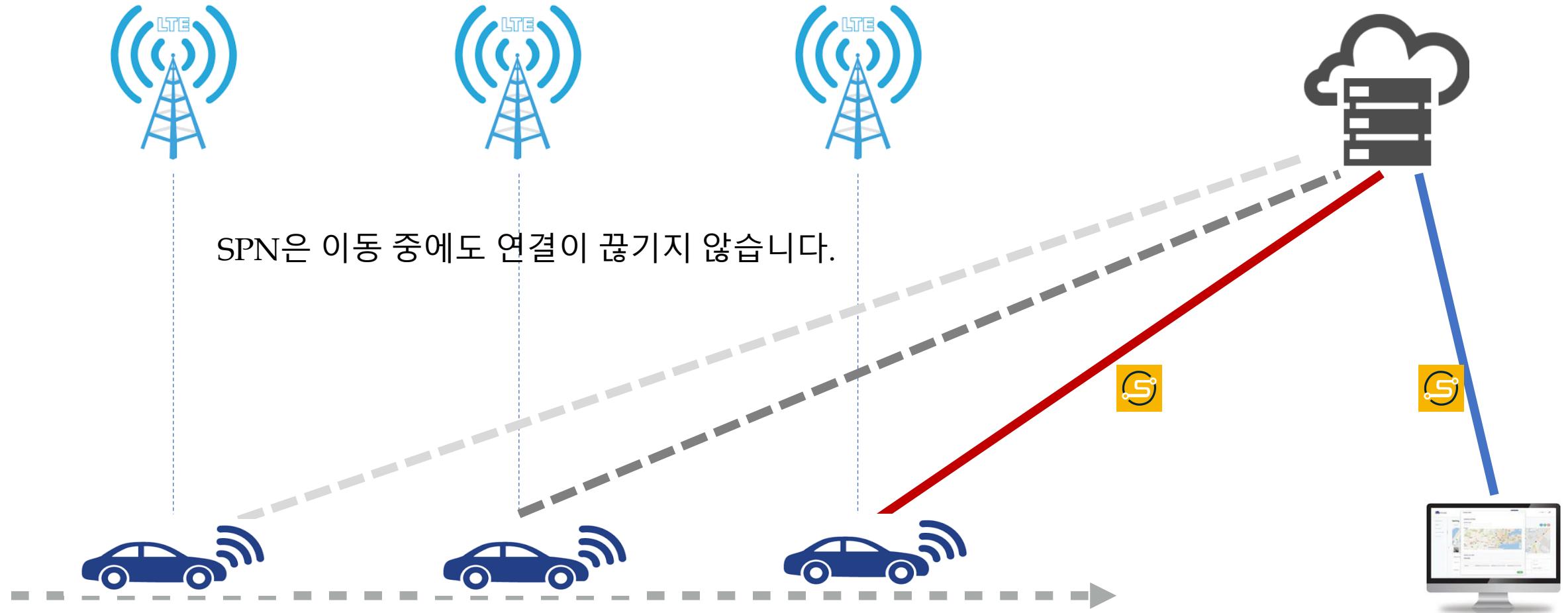


2.1 L3 SPN(3) - IP Tunnel(3)



L3 SPN 기능을 사용하면, L3 packet(IP packet)을 안전하게 실어 나를 수 있습니다.

2.1 L3 SPN(4) - Mobility/Roaming



2.1 L3 SPN(5) – Stealth Mode

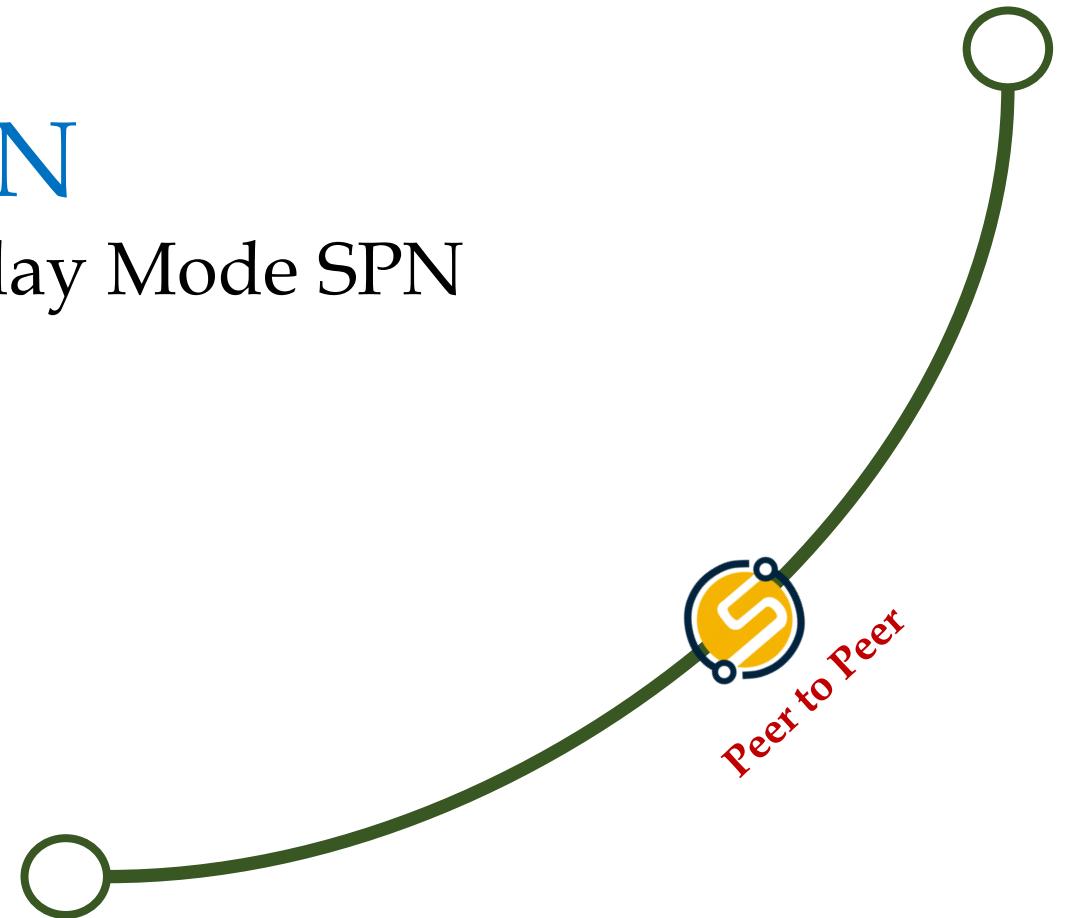


SPN은 배터리 소모를 줄이기 위해 불필요한 packet을 서버로 날리지 않습니다(Stealth mode).



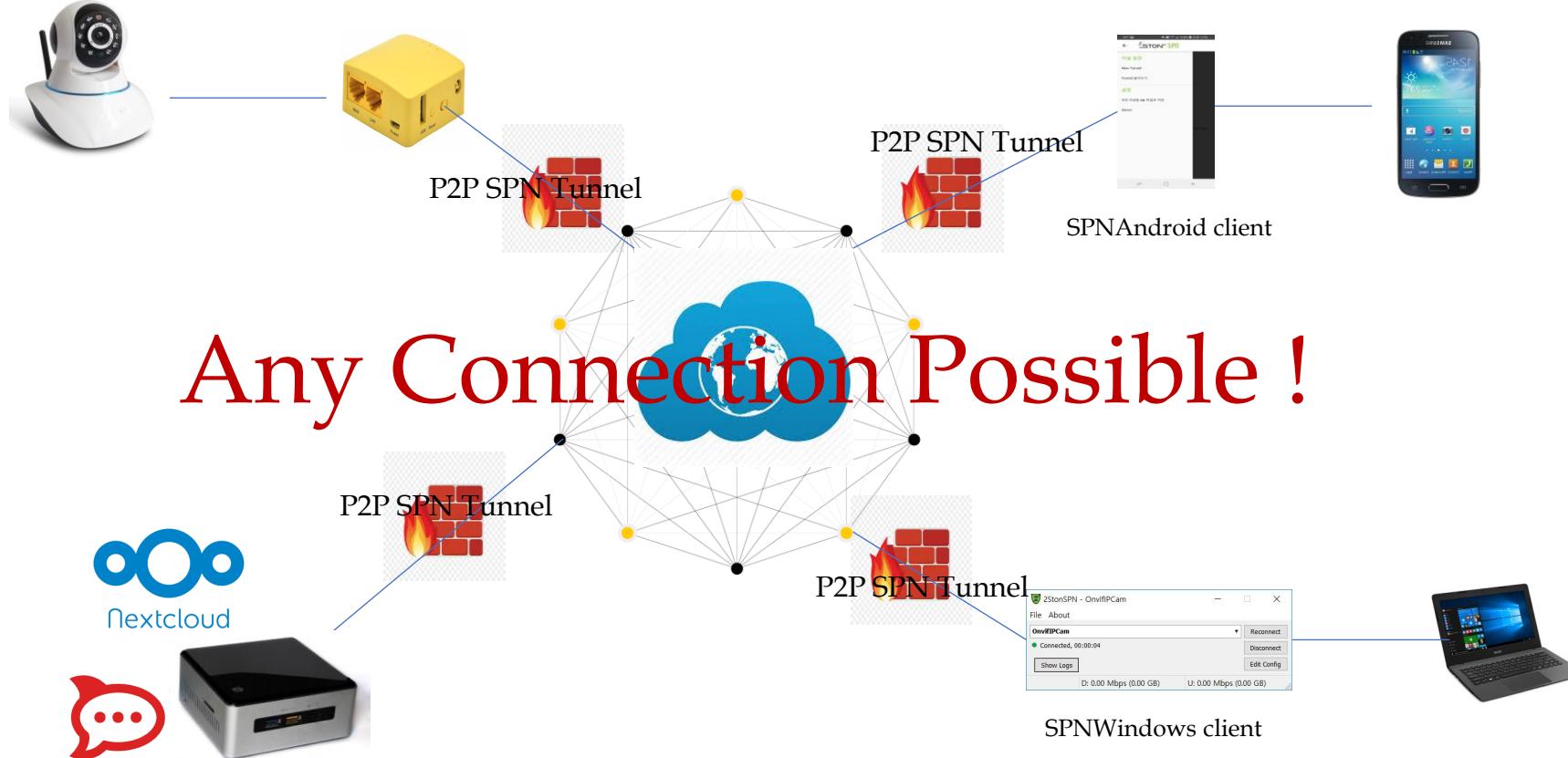
P2P SPN

: Hole Punching & Relay Mode SPN

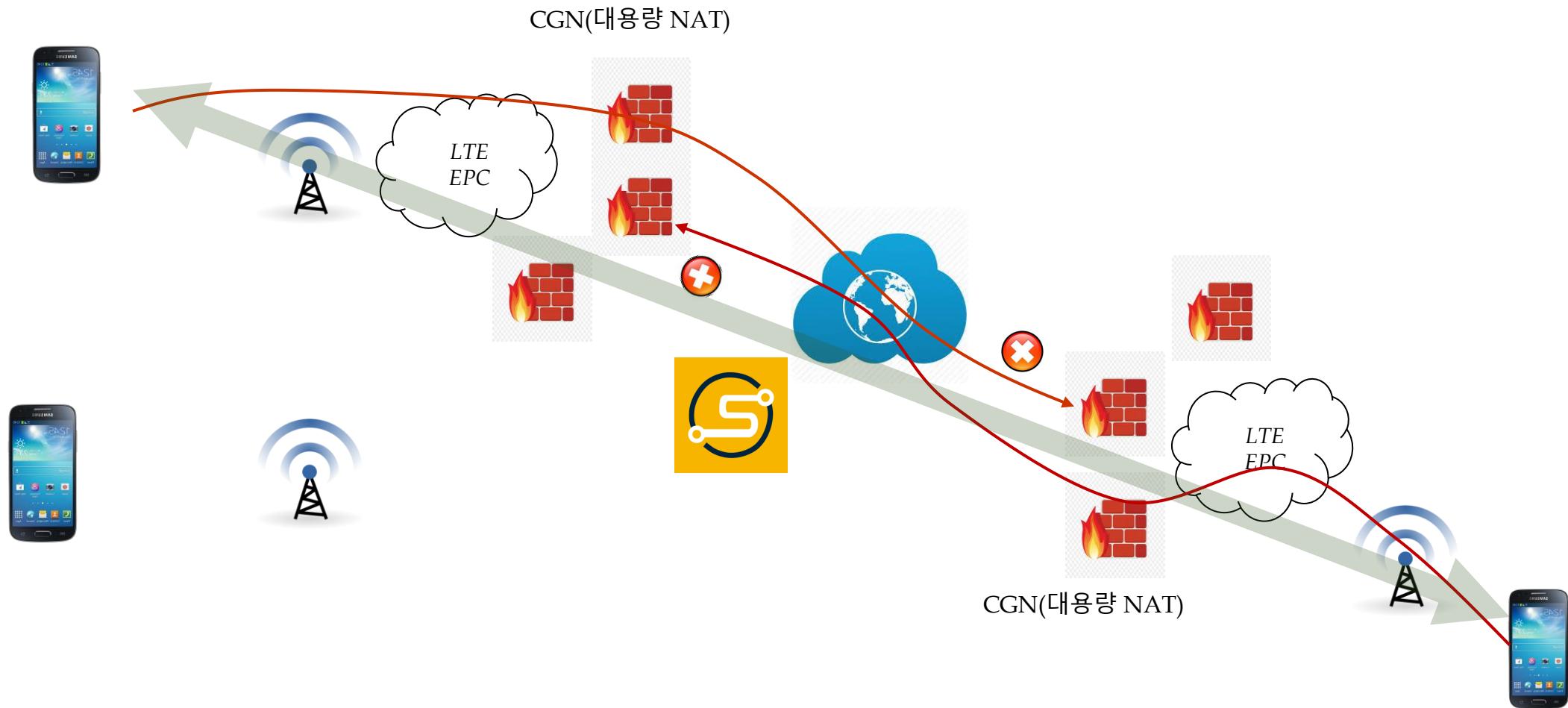


2.2 P2P SPN(1) - Easy Connection(1)

P2P SPN Tunnel을 이용할 경우, 더 이상 Firewall에서 Port Forwarding 설정을 해 줄 필요가 없습니다.



