

**VoIP vs. Mobile**

VoIP is a technology that allows voice communication over the Internet. It is a digital technology that converts voice into digital data and transmits it over the Internet. Mobile is a technology that allows voice communication over a cellular network. It is an analog technology that transmits voice as a continuous wave over the air.

Thanks for your attention

Many new smartphones have enhancements  
that allow them to use voice over IP (VoIP) services. So, if you're using a smartphone, you can use VoIP services to make calls over the Internet. This is a great way to save money on your phone bill, especially if you travel a lot. However, there are some drawbacks to using VoIP services. For example, you need a stable Internet connection to use VoIP services. If your connection is slow or unreliable, your calls may be dropped or have poor quality. Also, VoIP services may not work as well in areas with poor cellular coverage. So, while VoIP services can be a great way to save money, they may not be the best option for everyone.

In the name of GOD

## All Smart, No Phone

Electrical Engineering and Computer Department of  
Shahid Beheshti University

Course name: Mobile Communication

Spectrum IEEE, Oct 2014

Advisor: Dr.Ghorashi  
Lecturer: A.Hajhosseini

Feb 2015

most mobile phones today require data frequencies from 300 to 3,400 hertz. But unlike **cellular** with **analog** channels, **cellular** must share a **single** amount of wireless spectrum. So they **compress** the **voice data** to let more users connect. In fact, a mobile can use its own **own** network. The compressed data is sent to the **server** and then the **server** sends it to the **phone**. This is how **VoIP** works. It's a **digital** technology that **compresses** the **voice data** and sends it over the **Internet**. This is how **VoIP** works. It's a **digital** technology that **compresses** the **voice data** and sends it over the **Internet**.

**The Pros and Cons**

VoIP has many advantages over traditional phone services. It is often cheaper, especially for long-distance calls. It also allows for features like video calling and instant messaging. However, VoIP is dependent on a stable Internet connection, and quality can be affected by network congestion or latency. Traditional phone services, on the other hand, are more reliable and have consistent quality, but they can be more expensive.

**Conclusion**

While VoIP offers cost savings and additional features, the reliability and quality of traditional phone services remain a significant advantage. As technology continues to evolve, the gap between the two may narrow, but for now, the choice depends on the user's needs and the quality of their Internet connection.

**VoIP**

In general, the quality of VoIP services has gotten better. VoIP packets enter the Internet or a cellular network, they're handled as "best-effort traffic" along with other data. But VoIP providers can't promise that sound quality will always be adequate.

**How can that be?**

Mobile communication is a complex system. It involves many different components, including the phone, the network, and the service provider. Each component can affect the quality of the communication. For example, a weak signal or a congested network can lead to poor quality. So, while VoIP services can be a great way to save money, they may not be the best option for everyone.

**voice quality**

Labatory tests confirm that even in the best conditions, quality is not perfect. There are many factors that can affect voice quality, including the quality of the equipment, the quality of the network, and the quality of the service. So, while VoIP services can be a great way to save money, they may not be the best option for everyone.

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**Noise cancellation**

Many mobile phones use noise cancellation to improve the quality of the voice. This is done by using a microphone to pick up the voice and a speaker to play it back. The speaker also picks up some of the background noise, which is then subtracted from the voice signal. This process is called noise cancellation. It helps to make the voice clearer and more understandable.

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Many new smartphones have enhancements  
HD voice 50 to 7,000 Hz  
One solution is HD voice



why you haven't noticed these changes?

Even if your phone is HD compatible, you won't hear an improvement unless the phone you're talking with also supports HD voice.

### VoIP



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### How can that be?

Most smartphones have great audio. New smartphones also include and adapt, and also in line of respect of data to the public of you in need every second.

"While companies have noticed that the focus on a smart phone also being a telephone."

