



## 01 - VoWifi Introduction



### Why you need VoWifi? Or Wifi Calling?

1. Why you need Vo-Wifi? Or Wifi Calling?
2. How to avail VoWiFi Service?
3. Role of Mobile Operator in VoWiFi Service?
4. How to enable VoWifi on your Phone?
5. VoWifi - Benefits for Customers & Mobile Operator
6. Vo-Wifi Challenges & Risks



## Why you need Vo-Wifi? Or Wifi Calling?

### Why you need VoWifi ? Or Wifi Calling ?

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The biggest frustration for Mobile users is Weak coverage. Specifically, when you are inside house or office, Weak coverage will bring new level of frustration in your life. As you can see in Diagram (above), House No.3 is not getting good signal from Mobile Tower. These users in this house will be always complaining of bad Quality. You can see such users trying to make call while roaming in Street or leaning out of Window

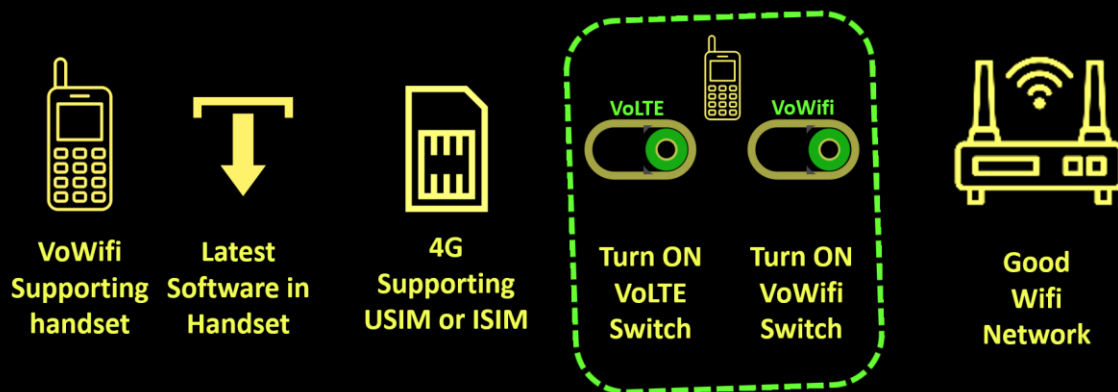
As solution, VoWiFi makes it possible for users to make and receive calls while staying indoors. As you know by now, VoWifi stands for Voice over Wi-Fi. VoWifi or Wi-Fi calling is altogether making and receiving calls using a Wi-Fi connection



## How to avail VoWiFi Service?



### How to avail VoWiFi Service ?



### What user need to do enable VoWifi Service

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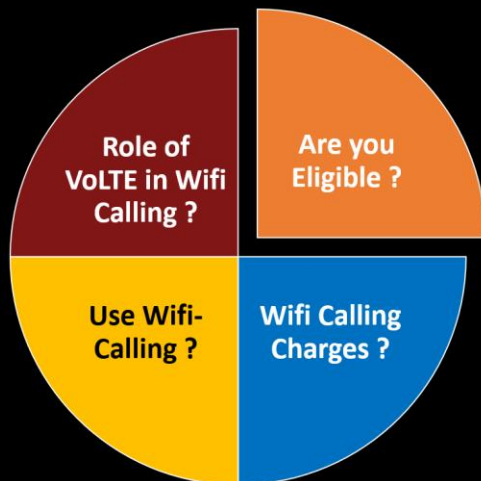
- First 2 are Most important things which belongs to Handset. The handset used should support VoLTE & VoWifi Service. Also, The Software Binary running on handset should also support VoLTE & VoWifi for corresponding Mobile Operator. This Software / or Firmware Build to allow or Disallow VoLTE is controlled by Handset manufacturer
- 3<sup>rd</sup> one is ISIM or USIM to be used by User, VoLTE will not work on traditional SIM used in 2G or 3G Era
- These two but most critical are VoLTE Switch & VoWifi Switch in Handset where user can enable or Disable VoLTE Services himself. Pls note, you must enable VoLTE in order to use VoWifi
- The last one is Good Wifi Network, you need to ensure good Wifi coverage all over the place, you also need to ensure that Wifi network backhaul is not congested and is not having Packet loss or latency



## VoWifi Service Doubts?



### VoWifi Service Doubts ?



### VoWifi Service Doubts?

While every country & every operator will have different terms and conditions as per plan you have opted: -