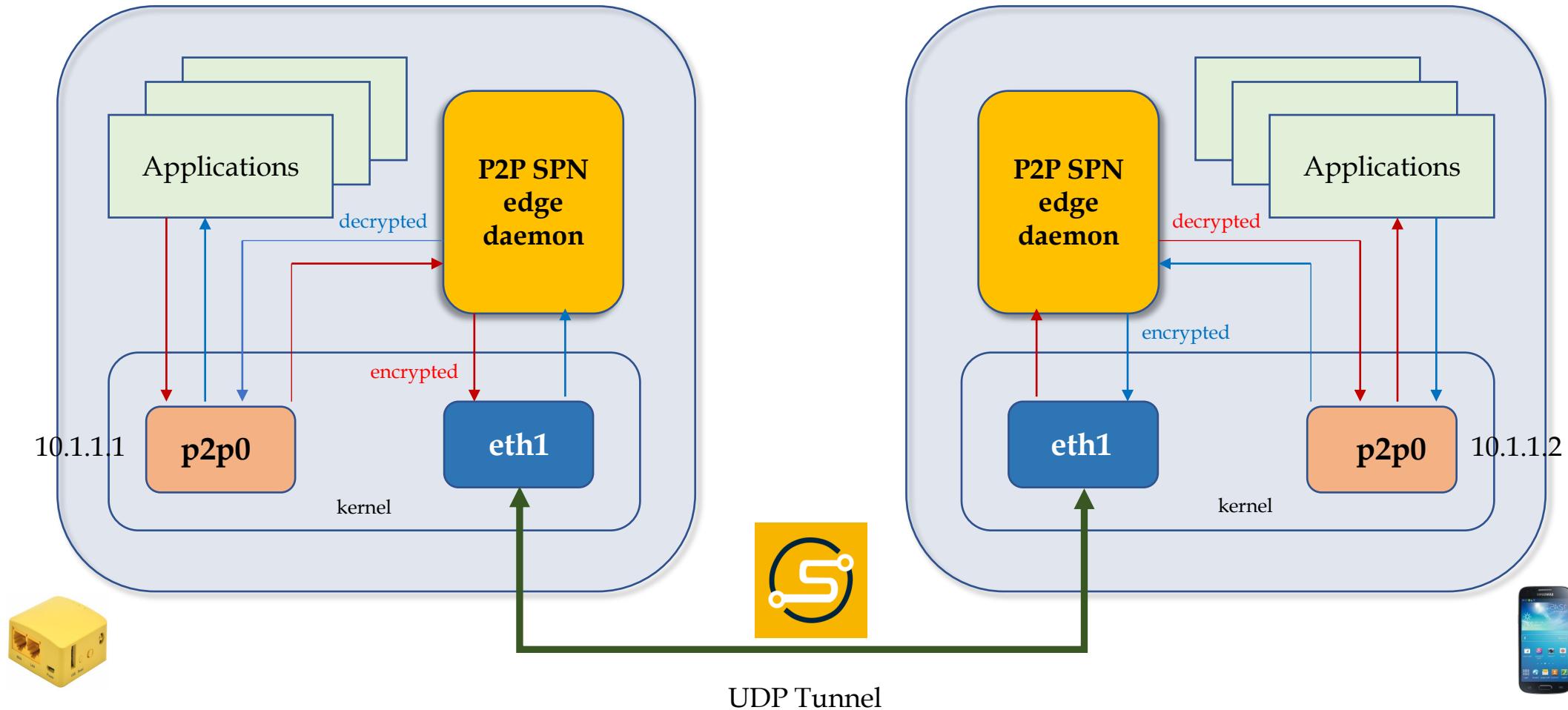
2.2 P2P SPN(1) - Easy Connection(2)



P2P SPN을 사용하면 LTE(Symmetric NAT) \leftrightarrow LTE(Symmetric NAT) 연결도 가능합니다.

2.2 P2P SPN(2) - Architecture(1)

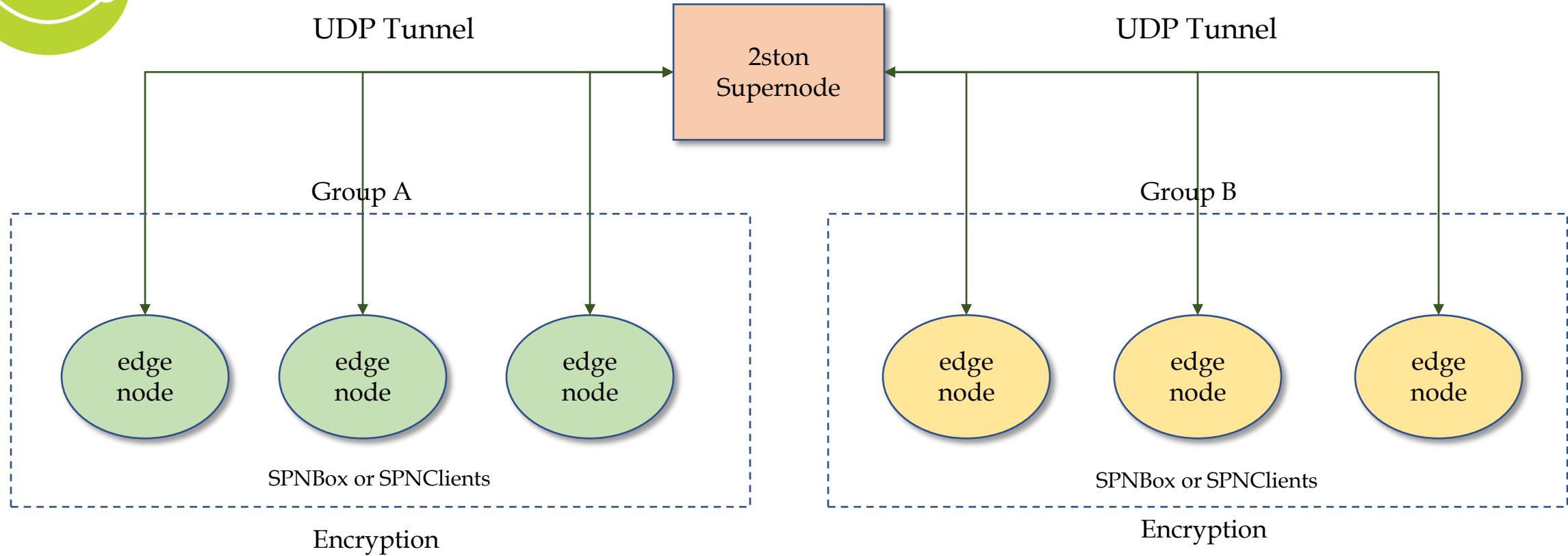
P2P SPN은 Tun device를 사용하여 암호 통신을 하는 방식입니다. 따라서 기존 Application은 하나도 수정할 필요가 없습니다.



2.2 P2P SPN(2) - Architecture(2)



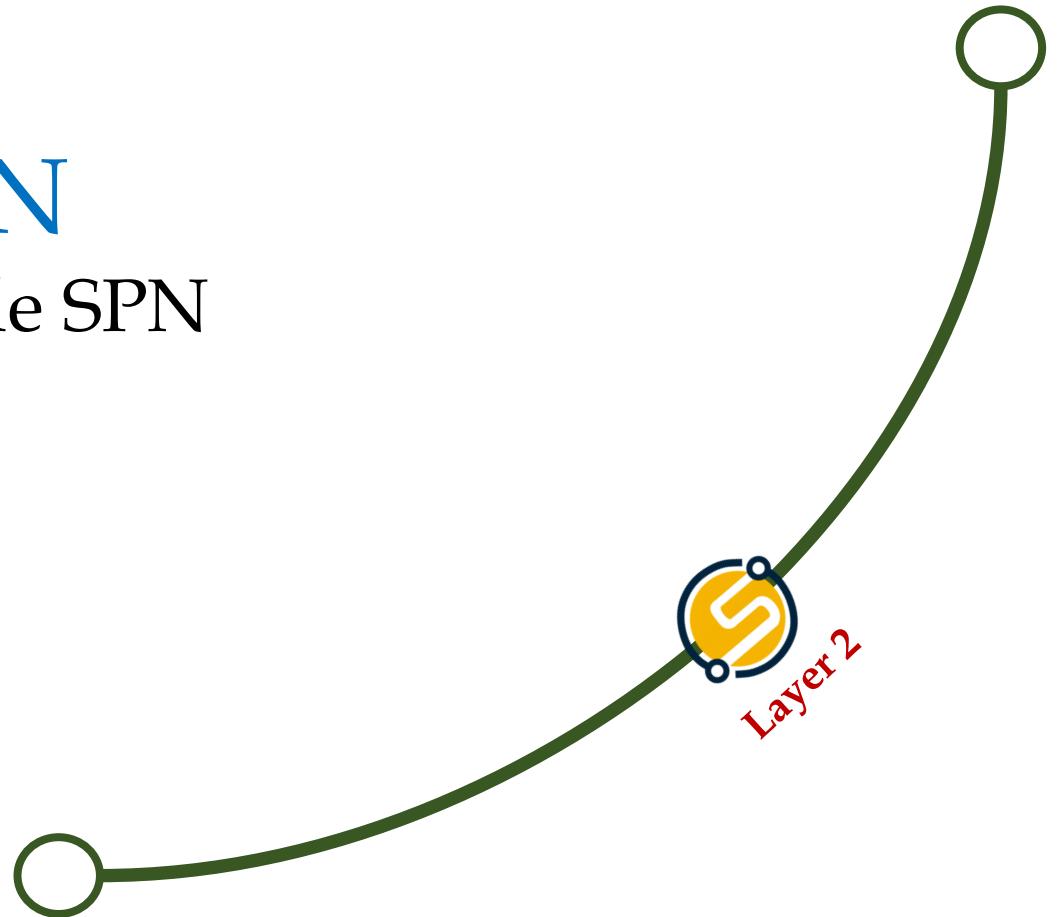
P2P SPN은 복수개의 Edge node(SPBox or SPNClients)와 Supernode(중앙 서버)로 이루어져 있습니다.



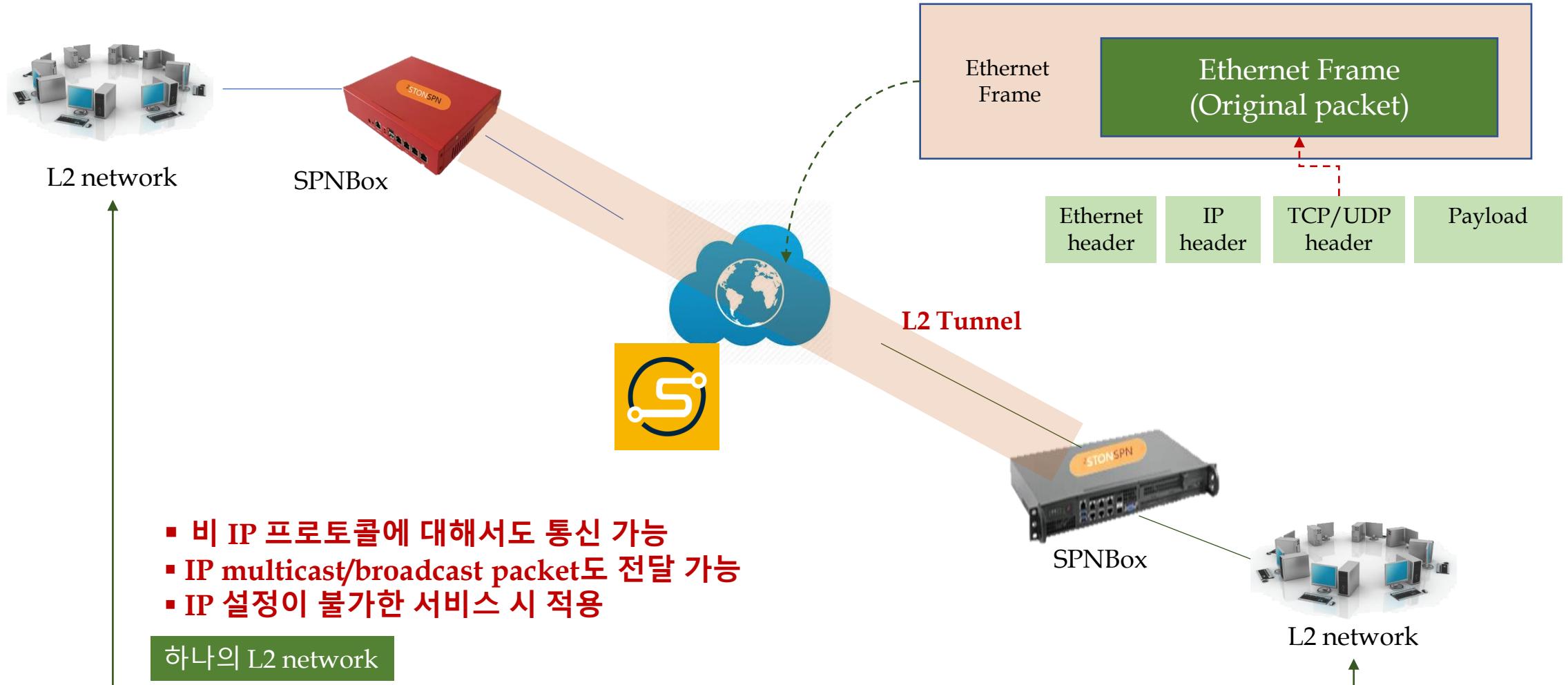
같은 supernode를 사용할지라도 Group 명이 서로 다르면 상대방과 통신할 수 없습니다.