### voice quality

Laboratory tests confirm that Even in the best conditions, quiet environment and a strong wireless signal, users rate voice quality lower on a telephone than on a landline.



next threat: phone transmits the call to a base station, most mobile phones today **compress** audio frequencies from 300 to 3,400 hertz. But unlike **landlines** with **full capacity** channel, cellphones must share a limited amount of wireless spectrum. So they **compress** the voice data to let more users connect.

local call to a mobile user on your own carrier network. The compressed data will likely travel to the receiving cellphone without further **transmission**. talking to someone on a **different carrier**, your local network will typically direct the call into the **backbone** telephone network, which was designed to carry **raw** voice traffic. So equipment at the exchange point must **convert** the mobile voice data to the higher **raw** line rate. **Raw** voice data can decide that signal without losing more information. But if your call is sent to another cellphone, voice quality became bad because base station serving the phone recompresses the data to fit into a cramped wireless channel.

### The first obstacle

When a mobile phone transmits a voice call, it must first convert the analog voice signal into digital data. This process is called **digitization**. The digitized voice data is then sent to the base station. The base station then transmits the data to the receiving phone. The receiving phone then converts the digital data back into analog voice. This process is called **analogization**.

### Noise cancellation

Many smartphones address this problem by using **multiple** microphones. With one microphone, sound is picked up from the user's lip and the additional ones set further away (surrounding or sideways), the difference in signals is better than the background noise.

But noise cancellation algorithms aren't a sure fix, because they can take a few seconds to recognize a noise.

Too much noise suppression removes making it sound **robotic**.

Yet even if your cellphone distills crisp, noise-free speech, there's no guarantee it will arrive at the listener intact.

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## After several rings .....

picks up my call on his cellphone.

ask his opinion on the quality of audio on mobile phones.

But the connection keeps cutting out

he asks me to dial him back on his landline.

This time, his voice is much clearer.



## How can that be?

Modern smartphones With small size , take photographs, play music and videos, and stream tens of megabits of data to the palm of your hand every second.

But try calling your boss in rush-hour traffic to say you're running late, and there's a good chance your message won't get through.

**"Mobile companies have rather lost the focus on a smartphone also being a telephone,"**

# voice quality

Laboratory tests confirm that Even in the best conditions: quiet environment and a strong wireless signal, users rate voice quality lower on a **cellphone** than on a **landline**.

For example, Nokia found that when they compressed voice data to 5.15 kilobits per second, which **cellphones do automatically when a tower connection is weak**, user ratings fell from "good".

When engineers decoded and then recompressed the data, which happens when a call travels through the backbone network to another cellphone, the ratings dipped **lower**.

Back then,  
mobility was a luxury

But now, more and more people are cutting the cord—or never installing one.

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# wireless

Today in the United States, for instance, 40 percent of homes rely exclusively on mobile phones for making and receiving calls.

In remote areas wired broadband is too costly  
wireless links.

[ On Fire Island, in New York, Verizon refused to rebuild the copper infrastructure destroyed by Hurricane Sandy in 2012, offering a fixed wireless service in its stead. Although Verizon eventually promised to install a fiber network on the island after customers protested. ]



On Fire Island, in New York, Verizon refused to **rebuild** the **copper infrastructure** destroyed by **Hurricane Sandy** in 2012, offering a fixed **wireless service** in its stead. Although Verizon eventually promised to install a **fiber network** on the island after customers protested.

Most cellular voice traffic today passes through a patchwork of diverse systems, each **exchange point** an opportunity for degradation and delays.

**But lest you despair,  
here's some good news**

Solutions to many of these impediments are in the works or already **available:**

**HD voice**

**Voice over LTE.**

# The first obstacle

The first obstacle to a good-quality voice connection on today's mobile phones is their **design**.

Motorola

With its **ear-size speaker** and **microphone** pointed directly at his mouth, the monstrosity Motorola used was clearly constructed with voice calls in mind.

The smartphone's form "is driven by **industrial design** and not **voice quality**

to create an elegant, palmable chassis for watching videos listen to music, smartphone designers **small** and **flatten** speakers and sometimes even **cover them** in plastic

smartphone's **puny** microphone is similarly problematic. And the **farther** it is from your mouth, the more unwanted noise it picks up.



## Noise cancellation

Many smartphones address this problem by using **multiple microphones**. With one microphone situated **as close as possible to the user's lips** and the additional ones set farther away, a smartphone can **compare** the **different incoming signals** to better filter out background sounds.

But noise-cancellation algorithms aren't a sure fix, because they can take **a few seconds to recognize a noise**.

Too much noise suppression removes making it sound **robotic**.