1. **Let's understand, who all customers are eligible for Wi-Fi calling?** Well Any user have VoWifi enabled Handset & 4G SIM with active plan should be able to use VoWifi Services
2. **Are there any extra charges for using VoWifi services?** Answer is NO .. Since VoWifi services brings host of benefits for operator as well as for end users, It's a win win situation. Usually Operators doesn't charge anything extra for VoWifi Service
3. **How to use VoWifi service?** Once Wifi Calling is enabled on phone , You have to make or receive calls using standard dialer , No separate app is required . We will cover steps for enabling Wifi calling in some time in this Video. Once VoWifi is enabled you will notice small icon in Notification area of Phone. Your phone will automatically start placing calls on Wifi whenever its latched on Wifi Network
4. **What is Role of VoLTE in order to avail VoWifi Service?** Since Both VoLTE and VoWifi belongs to same IP based IMS Technology , Enabling VoLTE is mandatory for using VoWifi services

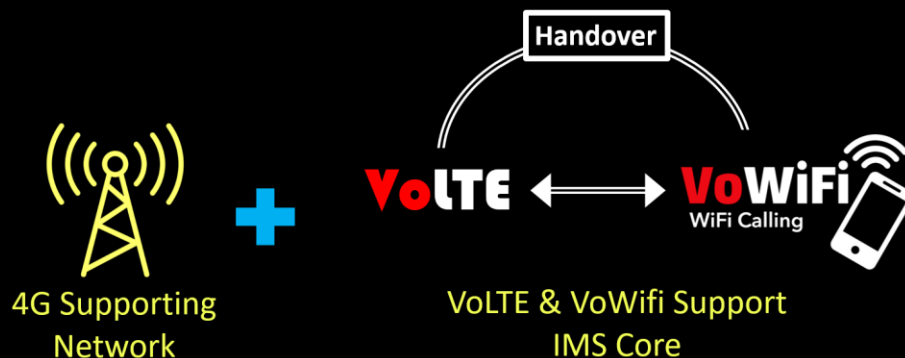
For more details, I would request you to go to your mobile Operator Website for further details as these terms may vary from Country to Country and Operator to Operator



## Operator role - VoWiFi Service?

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### Operator role - VoWiFi Service ?



### What is expected from Mobile Operator ?

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### Let's understand Operator role in providing VoWiFi Service?

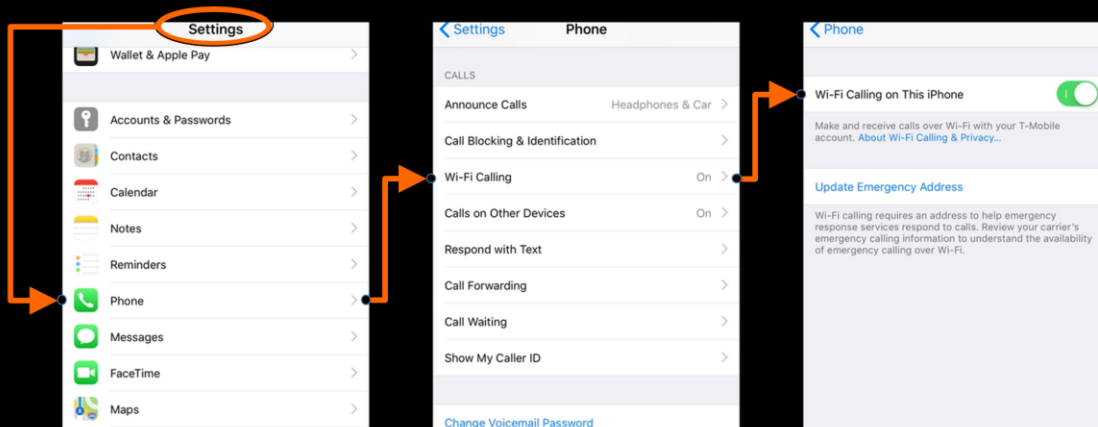
Mobile Operators needs to have 4G Network support along with VoLTE Services to start their journey . Moving ahead this same VoLTE service can be easily extended to VoWifi support as parent technology of both VoLTE and VoWifi is same i.e. IMS Core Network

In order to have seamless VoWifi Network experience , Operator need to enable handovers between VoLTE and VoWifi Services as well



## How to enable VoWifi on Apple?

### How to enable VoWifi on Apple ?



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### How to Enable WiFi Calling on iPhone?