L2 SPN
: Bridge Mode SPN

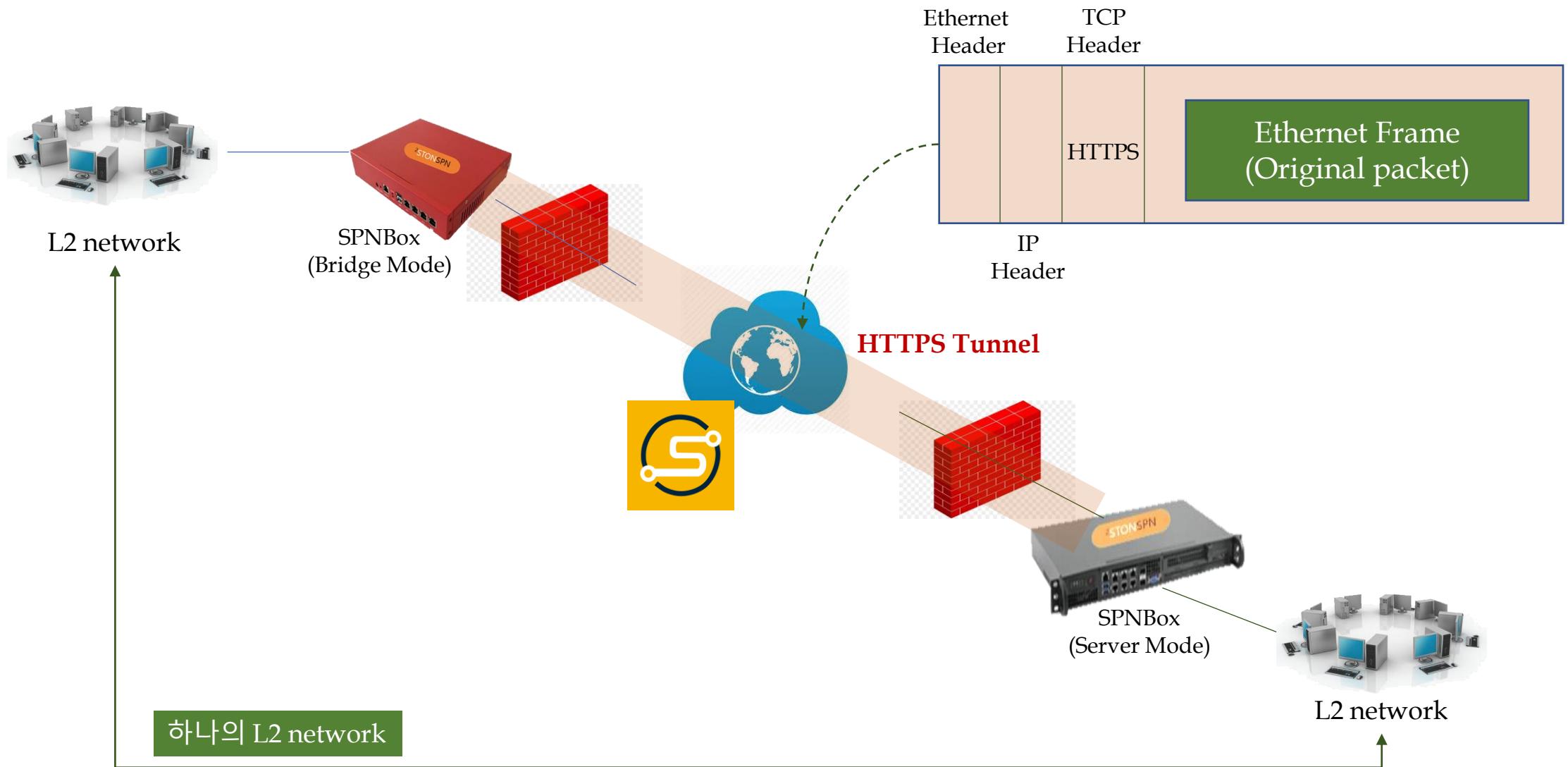


2.3 L2 SPN(1) - L2 Tunnel(1)



L2 SPN 기능을 사용하면, L2 packet(Windows NETBEUI, DHCP, ARP, Broadcast/Multicast 등)을 안전하게 실어 나를 수 있습니다.

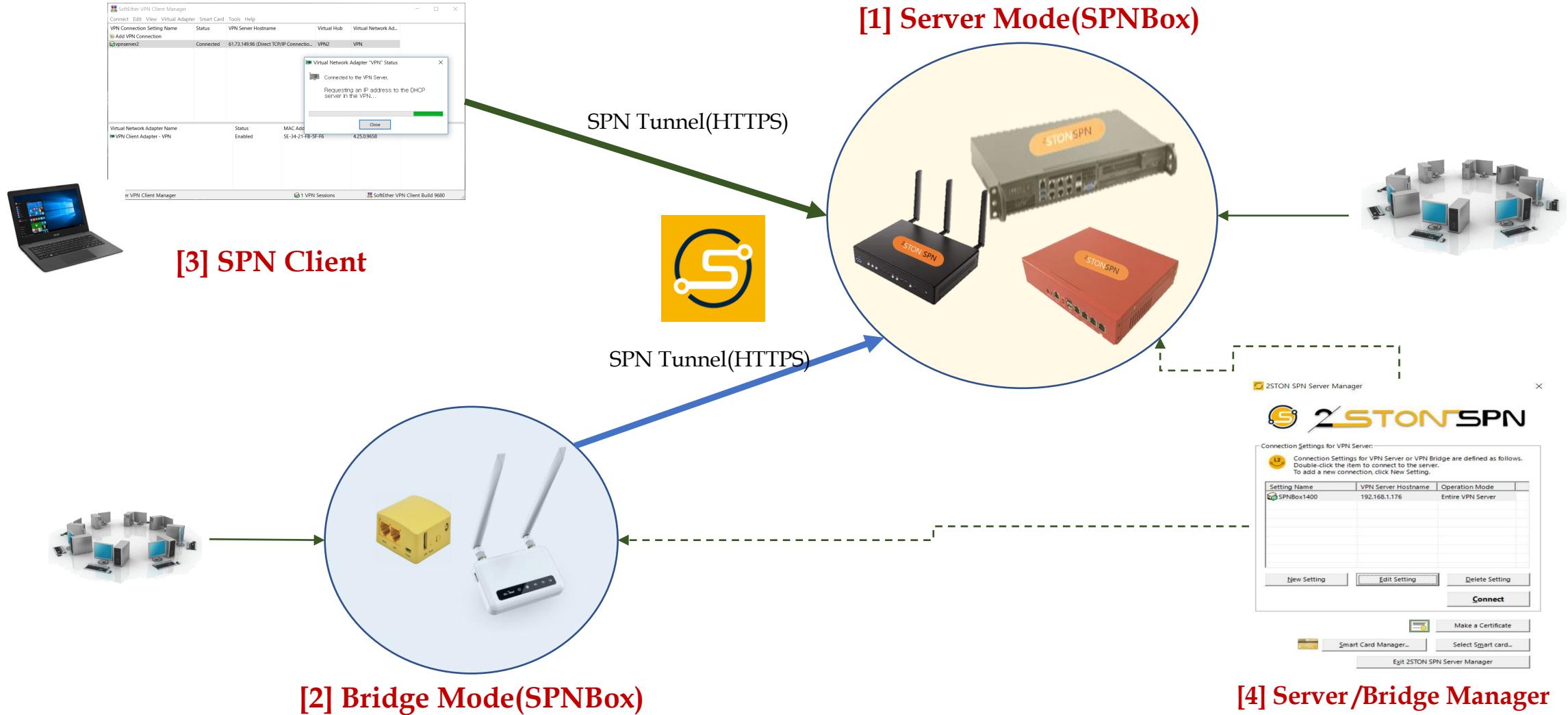
2.3 L2 SPN(1) - L2 Tunnel(2)



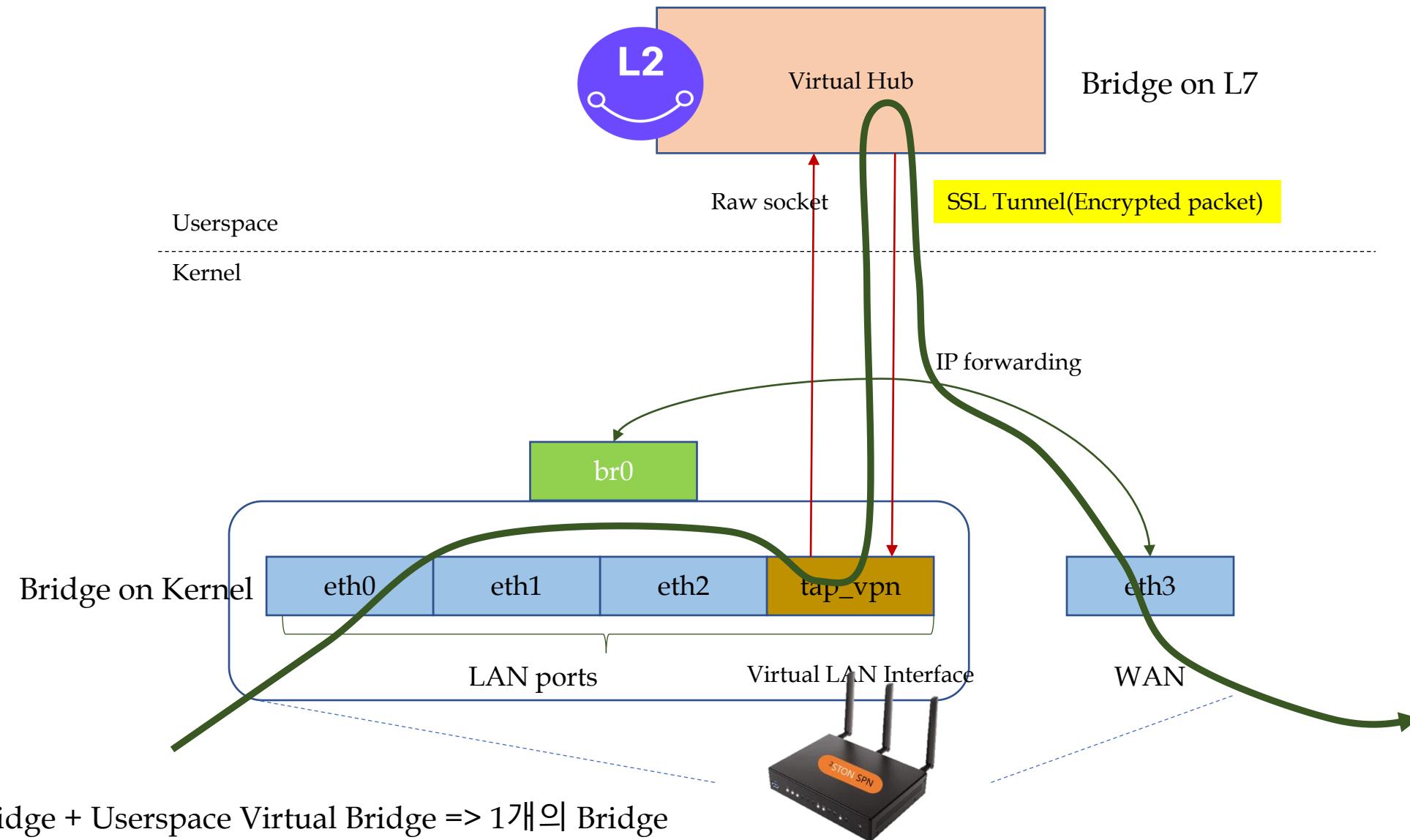
HTTPS Tunnel(or SSL Tunnel)은 방화벽을 통과하는데 있어 자유롭습니다.

2.3 L2 SPN(2) - 제품 구성

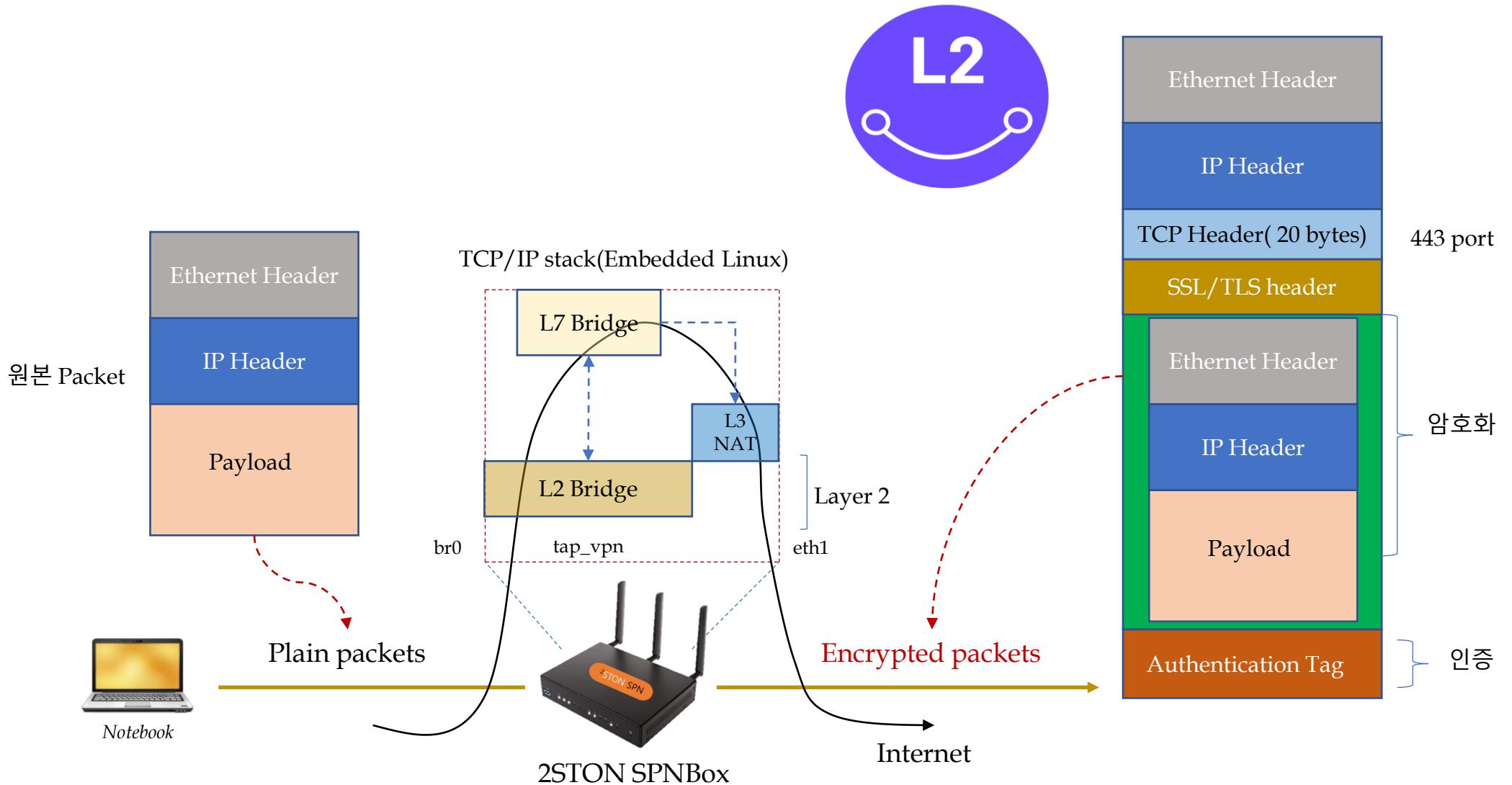
L2 SPN은 3개의 구성 요소(SPN Client, Bridge, Server)로 이루어져 있습니다.