Yet even if your cellphone distills crisp, **noise-free speech**, there's **no guarantee** it will arrive at the listener intact.

next threat: phone **transmits** the call to a **base station**.  
most mobile phones today **digitize audio** frequencies from **300 to 3,400** hertz. But unlike **landlines** with **full-capacity** channel, cellphones must share a limited amount of wireless spectrum. So they **compress** the voice data to let more users connect.

local call to a mobile user on your own carrier network, The compressed data will likely travel to the receiving cellphone without **further manipulation**.

talking to someone **on a different carrier**: your local network will typically direct the call into the **backbone** telephone network, which was designed to carry **landline** traffic. So equipment at the exchange point must **convert** the mobile voice data to the higher wire-line rate.

**landline phone** can decode that signal without losing more information. But if your call is sent to another cellphone, voice quality became bad. because base station serving the phone recompresses the data to fit into a cramped wireless channel.

# Many new smartphones have enhancements

but carriers will have to make major network upgrades which will take time and money.



**One solution is HD voice.**

50 to 7,000 Hz

By the 1980s researchers: people need to hear a wider range of wavelengths to fully understand speech.

names like **Jeff** and **Jess** sound the same on the phone

329 smartphone models support the standard, and 109 mobile operators offer service in 73 countries.

## **why you haven't noticed these changes ?**

HD voice equipment still typically defaults to standard

Even if your phone is HD compatible, you won't hear an improvement unless the person you're talking with is also on an HD phone and all of the networking equipment in between supports the technology.

# VoIP



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## Voice over LTE (VoLTE).

VoLTE lets mobile carriers deliver voice traffic just like regular data

VoLTE **eliminates** the need to **convert** the data into different formats for different parts of the system. So no information is lost.

LTE carriers can't guarantee that voice packets will arrive at their destination in a **timely manner**.

### U.S. carriers announced plans for VoLTE rollouts

calls it "the next evolution in **wireless calling**."

If that's really true, it's reason for me and other voice customers to be optimistic.

**But I've experienced too many **lousy connections** to take these promises at face value: I'll believe it when I hear it.**

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### The first obstacle

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most mobile phones today **digitize** audio frequencies from 300 to 3400 hertz. But unlike **analogues** with **full capacity** channel, cellphones must share a limited amount of wireless spectrum. So they **compress** the voice data to let more users connect. local call to a mobile user on your own carrier network. The compressed data will likely travel to the receiving cellphone without **further transmission**.  
talking to someone on a **different carrier**: your local network will typically direct the call into the **backbone** telephone network, which was designed to carry **raw** voice traffic. So equipment at the exchange point must **convert** the mobile voice data to the higher wire-line rate.  
**mobile phone** can decide that signal without losing more information. But if your call is sent to another cellphone, voice quality became bad because base station serving the phone recompresses the data to fit into a cramped wireless channel.

### Conclusion

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Many new smartphones have enhancements  
HD voice  
One solution is **HD voice** 50 to 7000 Hz  
By the 1980s, frequency range used to have a wider range of frequencies to fully utilize those channels. market like 16K and 32K sound the same on the phone. 32K smartphones must support the standard and 16K mobile operators offer service in 7.3 countries.  
**why you haven't noticed these changes?**  
HD voice requires that both ends of the connection support the technology. Even if your phone is HD compatible, you won't hear an improvement unless the other person's phone also supports it. So for most of the world, HD voice is still a future technology.



How can that be?  
Most smartphones have HD voice. But not all. And not all networks support it. So you won't hear an improvement unless the other person's phone also supports it. So for most of the world, HD voice is still a future technology.

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### voice quality

Laboratory tests confirm that Even in the best conditions, quiet environment and strong wireless signal, users rate voice quality lower on a cellphone than on a landline.



But that's just desktop, isn't it? You're not going to use a laptop on a mobile phone.

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But that's just desktop, isn't it? You're not going to use a laptop on a mobile phone.

### Noise cancellation

Many smartphones address this problem by using multiple microphones. With one microphone, the phone can't tell the difference between the user's voice and the ambient noise. But with two microphones, the phone can tell the difference between the user's voice and the ambient noise.

But noise cancellation algorithms aren't perfect. Because they can take a few seconds to recognize a noise.

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