1. For Apple users, just make sure you have the latest iOS version running on your device (typically iOS13 is available now a days) and that's it.
2. Now, Pls connect to an active WiFi network
3. Now it's time to enable Wifi Calling, Go to Settings > Phone. Here you will see an option WiFi calling
4. Enable the toggle or Switch for WiFi calling on your iPhone and you are ready to use VoWifi

Similar steps can be followed for iPad, or Apple Watch

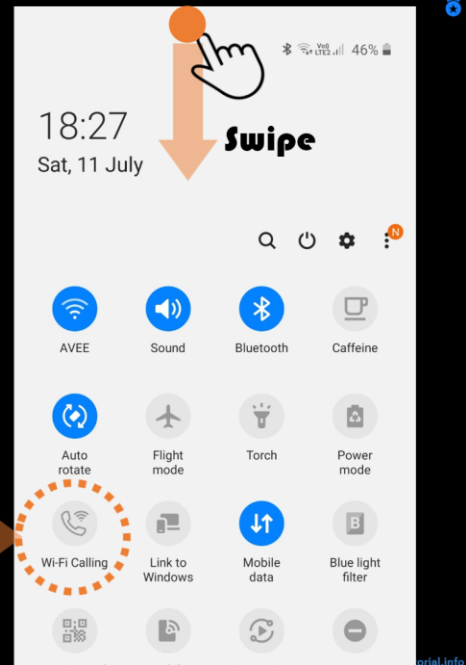


## Option # 1 - How to enable VoWifi on Android

### How to enable VoWifi on Android

#### 1<sup>st</sup> Option

 **Android's Quick Settings Dropdown**



### How to enable VoWifi on Android?

Android is flexible, there are various options available to enable Wifi calling on Android.

1<sup>st</sup> one is easiest option. Just Pull down the notification panel (or Android's Quick Settings Dropdown) and tap the **Wifi Calling** Icon to get started. Just head over to Quick Settings Panel and turn on the WiFi calling option as visible on screen

This is example of Samsung device, based on your device make / model, Settings may vary

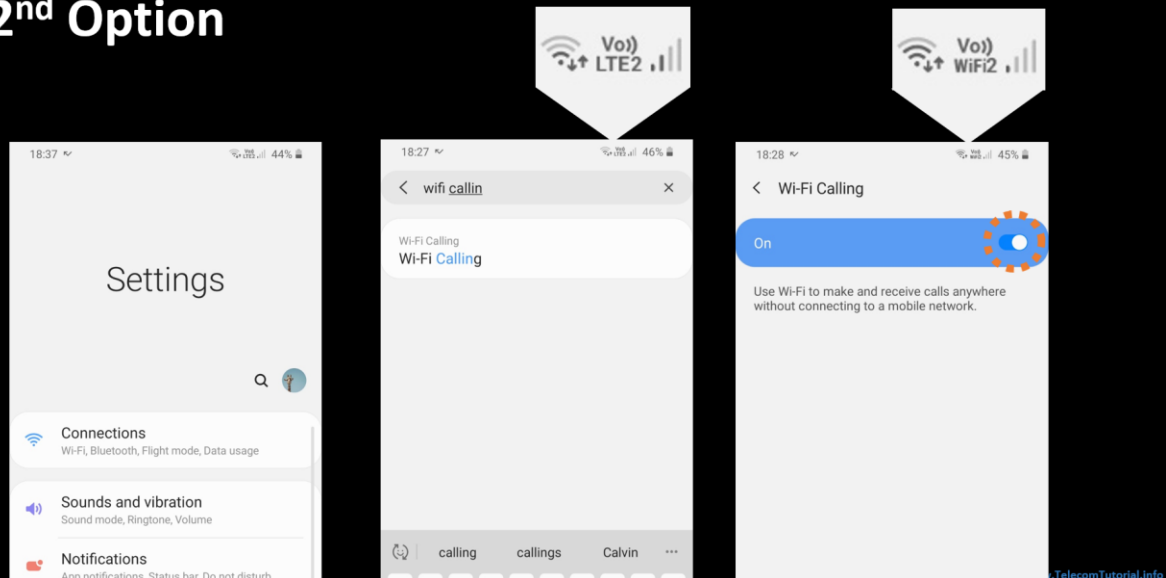


## Option # 2 - How to enable VoWifi on Android

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### How to enable VoWifi on Android

#### 2<sup>nd</sup> Option



### How to enable VoWifi on Android? – Let's see Another Option to do this

As you know, Android is flexible, we get many ways to enable VoWifi

1. Go to Settings & Click Search Icon. on Top Right
2. Type Wifi Calling in Search box & You will see Wifi-Calling Option as visible on screen
3. This will take you to Wifi Calling Switch which needs to be turned ON