2.3 L2 SPN(3) - Architecture(1)

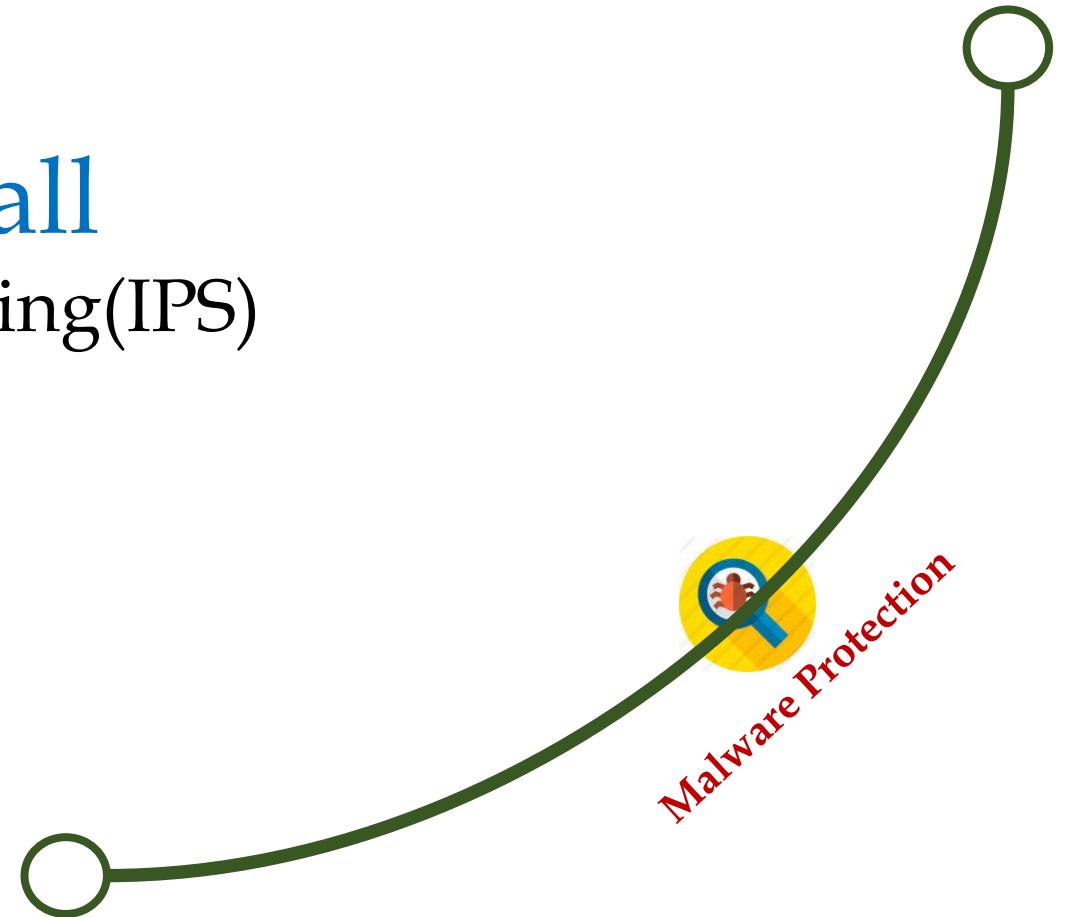


2.3 L2 SPN(3) - Architecture(2)



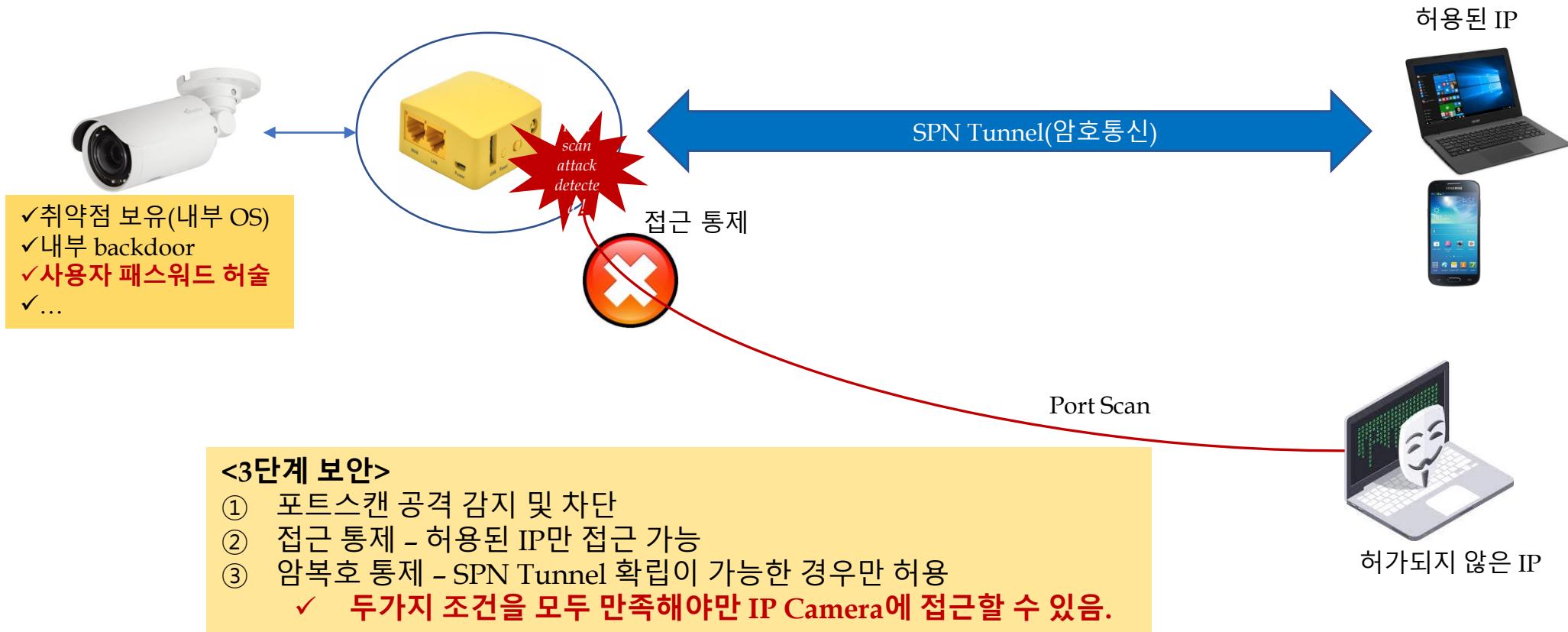


Sfirewall
: L3 & L7 filtering(IPS)



2.4 Sfirewall(1) - L3 Filtering

- 허용된 IP 및 SPN Tunnel 설정을 통과해야만 IP Camera에 접근할 수 있습니다.
- 따라서 IP Camera의 패스워드가 허술해도 이를 악용할 수 조차 없습니다.



L3 Sfirewall은 자동으로 port scan 공격을 감지하고 차단할 수 있습니다.

2.4 Sfirewall(2) - L7 Filtering(1)

Malicious attacks



L7 Filtering

worm

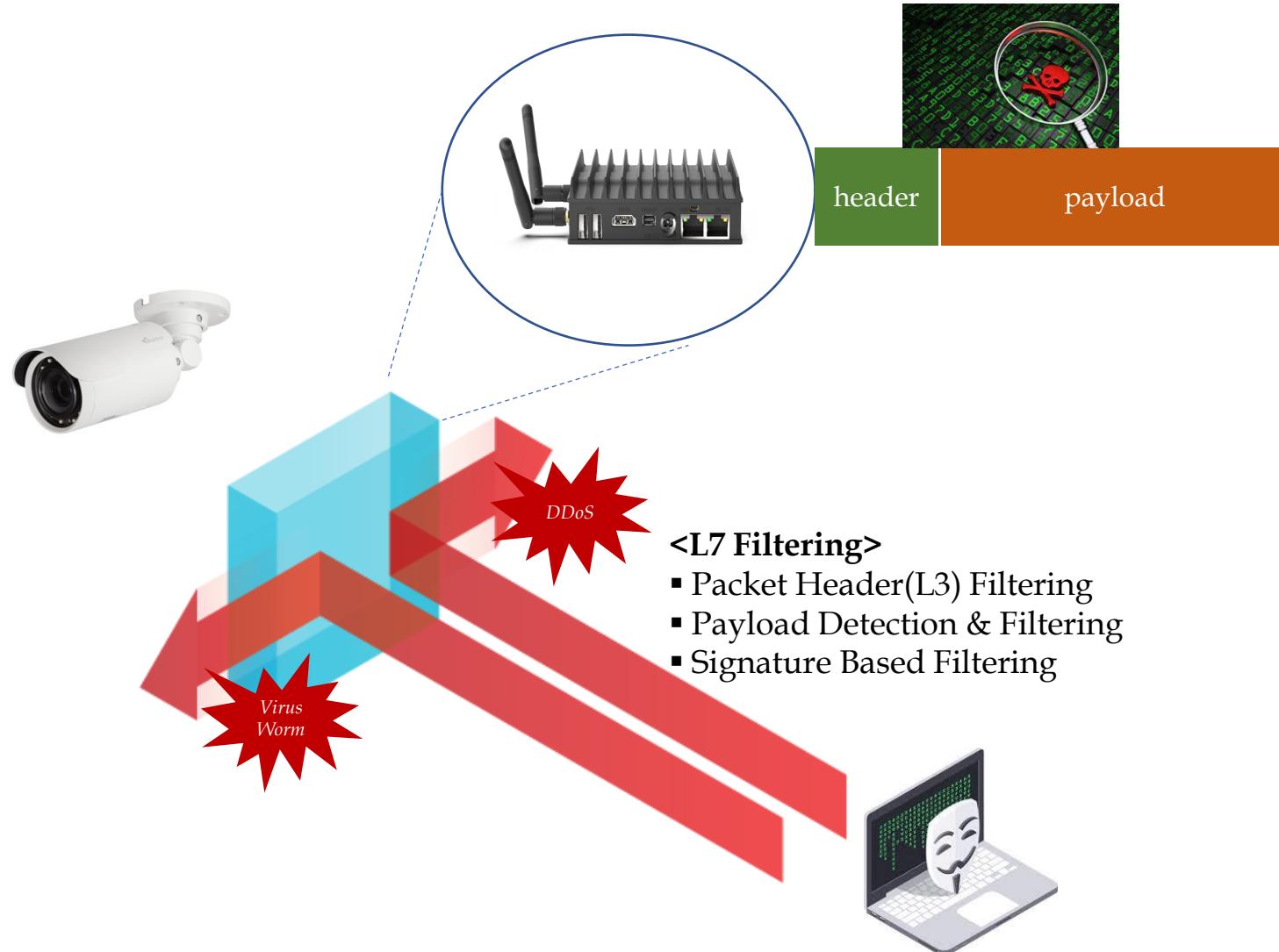


adware

Virus/Worm/Malware/Trojan/Adware/Spyware 등 다양한 공격을 막아낼 수 있어야 합니다.

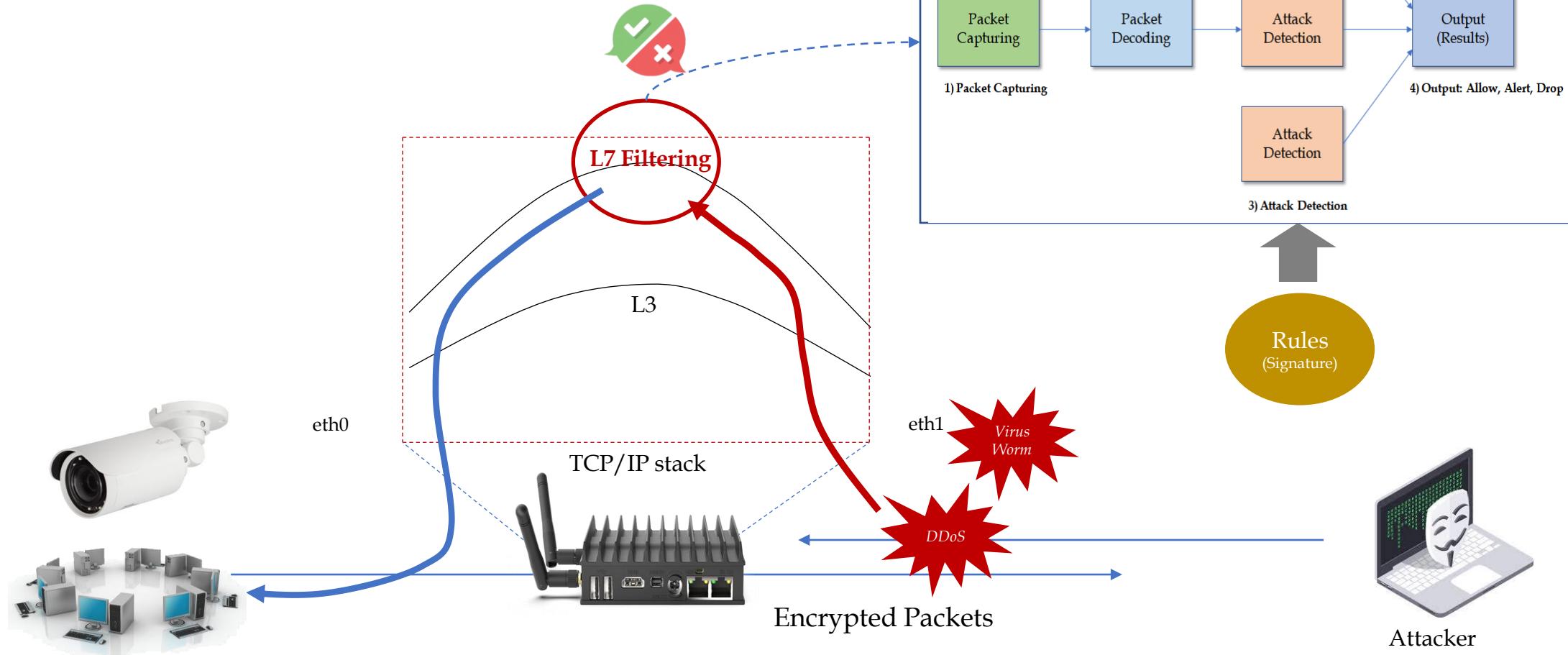
2.4 Sfirewall(2) - L7 Filtering(2)

L7 Filtering은 IP packet header는 물론이고, payload를 검사하여 유해한 트래픽을 실시간으로 차단할 수 있습니다.

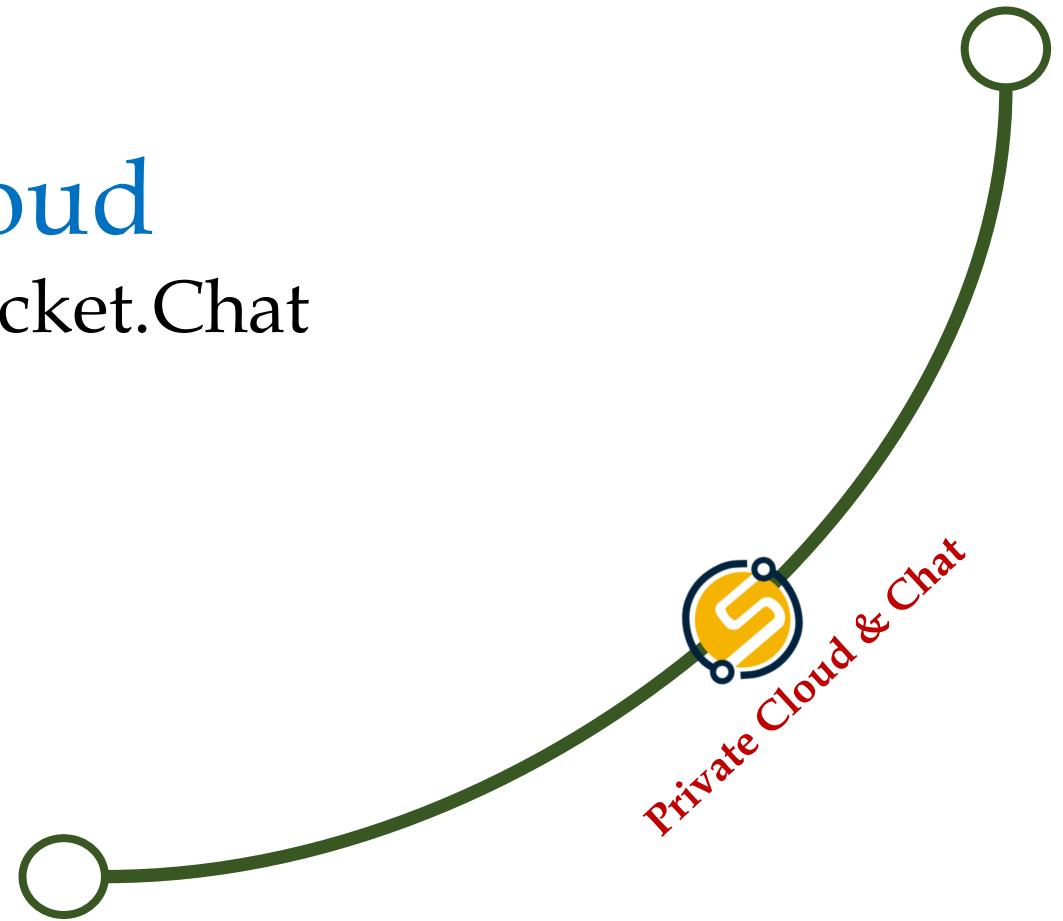


2.4 Sfirewall(2) - L7 Filtering(3)

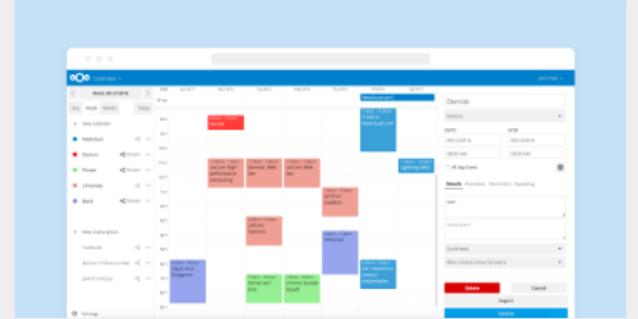
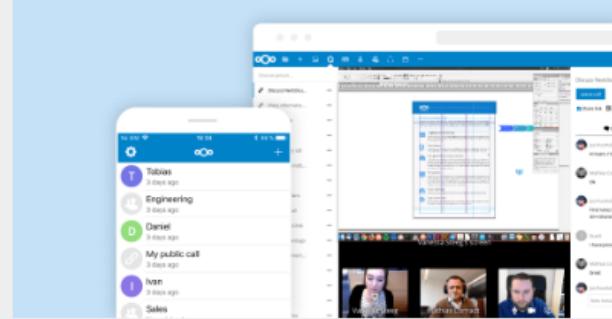
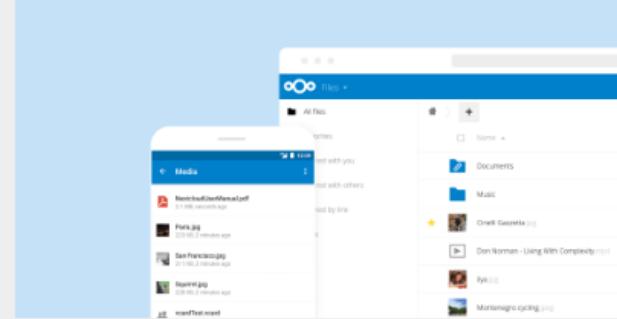
SPN L7 Filtering은 Signature 기반의
Lightweight Intrusion Prevention System입니다.



EdgeCloud
: NextCloud, Rocket.Chat



2.5 SPN EdgeCloud(1) - NextCloud(1)



Nextcloud Files

Enterprise File Sync and Share

Nextcloud Files offers an on-premise Universal File Access and sync platform with powerful collaboration capabilities and desktop, mobile and web interfaces.



Nextcloud Talk

Calls, chat and web meetings

Nextcloud Talk delivers on-premises, private audio/video conferencing and text chat through browser and mobile interfaces with integrated screen sharing and SIP integration.



Nextcloud Groupware

Calendar, Contacts & Mail

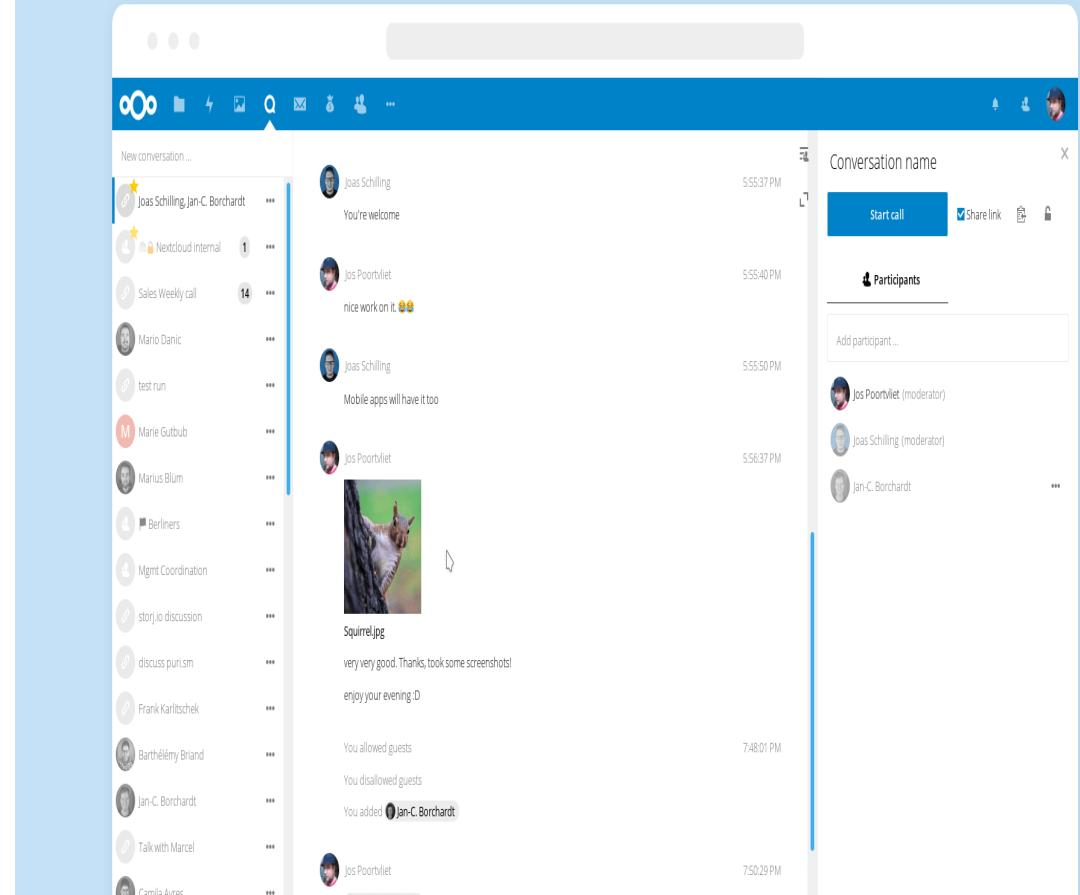
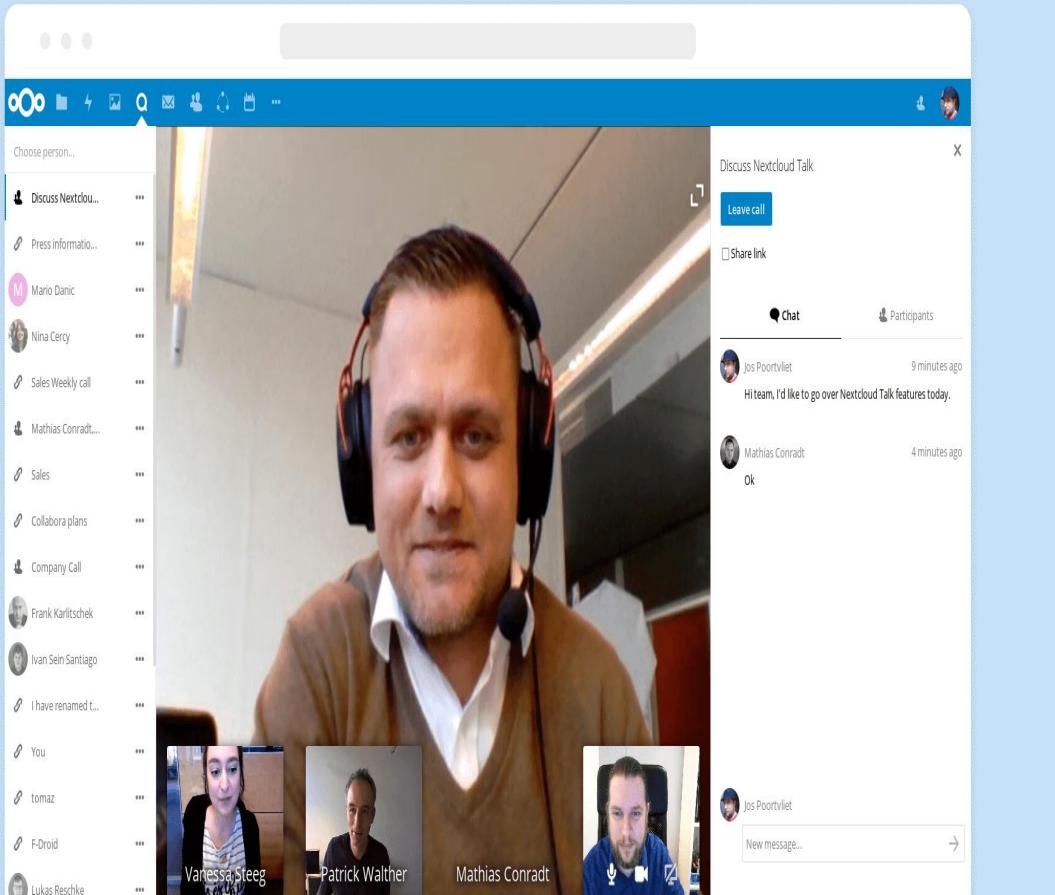
Nextcloud Groupware integrates Calendar, Contacts, Mail and other productivity features to help teams get their work done faster, easier and on your terms.

NextCloud란 ?

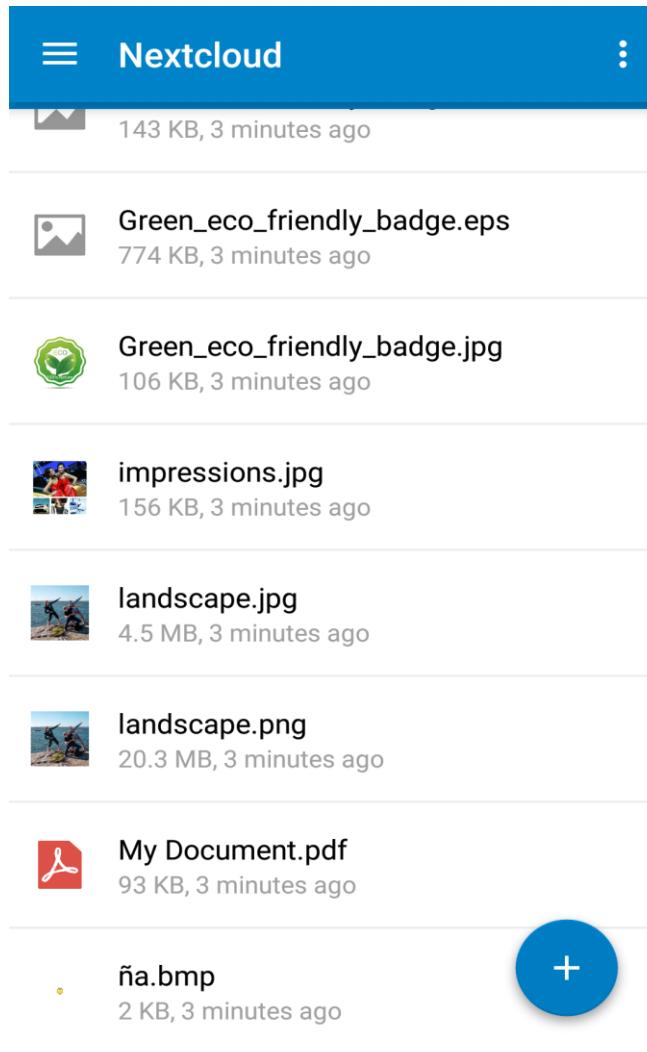
- ✓ 개인용 or 소규모 Cloud Platform
- ✓ File 관리/Talk(messenger, video conferencing, screen sharing, SIP)/Groupware(calendar, contacts, mail)
- ✓ Open source project, version 16.x