Depending upon the brand of your phone, this might differ a little

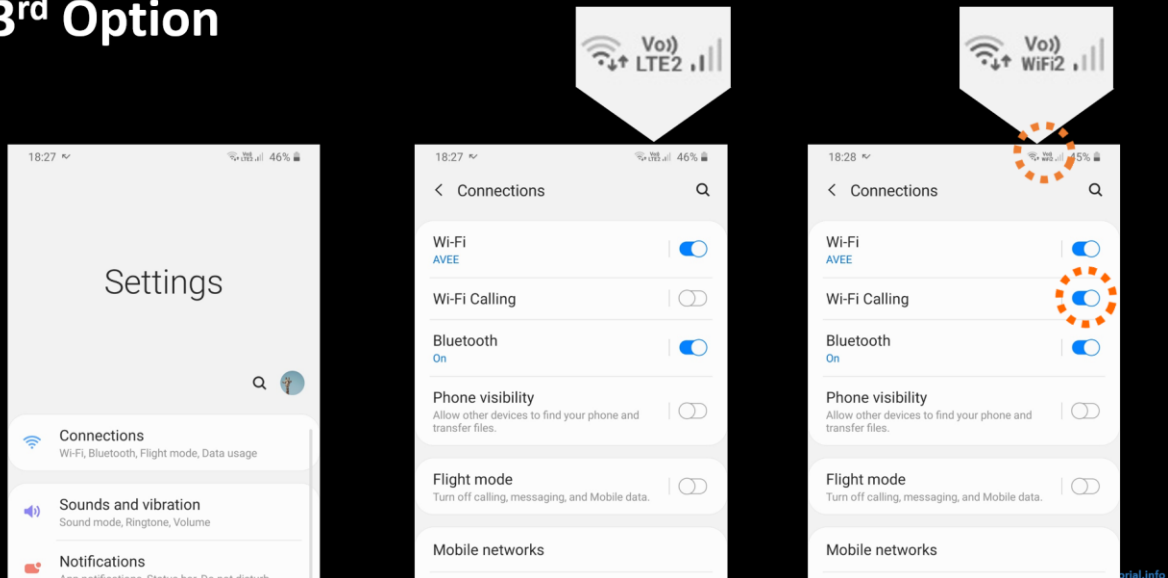


## Option # 3 - How to enable VoWifi on Android



### How to enable VoWifi on Android

#### 3<sup>rd</sup> Option



### Let's see one more Option to enable VoWifi on your phone

1. Go to Settings & Then to Connections
2. Under Connections, you will See Wifi Calling Option
3. Just Head on to Wifi Calling Switch which needs to be turned ON

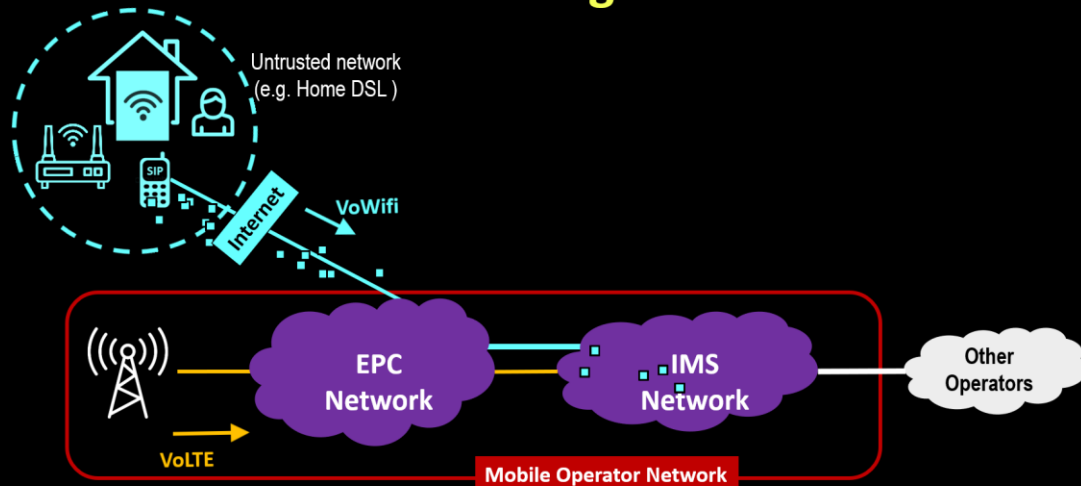
This is example of Samsung, For Xiaomi, Users can find the option within the device Settings > SIM cards and Mobile Networks > SIM1 or SIM2 > Make Calls using WiFi. Similarly, OnePlus users will get the option within Mobile Network & SIM1 or SIM2 Section



What is VoWiFi or Wifi Calling?



## What is VoWiFi or Wifi Calling ?



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## Let's understand What is VoWiFi or Wifi Calling?