2.5 SPN EdgeCloud(1) - NextCloud(2)

Web Browser를 이용한 화상 통신 및 Chat



2.5 SPN EdgeCloud(1) - NextCloud(3)



Nextcloud

143 KB, 3 minutes ago

Green_eco_friendly_badge.eps
774 KB, 3 minutes ago

Green_eco_friendly_badge.jpg
106 KB, 3 minutes ago

impressions.jpg
156 KB, 3 minutes ago

landscape.jpg
4.5 MB, 3 minutes ago

landscape.png
20.3 MB, 3 minutes ago

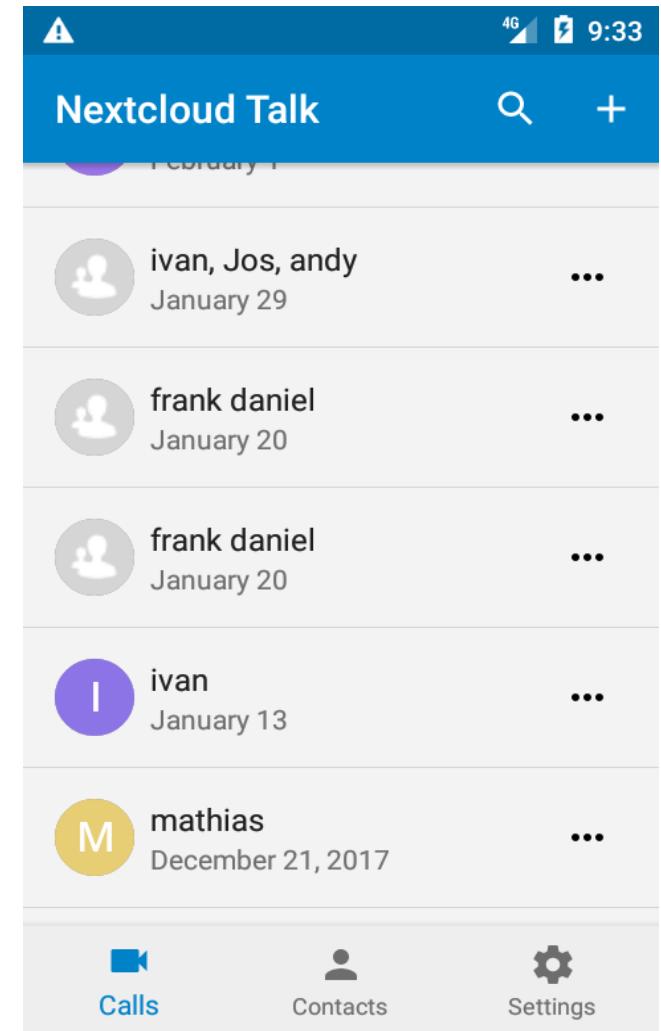
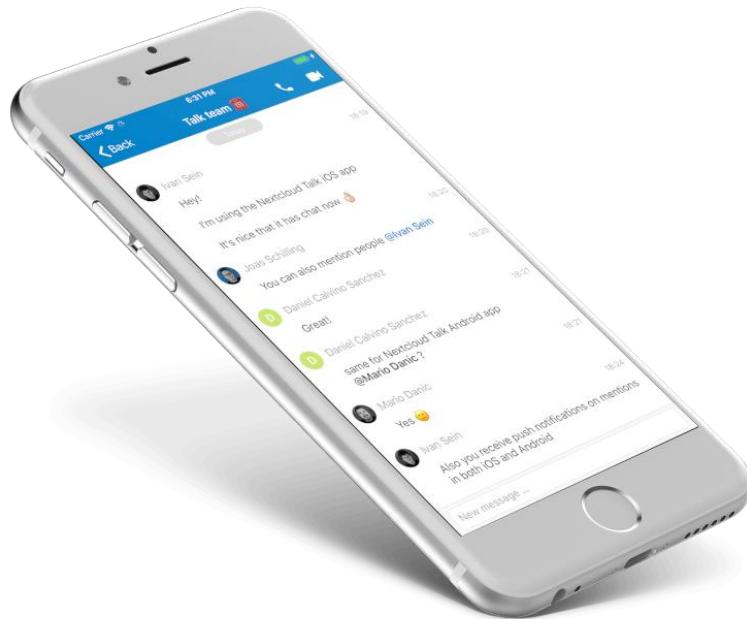
My Document.pdf
93 KB, 3 minutes ago

ña.bmp
2 KB, 3 minutes ago

+

Android app을 이용한 Talk

파일도 올리고, talk도 할 수 있습니다.



4G 9:33

Nextcloud Talk

February 1

ivan, Jos, andy
January 29

frank daniel
January 20

frank daniel
January 20

ivan
January 13

mathias
December 21, 2017

Calls Contacts Settings

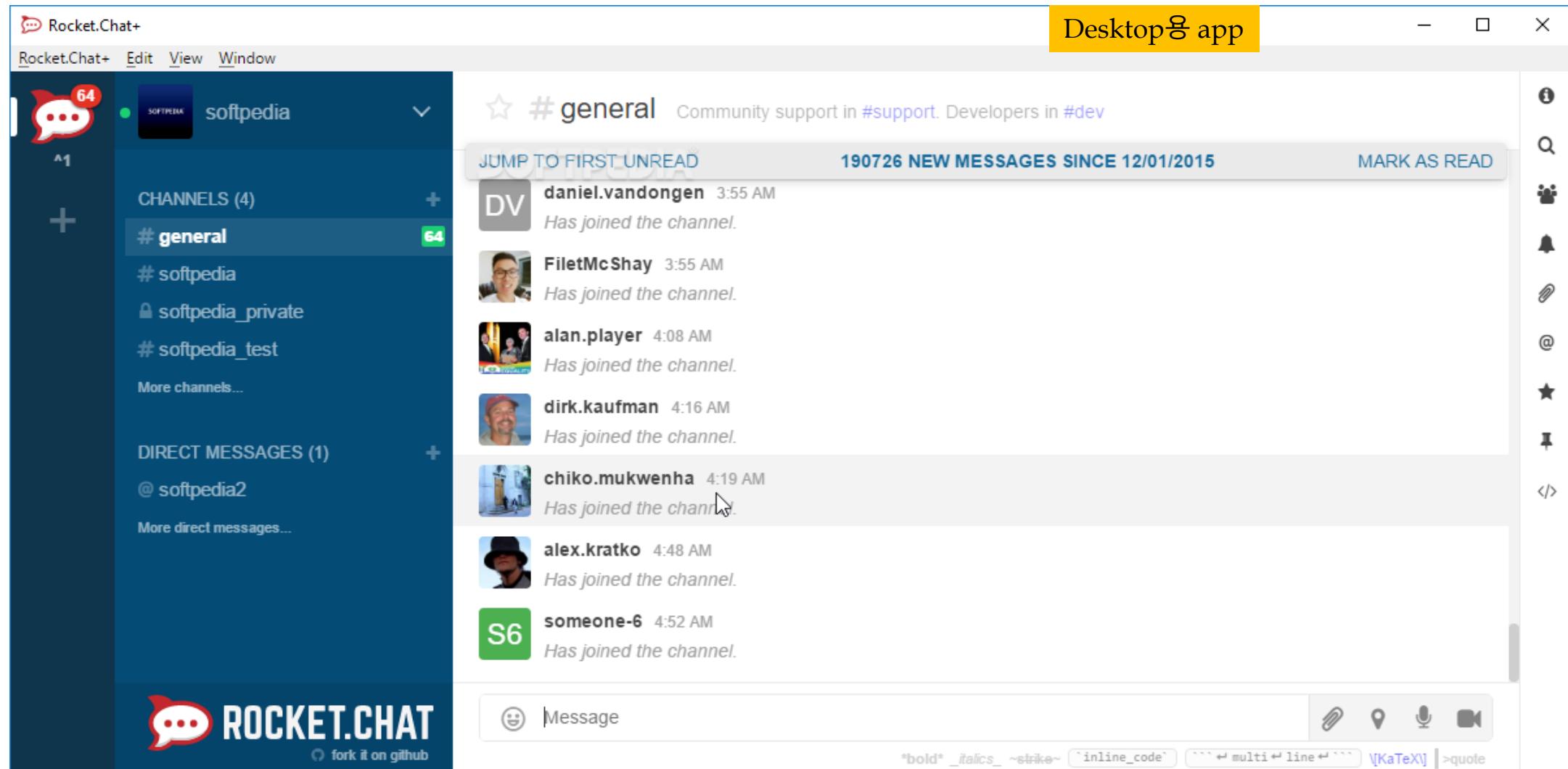
2.5 SPN EdgeCloud(2) - Rocket.Chat(1)



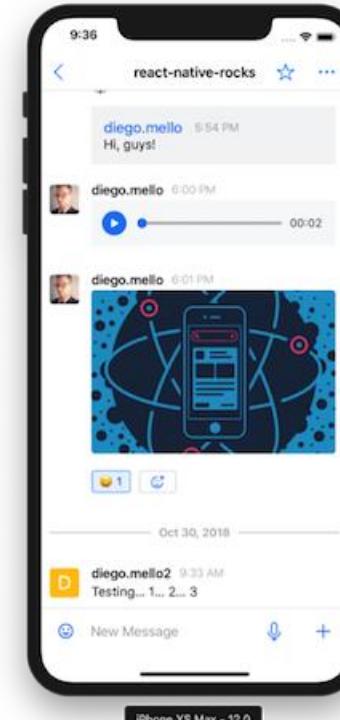
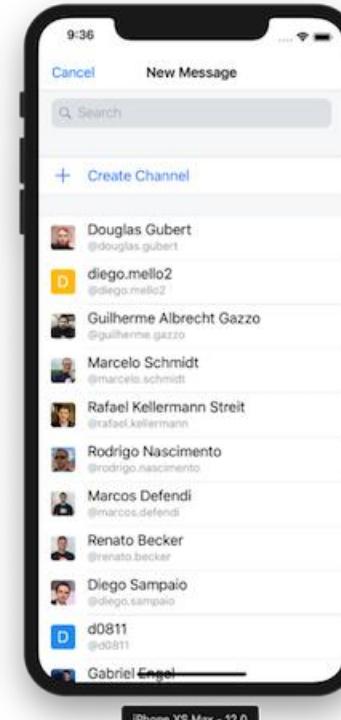
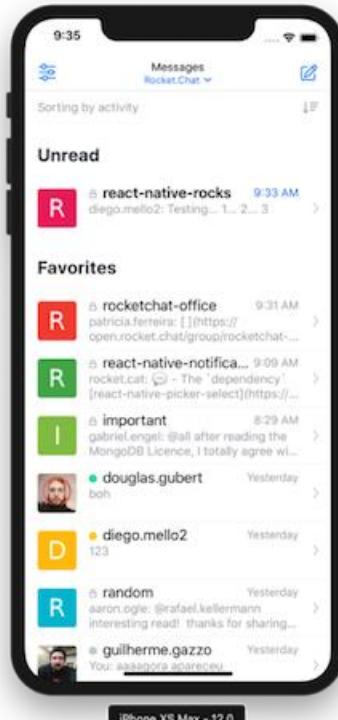
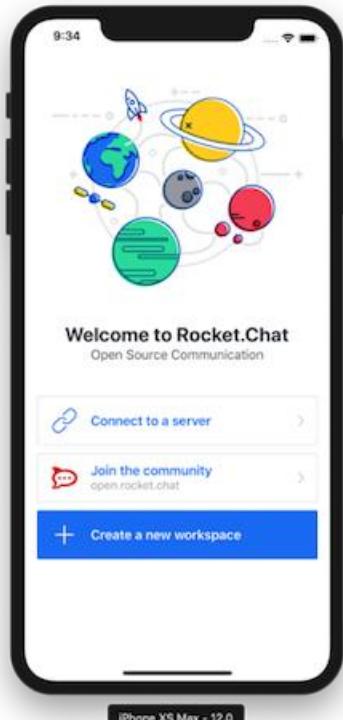
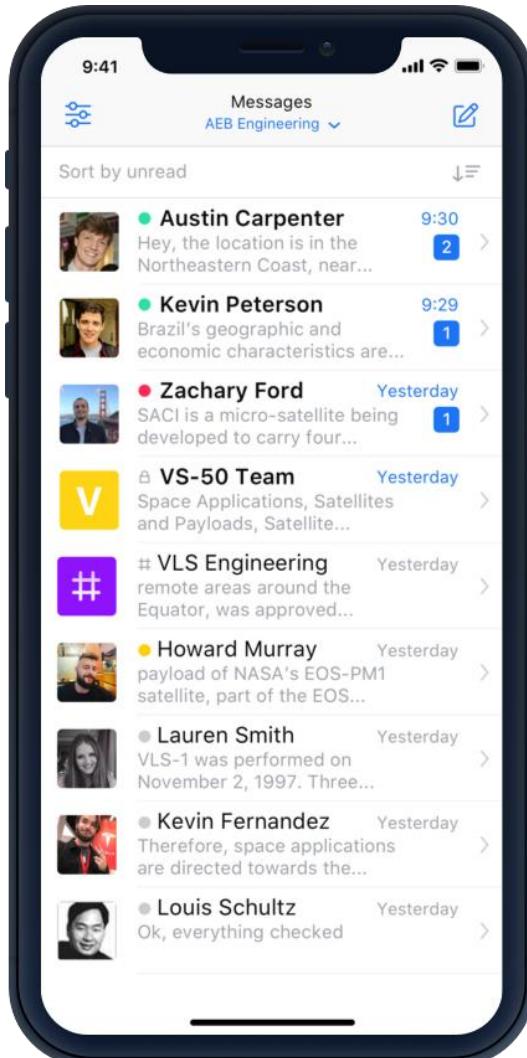
The screenshot shows the Rocket.Chat website homepage on the left and a mobile device displaying the app's interface on the right. The website features a dark header with navigation links: Install, Pricing, Community, Docs, Blog, Contact. A large banner below the header reads "Moving from Atlassian? 🚀 Welcome to Rocket.Chat!". The main content area has a dark background with white text, featuring the heading "Open Source Team Communication" and a paragraph about the software being free, unlimited, and open source, replacing email, HipChat, and Slack. Two buttons at the bottom are "Start cloud trial" (blue) and "Install own server" (grey). The mobile app interface shows a list of channels like "# Design", "# Development", "# Ideas", "# QA", and "# Bureaucracy". On the right, a detailed view of a channel conversation between users @louisa.fields, @marie.rowe, and @louisa.fields again, discussing button sizes and sharing a photo of a man.

Rocket.Chat은 HipChat, Slack 형태의 중소규모 그룹을 위한 오픈소스 메신저 서버/클라이언트 프로그램입니다. 실시간 채팅을 할 수 있고, 음성과 화상채팅도 가능합니다. 다양한 서버 OS를 지원하고 있으며, Raspberry PI 2에 설치도 가능합니다. 클라이언트 프로그램으로는 PC(Electron - Windows/macOS/Linux)와 모바일 앱(iOS/Android)이 이미 준비되어 있습니다.

2.5 SPN EdgeCloud(2) - Rocket.Chat(2)



2.5 SPN EdgeCloud(2) - Rocket.Chat(3)



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2.6 Five Main Features of SPN



빠른 속도, 높은 보안성, 이동성, 영상 전송에 적합



쉬운 네트워크 구성, LTE to LTE 가능, 소규모 데이터 전달에 적합



IP 설정이 불가한 서비스 연결에 적합, 빠른 속도, 높은 보안성



SPN만으로 해결되지 않는 보안 문제 처리(IPS)

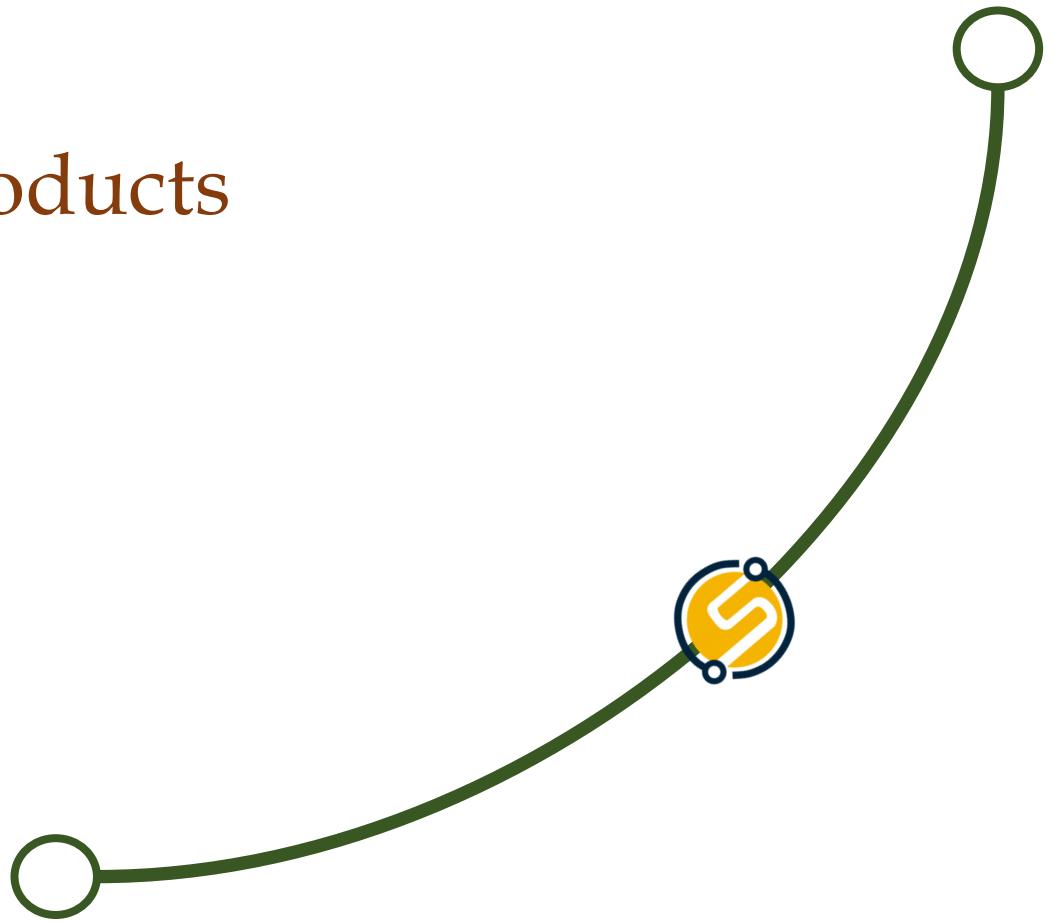


소규모 사업자를 위한 Intranet Solution
보안과 EdgeCloud를 하나로 !

SPN is **Surely** not **VPN**

3. 도대체 무엇을 팔아야 하나 ? What on earth should I sell ?

SPN v2.0 Products



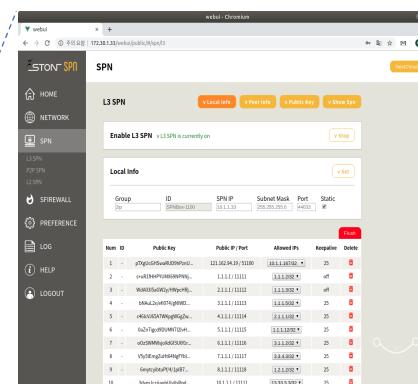
3.1 SPN v2.0 Products(1) - SPNBox X86 Series & Clients



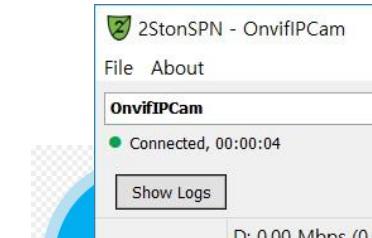
SPNBox-3000



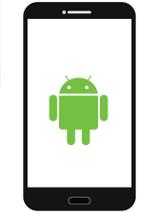
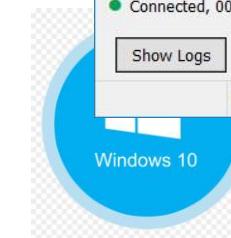
SPNBox-1100



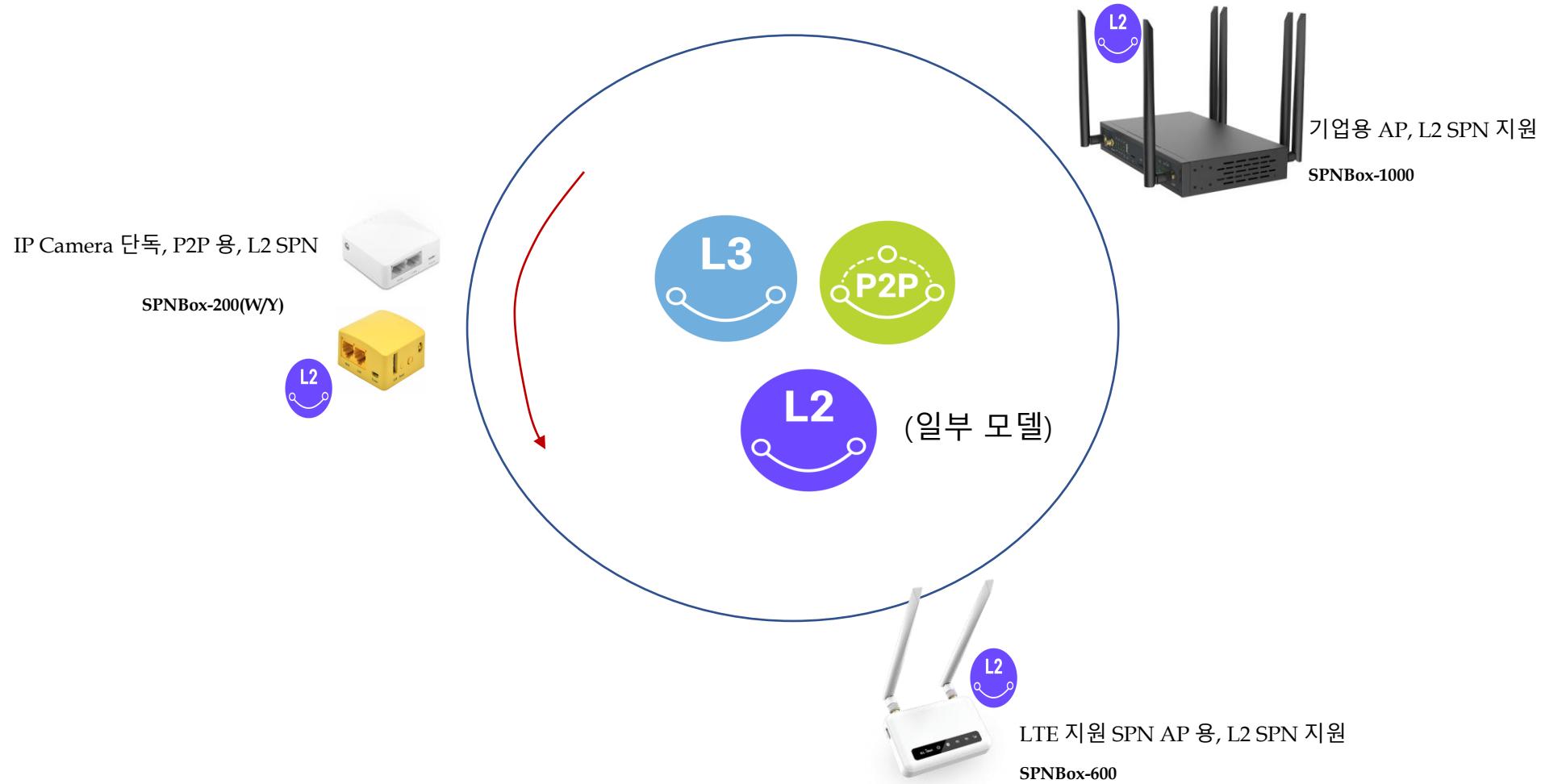
SPNCloud



SPN Clients



3.1 SPN v2.0 Products(2) - SPNBox AP Series



3.1 SPN v2.0 Products(3) - SPNBox WebUI

The image displays three screenshots of the SPNBox WebUI interface:

- Login Screen:** Shows a login form with fields for ID (spnbox) and Password (*****), and a "Login" button.
- Home Status Screen:** Shows the SPNBox Status with the following details:
 - Model Name: SPNBox-FITLET2
 - SPNBox Name: SPNBox-1100
 - LAN IP: /
 - WAN IP: 172.30.1.33 / 255.255.255.0 / 172.30.1.254
 - Version: 01.05.00
 - Uptime: 05:21:16 up 19:00, 3 users
 - CPU Usage: 0.06, 0.07, 0.08
 - Memory Usage: 501 / 3768
- L3 SPN Configuration Screen:** Shows the L3 SPN configuration table and rules action editor:

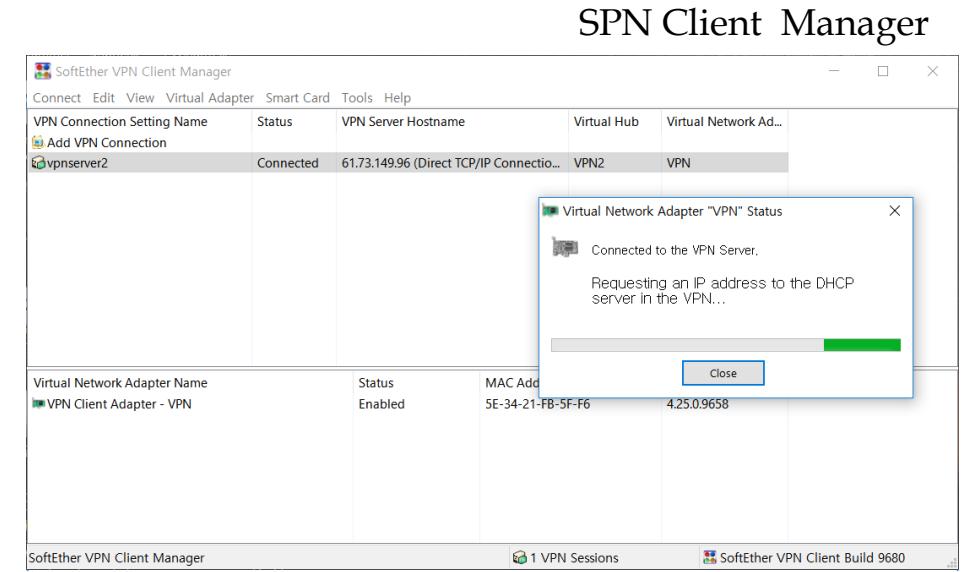
Num	ID	Public Key	Public IP / Port	Allowed IPs	Keepalive	Delete
1	-	pTxglcGHSwuRUD9hP2nU...	121.162.94.19 / 51100	10.1.1.167/32	25	<input checked="" type="checkbox"/>
2	-	s+uR1HHPVUM69NPNN...	1.1.1.1 / 11111	1.1.1.2/32	off	<input checked="" type="checkbox"/>
3	-	WdA03l5aGW2y/HWpcHRj...	2.1.1.1 / 11112	1.1.1.3/32	off	<input checked="" type="checkbox"/>
4	-	bNAuL2x/ef074/gNIWD...	3.1.1.1 / 11113	1.1.1.5/32	25	<input checked="" type="checkbox"/>
5	-	c46cVJ6SA7WKpgVGgZw...	4.1.1.1 / 11114	2.1.1.1/32	25	<input checked="" type="checkbox"/>
6	-	0aZnTggd9dUNNT72vH...	5.1.1.1 / 11115	1.1.1.2/32	25	<input checked="" type="checkbox"/>
7	-	oOzSWMWsjoxdGr3U0f1r...	6.1.1.1 / 11116	3.1.1.2/32	25	<input checked="" type="checkbox"/>
8	-	V5y5lEngZuHt64NgFyb...	7.1.1.1 / 11117	3.3.4.3/32	25	<input checked="" type="checkbox"/>
9	-	6mytcylbtuPF4j1pIB7...	8.1.1.1 / 11118	1.2.1.2/32	25	<input checked="" type="checkbox"/>
10	-	3dvmJc+iiaoUblyVsRp...	10.1.1.1 / 12111	13.33.3.3/32	25	<input checked="" type="checkbox"/>

The "Change IPS Rules Action" section shows a list of rules and their enable/disable status.

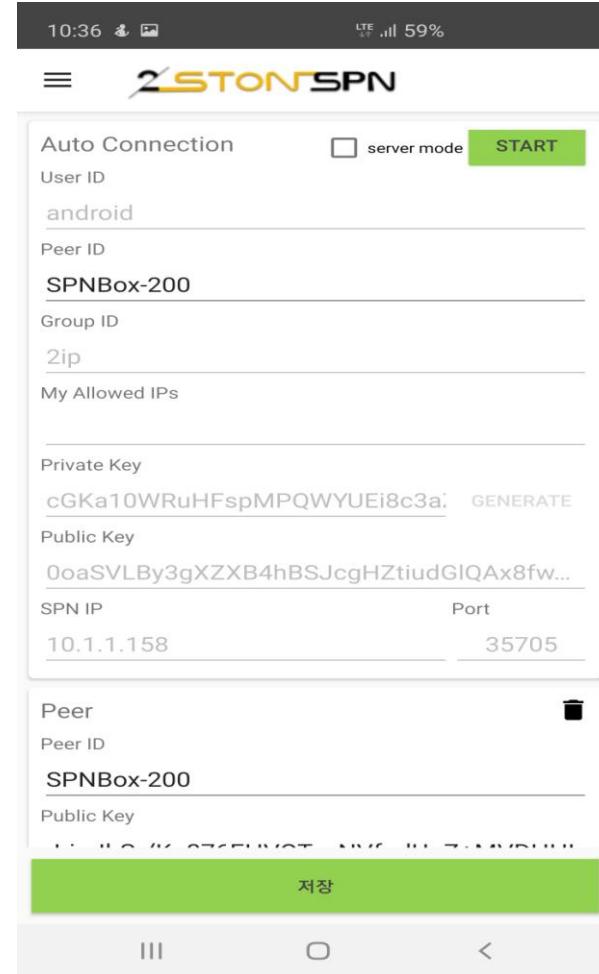
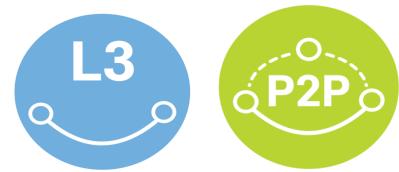
3.1 SPN v2.0 Products(4) - L2 SPN Series