You can see the typical 4G VoLTE Network here. The users are attaching on 4G Radio network are connecting to IMS Network for using Telephony services such as Voice, SMS etc. The IP Packets are travelling from User Equipment which is Mobile Handset to IMS Network

The VoWiFi Services as shown in diagram is extension of existing Mobile Network. VoWiFi is a complementary technology to VoLTE and utilizes IMS technology to provide a packet voice service delivered over IP via a Wi-Fi network. VoWiFi enables direct connectivity between Mobile handset to EPC Network of Mobile Operator. Technically, it uses IEEE 802.11 wireless LANs standard supporting Wifi network to make Voice calls over Wifi. This is very beneficial specially whenever you are in low 4G coverage like in house or indoors or in basement where Wifi is available. This feature will allow you to make normal calls using Wi-Fi. The technology is now available on all Leading Operators across Globe. All you need is latest Android and iOS smartphones to support this

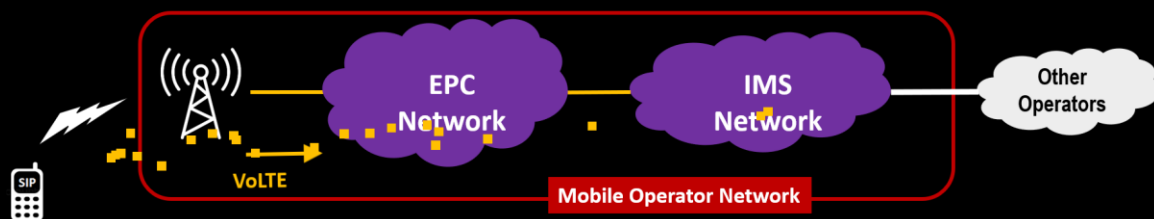
Where possible, Mobile Operators allow seamless handed over between 4G LTE and Wi-Fi and vice versa. This is applicable to both Video and Voice Calls. This will help in case you are moving in or out from home and switch between VoWiFi network inside your home and VoLTE Network outside



## How is it any different from VoLTE?

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## What is VoWiFi or Wifi Calling ?



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VoLTE or Voice over LTE is upgraded technology as compared to 2G / 3G Networks. It uses all End to End - IP Based, Packet based 4G Network to make voice calls. This enables high-quality voice calls and also makes sure that the user can browse internet while on a phone call. Both VoLTE and VoWiFi are served by common IMS Platform which makes them similar in feature & functionality

While VoLTE still requires you to stay connected to a 4G radio and serve via 4G Access. VoWiFi uses Untrusted network such Public Internet or Wifi to serve services using IMS Infrastructure



## VoWifi - Benefits for Customers & Users

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Good Wifi  
Connectivity is key

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### VoWifi - Benefits for Customers & Users

Deploying VoWifi Solution enables operators to quickly and easily extend their coverage or service range without putting up towers and costly Radio infra, this technology brings many benefits to users as well. In order to enjoy all benefits Users, need good Wifi Connection which is not having latency or congestion. If your Wifi is having problems such as Packet loss, frequent disconnection etc., The overall experience will not be great.

Let's understand What all benefits VoWifi brings to end users: -

1. **Better indoor coverage:** - With VoWifi, you are definitely going to experience better indoor coverage and this brings ease of making calls and SMS in Low Coverage
2. **Secure Communication:** - VoWifi works on End to End Secure communication, even if you are public Hotspot or using Wifi of any Caffe shop, you should not worry on security, there is no way someone can listen your voice call or read your SMS even if they get duplicate copy of all Traffic
3. **Ease of Connectivity:** - There is no need to type user name / Password or login into some app or platform to use VoWifi. What you need is enable VoWifi in Handset and you are ready to use seamless voice, SMS and telephony services via Wifi. You are actually registering on you Mobile Operator network



using SIM-based authentication. Yes, it works with the existing SIM, through the default phone dialer and messaging app without any additional App

4. **Call to Any Network:** - WhatsApp users can make call or text to another WhatsApp users; Same goes with Telegram. Telegram user can make call or send text to another Telegram users only. Well such restrictions don't apply with VoWifi services. With VoWifi, you can make WiFi calls to the other person irrespective of their phone supporting WiFi Calling or not. The recipient can be on any network, be it same operator or any other operator, you can make STD or ISD Calls as well just like normal telephone
5. **Seamless Handovers:** - Have you ever wondered, what will happen if WiFi gets disconnected, what will happen to ongoing VoWifi Call. Well, the call will take place over your mobile 4G Network. VoWifi and VoLTE are parented to same IMS Network at Mobile Operator, this gives you flexibility to have seamless handover between VoWifi and VoLTE Networks
6. **HD Quality Voice:** - As you know, VoLTE and VoWifi belongs from same family of technology. This brings all good Qualities of VoLTE to VoWifi as well. VoWifi enables high-definition (HD) voice quality. The VoWifi uses wideband audio codecs, Net Net HD voice uses a wider frequency range than narrowband voice services, which enhances overall voice experience
7. **Faster Call Setup:** The average call setup time of 2G / 3G networks is 6 Seconds. Which means after dialing, you need to wait for average 6 seconds before call terminates to B Party. With VoWifi, its rocket fast calling where your call terminated between 1-2 seconds. This benefits also comes from VoLTE family where call set-up times are greatly reduced so that people can connect with each other more quickly
8. **Longer battery life:** Since your phone is not changing networks between 4G & 3G or 2G for voice calls. Users saves couple of Amps & battery life with VoLTE & VoWifi Technology
9. **No Extra Charge:** For using VoWifi, there are usually no additional charges levied by Operators

## Conclusion

Altogether, the benefits of VoLTE and VoWiFi will contribute to an overall better customer experience for consumers and business users. And when customers have good service experience, they are more likely to stay with their current service provider and tell others about it, which in turn helps service providers reduce churn and attract new customers



## VoWifi - Benefits for Mobile Operators

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### VoWifi - Benefits for Mobile Operators

Better User Experience & Cost Saving are key factor when they consider VoWiFi. The main fascination for VoWiFi for mobile operators is that it reduces customer churn and improves end to end experience by helping users get service in buildings that can't get good quality signal from the 4G Radio, and it does so without investing into CAPEX.

1. **Wifi Offload, Unclog Cellular Network:** - Operators are always trying to offload traffic to Unlicensed Wifi rather than utilizing Precious and costly spectrum. Few Operators are coming up with Public Wifi hotspots all major public places such as Shopping Malls, Metros, Shops, Markets. VoWifi helps operators to offload traffic to Wifi and save 4G Spectrum
2. **Reduce Customer Churn:** Serve customers without Coverage helps operators to stop churn of users
3. **Unlock revenue opportunities:** Operators can make new customers & Serve them with Quality even when coverage is not so great
4. **Existing Security re-use:** Since both VoLTE & VoWifi solutions are part of same family, Operators can Leverage existing SIM-based security and authentication which they have used for VoLTE
5. **Use Other Operator Wifi for serving users:** Operators gain the opportunity to access Wifi of Other Operators to serve Voice / SMS traffic of their users
6. **Common Bill / Charging:** Operator Issue a single bill for the user for all IMS-based services across different access types such as VoWifi, VoLTE etc. There is no additional investment required at Operator for VoWifi charging / billing

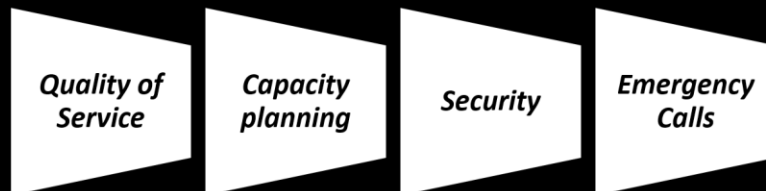


Net Net, Operators gain a competitive advantage with VoWifi. Since VoLTE & VoWifi belongs to same family, Operator leverage all VoLTE benefits for providing VoWifi services

## Vo-Wifi Challenges & Risks

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### Vo-Wifi Challenges & Risks



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### VoWiFi challenges

Let's understand What is needed for VoWiFi to work well? You need mitigate below challenges