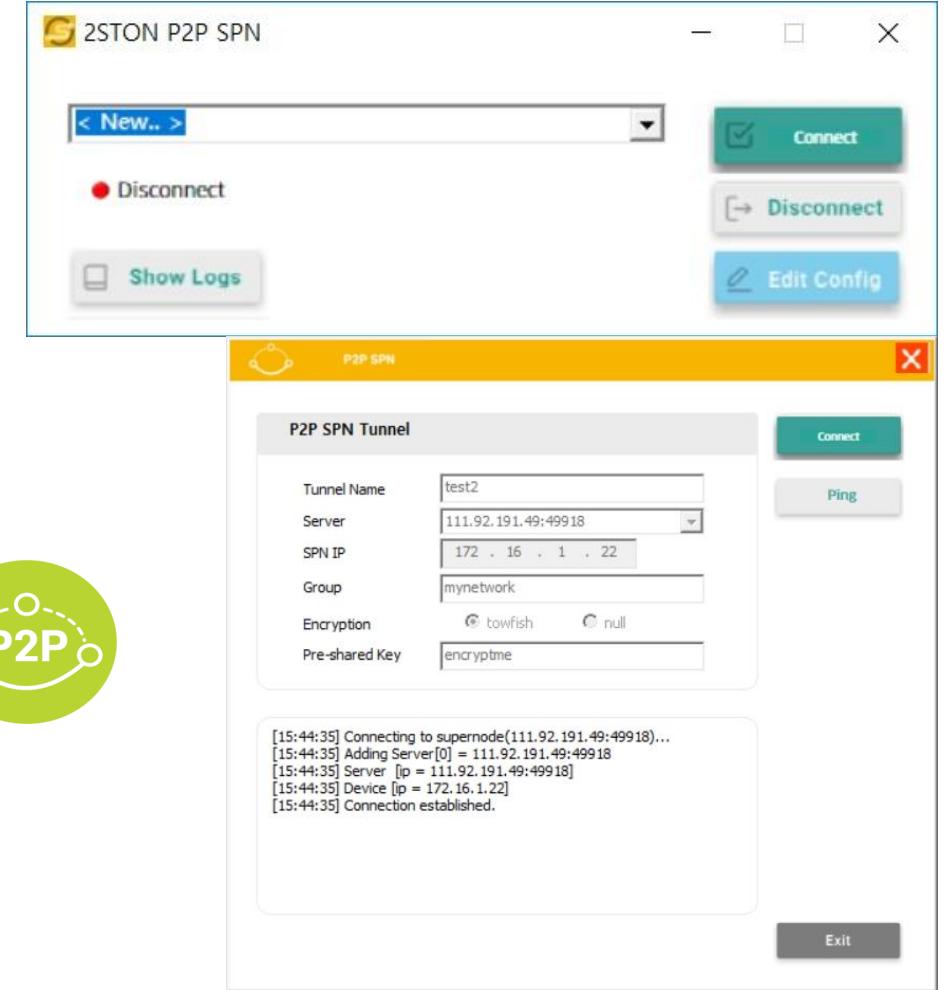
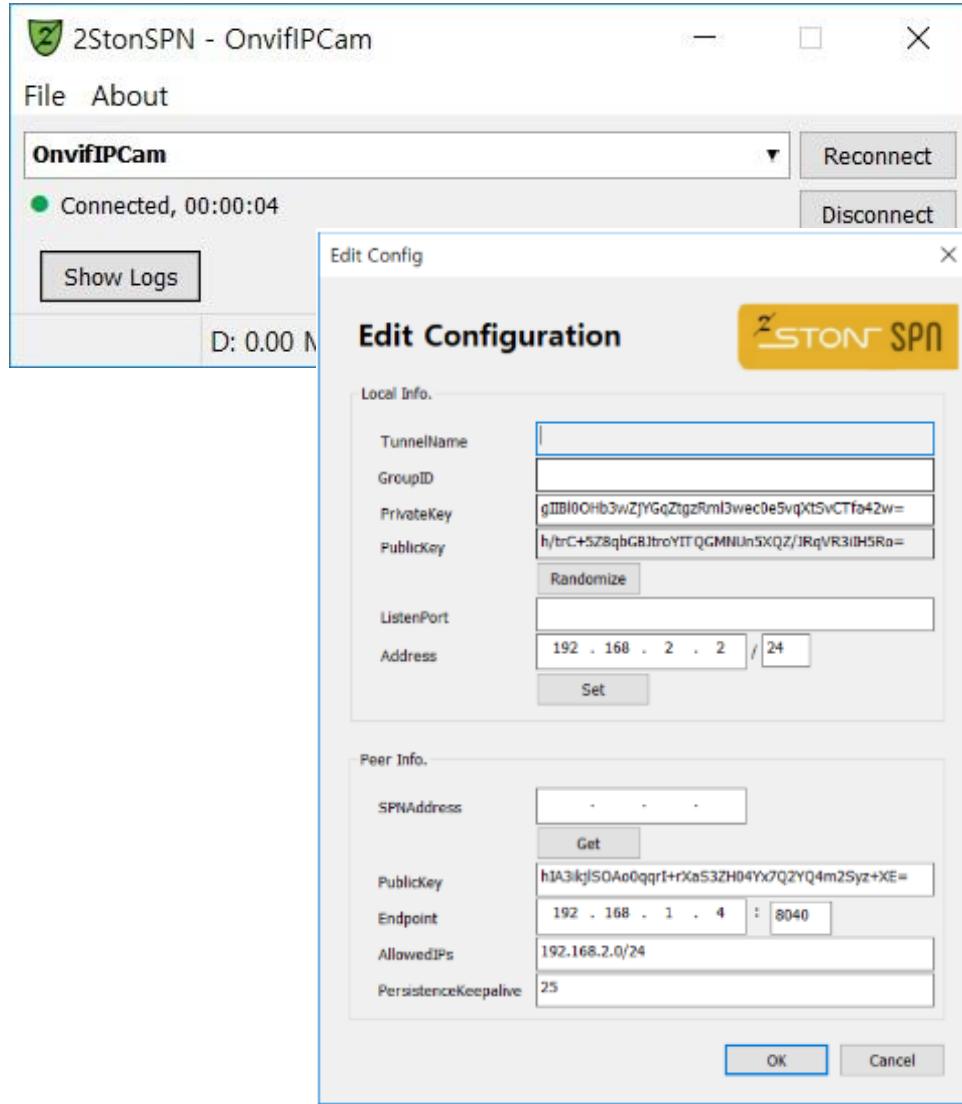
SPN Server Manager
(for Server & Bridge)



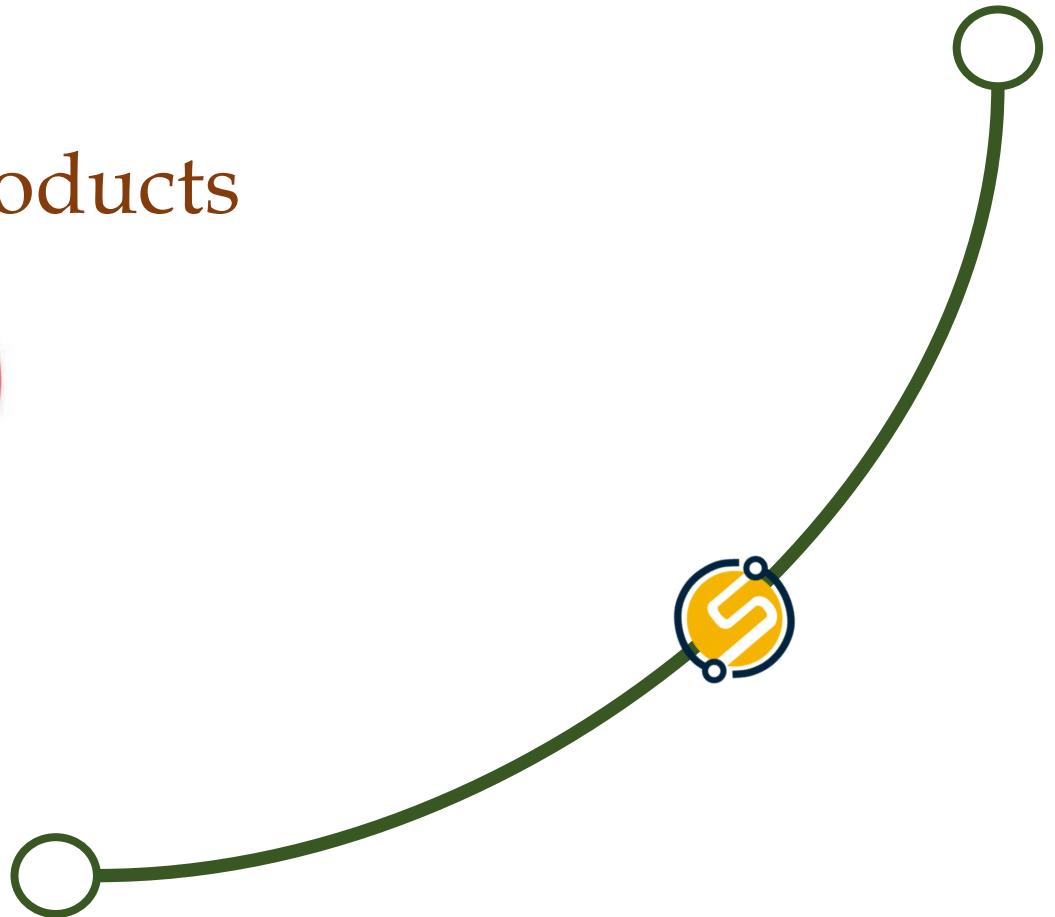
3.1 SPN v2.0 Products(5) - SPNAndroid



3.1 SPN v2.0 Products(6) – SPNWindows



Available Products



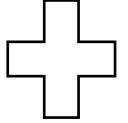
3.2 Available Products(1) – *IP Camera Security*



[1] IP Camera 전용 보안 패키지

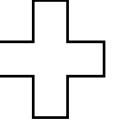


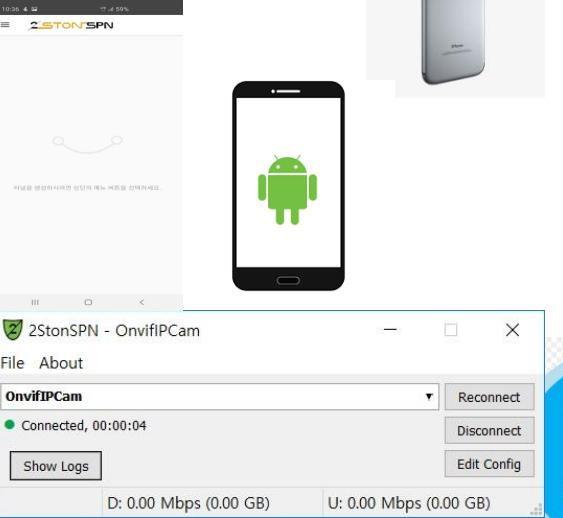
Onvif IP Camera





SPNBox-200(Y)





SPNAndroid / SPNiOS & SPNWindows



macOS



Windows 10

(*) NVR도 고려해 볼 만함.

3.2 Available Products(2) – *Intranet Security*

[2] 보안 Gateway + 소규모 Private Cloud



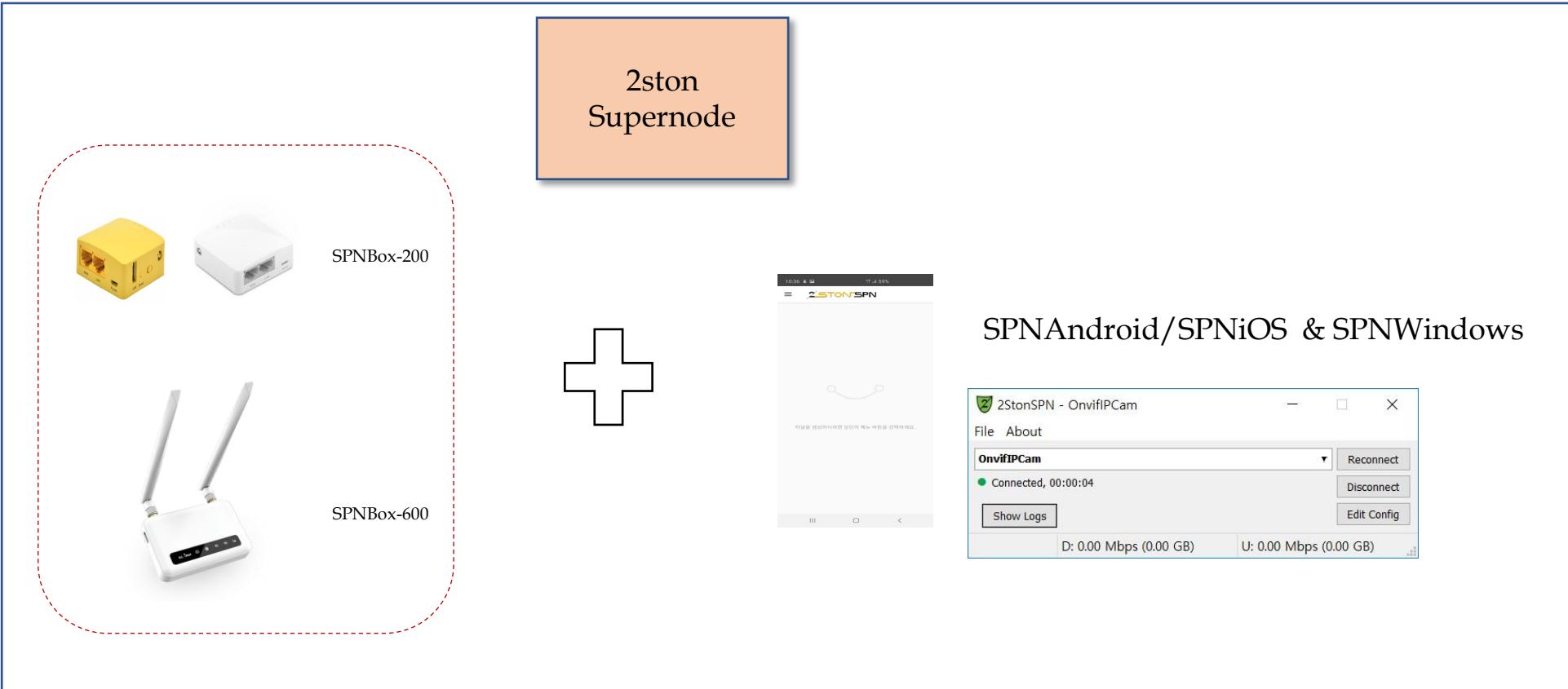
The diagram shows a blue-bordered box containing two main components. On the left, a dashed circle encloses a blue Nextcloud logo, a red speech bubble icon, a yellow S logo on a black circle, and a black SPNBox-1100 device. A green plus sign (+) is positioned between this circle and the right side of the box. On the right, there is a screenshot of a computer interface titled 'SPN RULES' showing a list of rules, and a smartphone displaying a mobile application interface.

(*) Google Drive 보다 저렴해야 함.

3.2 Available Products(3) – *Easy Connection*



[3] Easy Connection Solution



3.2 Available Products(4) - IoT Device Monitoring



3.2 Available Products(5) – *Remote Office*

[1] Server Mode(SPNBox)

[2] Bridge Mode(SPNBox)

[3] Server /Bridge Manager

[5] 원격 Access, 원격 Presentation, 원격 Printing

[4] SPN Client

Thank You



We Secure the Internet of Things with 2STON™