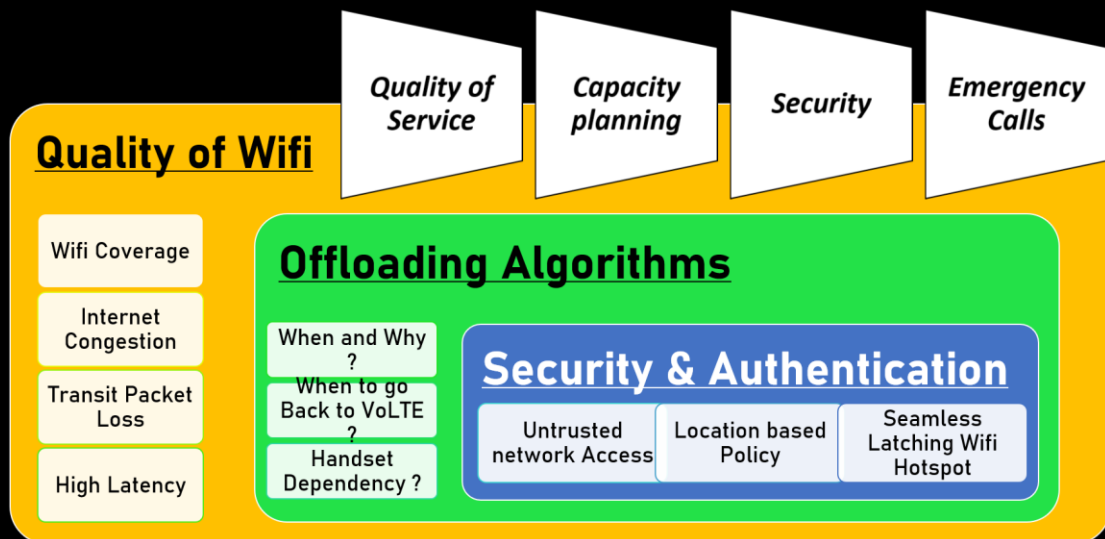
- **Quality of Service:** Mobile Operators have absolutely no control over the quality of a WiFi network. After VoWifi, they will be challenged to troubleshoot WiFi issues and could be unfairly blamed for poor service. As solution, we need to timers well placed with Handset Binary to trigger fallback to VoLTE during bad quality of Wifi Internet
- **Capacity planning:** Offloading 4G or Mobile traffic to WiFi will free up spectrum bandwidth for Mobile Operators. This means, Operator need to Re-Plan Capacity & Infrastructure and need to build ample Backend capacity for Wifi Core such as ePDG, AAA etc. In case Mobile Operator have also deployed Wifi Hotspots in Country, they need to Re-Engineer for traffic Capacity & Coverage for Wifi Hotspots as well
- **Security:** End to End Secure communications must be managed by Mobile Operator. They need to implement Authentication, encryption, & IPsec



- **Emergency Calls:** Since IP Address of End user does not provide a location. Mobile Operator need to find solution to services which requires geographical location



## Vo-Wifi Challenges & Risks



## Factors effecting VoWifi experience

**Quality of Wifi Networks:** Since VoWifi is thrown open for Public Network, Quality of Wifi Networks may be compromised in terms of factors like these: -

- **Wifi Coverage:** A Weak Wi-Fi coverage will lead to bad experience as call will switch to VoLTE once RSSI level goes down
- **Internet Congestion:** Since Internet is shared resource at Wifi End, You Wifi router doesn't differentiate and give priority to VoWifi traffic, this become really challenging during congesting scenarios where someone at your home watching YouTube will deteriorate quality of your voice call over Wifi as your internet is congested
- **Packet Loss:** Transit Packet Loss between your Wifi Backbone to Mobile Operator Network will also lead to huge quality issues. There are so many internet providers now a days. Every Internet provider may not give you seamless error free highway and connectivity to Mobile Operator Network where every VoWifi calls are terminating



- **Latency:** High Latency between UE & Mobile Operator ePDG will seriously dent your VoWifi Experience.

Net-Net, you need to ensure Good Wifi Network & Internet connectivity for seamless Wifi Calling experience

## Offloading Algorithms

Do you know, who takes decision of handover for VoWifi to VoLTE or Vice versa, There is whole set of calculations done by handset such as Wifi Signal, Packet loss, Reachability with Mobile network ePDG on basis of which it takes decision to stay on Wifi-Calling or exit to VoLTE Network. Again, every handset has its own criteria to build these calculations wherein we have huge dependency on Handset Manufacturers to decide fate of VoWifi uptake and experience

## Security & Authentication

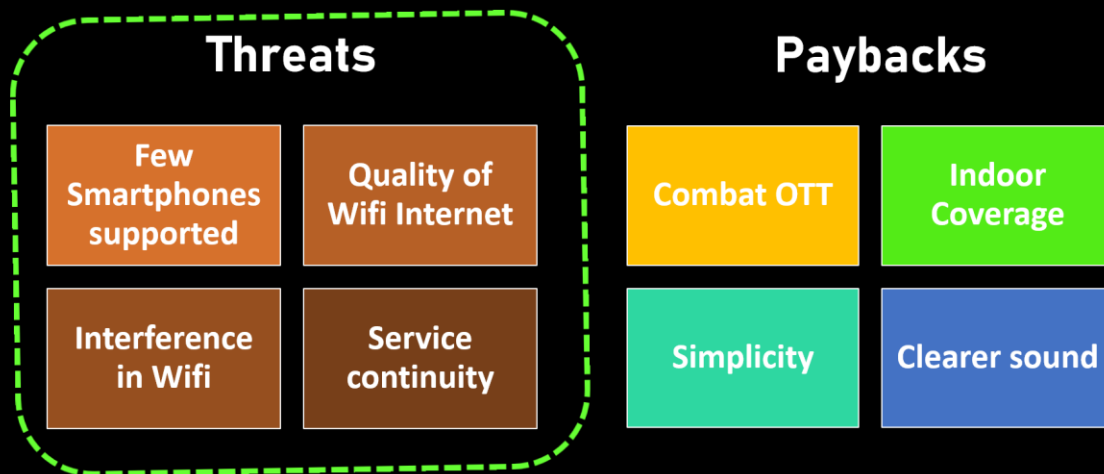
- **Encryption:** Mobile Operators needs to allow Access from Untrusted network which is full of Security risks if not done properly. On One side, Mobile Networks needs to protect themselves from Cyber-attacks, they also need to ensure End to End encryption for all communication with Mobile Handset
- **Seamless Latching Wifi Hotspot:** Since both Wifi and VoWifi latching needs Authentication of user, Mobile Operator needs to ensure its all seamless and user need should not experience any sort of hassle to use this service. Entire Latching and Authentication has to be done by handset Automatically in backend without bothering user about same



## Conclusion

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### Conclusion



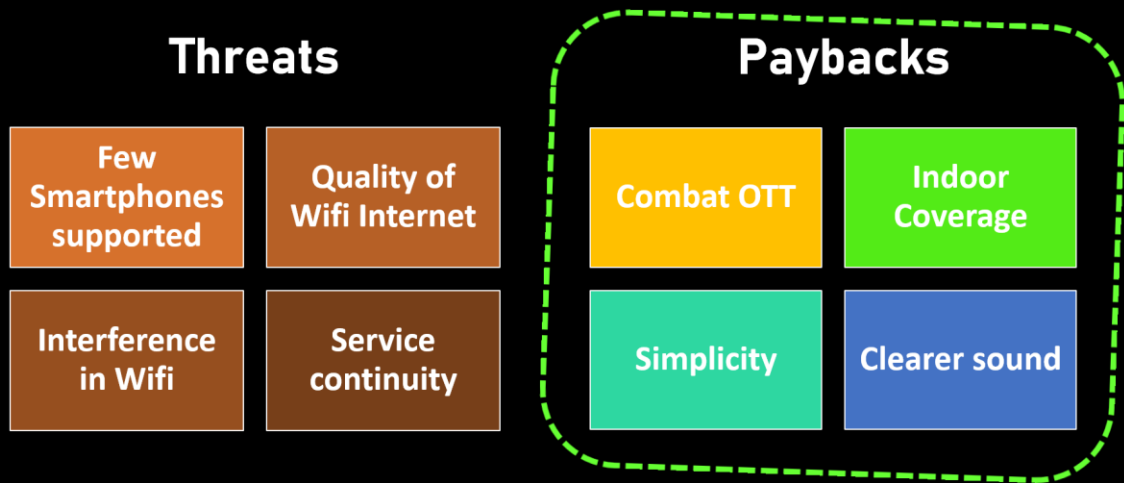
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### Threats for Wifi Calling

- As you know, VoWiFi or Wifi Calling is still a relatively very new service. Currently, only a handful of smartphone models support VoWiFi. At worst, there is No backward support for old smartphone models
- This problem amplifies as Mobile Operator doesn't have control over the quality of Wi-Fi signal at home or malls. At times, the End to End Quality of service may be impacted at times. At best, The Mobile operators can reserve bandwidth for VoWiFi calling on their hotspots and self-owned Fix line networks but same can't be guaranteed on public Internet such as MiFi devices, Public hotspots & routers
- As you know, The Wi-Fi operates in unlicensed bands, so there are interferences seen in many Wifi Networks which also deteriorates Wifi Calling Quality
- Another issue is Maintaining service continuity and seamless transition between VoWifi and VoLTE networks, this can be challenging as service disruptions may occur due to bad implementation by Operator



## Conclusion



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### Paybacks for using Wifi Calling

Even after so many challenges & threats, VoWifi or Wifi Calling is new revolution. It brings joy & smile to frustrated customers specially in Urban areas where indoor coverage is problem. VoWifi helps Mobile operator to Combat OTT apps and gain back lost revenue, provide a better experience & keep their users happy and Loyal

This technology is Simple, you don't need for an Additional app. Users can just call straight from phone's native dialer. Ultimately WiFi calling often has a much higher-quality and a clearer sound

Altogether, the benefits of VoWiFi give overall better customer experience, we know that when customers have good service experience, they are more likely to stay with their current service provider. This technology ultimately helps Mobile Operators to reduce churn and attract new customers