# spearline®

# 2018 Global telecoms quality of service report

Insights into global inbound voice trends and country-by-country performance

Voice services continue to evolve and change with more and more emphasis on IP-transit and VOIP delivery. However, with ever-increasing complexities in voice networks, sometimes the focus on the 'how' of delivery can overwhelm the focus on 'what' is being delivered. Global telecoms teams can often be left blind to the reality of the end-to-end performance of voice calls on their network.

The intelligence of inbound service offerings and the growth of cloud-based contact centre solutions allow enterprises to use more sophisticated routing and ensure that calls are directed to the most suitable agent for fastest resolution of customer queries. Inbound services provide a range of access methods with flexible calling options. Enterprises are able to control how much callers pay to connect to their call centres using a range of number options and tariffs, including:

- Domestic or international freephone/toll free
- Universal international freephone/toll free
- Shared cost
- PSTN/caller pays

Enterprises also have direct control over flexible routing to customise how calls are delivered across the contact centre, whether to one or multiple sites. Options include:

- Load balancing
- Time of day, holiday and disaster recovery plans
- CLI-based routing
- Network queuing
- Percentage-based routing

Voice is data in today's network. Convergence is here. Users demand high quality of service (QoS), and quality of experience (QoE) robustness, while businesses want moderate costs, compatibility with standards and ease of management. The real-time nature of voice traffic presents real challenges as it competes for network resource at all points in its path between the customer and the enterprise.

## But connection is a given, right?

Routing flexibility and control at carrier level afford carriers more techniques and escape paths so that capacity hotspots can be circumvented and bilateral arrangements availed of more dynamically. However, change management happens in a much more delicate environment than it did in the past and network assets are perhaps worked harder than ever. Routing can, and does, go wrong.

When routing does go wrong, businesses can be unaware of the calls that have not arrived at their contact centre. Genuine customers with credit cards at-the-ready, may find themselves listening to a fast-busy, dead-air, or directed to a wrong termination point.

## Is voice still a priority though?

Many businesses are expanding their contact channels, and inbound voice is sometimes seen as outdated in this omnichannel world. Yet inbound voice is far from obsolete. It continues to be the primary customer contact channel and (according to recent research [1]) has actually seen an increase since 2014.

While the use of inbound voice has increased from 50% in 2014 to 59.5% in 2018, channels that might have been assumed to be 'on the up' have actually seen slight decreases in the last year. Email usage has dropped from 18.8% to 17% and social media dropped from 2.4% to 1.9%. So people still like to talk to people, particularly where the purchasing decision is significant, or a customer problem is complex.

Organisations worldwide see the importance of customer experience to their business. And where customer experience is a priority, voice quality must be too.

[1] Source: Callcentrehelper's 'What contact cenres are doing right now' report

## What is your mix of contact channels?

| Contact channels | 2018 | 2017 | 2016 | 2015 | 2014 |
|---|---|---|---|---|---|
| Voice - Inbound | 59.5% | 55.9% | 62.0% | 55.7% | 50.0% |
| Voice - Outbound | 12.8% | 14.3% | 14.0% | 17.0% | 18.2% |
| Email | 17.0% | 18.8% | 15.2% | 14.8% | 12.8% |
| Live Chat | 4.8% | 3.9% | 3.0% | 3.0% | 4.2% |
| Social Media | 1.9% | 2.4% | 1.6% | 1.8% | 2.7% |
| Letters | 1.8% | 1.8% | 1.6% | 3.6% | 5.2% |
| SMS | 0.8% | 1.1% | 0.9% | 1.2% | 3.4% |
| Video Chat | 0.1% | 0.1% | 0.2% | 0.2% | 0.2% |
| Other | 1.3% | 1.7% | 1.5% | 2.7% | 3.3% |

**Source:** www.callcentrehelper.com

year 2020

"Customer experience will overtake price and product as the key brand differentiator by the **year 2020.** [2]

**Walker**

72%

**72% of businesses** say that improving the customer experience is their top priority. [3]

**Forrester**

62%

**62% of companies** view customer experience delivered by the contact centers as a competitive differentiator. [4]

**Deloitte**

63%

**63% of customers** recommend an organisation based on its phone service - voice service is important. [5]

**Autonomous Customer APAC 2012**

[2] Source: www.walkerinfo.com/Portals/0/Documents/Knowledge%20Center/Featured%20Reports/WALKER-Customers2020.pdf

[3] Source: go.forrester.com/press-newsroom/72-of-businesses-name-improving-customer-experience-their-top-priority/

[4] Source: www2.deloitte.com/us/en/pages/operations/articles/2013-global-contact-center-survey.html

[5] Source: https://www.btireland.com/content/dam/btireland/documents/general/BT_Inbound_Contact_global_datasheet.pdf

## Customer experience and voice

You will often have heard reference to the importance of non-verbal cues impacting communications. The common statistic referred to is that 55% of communication is body language, 38% is the tone of voice, and 7% is the actual words spoken. The actual breakdown may be disputed[6], but it's clear that, in the absence of a face to face interaction, tone of voice can have a huge impact on whether your words are taken positively or negatively.

> Harvard University research[7] has shown that tone of voice affects ratings of the politeness of a speaker in most circumstances. Individuals in two studies listened to statements or questions that were either consistent or inconsistent across verbal content and tone of voice. For both positive and negative questions, tone of voice affected ratings of politeness. Positive content statements were substantially affected by tone of voice, and negative content statements were minimally affected.

Only the voice channel can deliver the enhanced communication that tone of voice brings. Indeed, experienced call centre agents will rely on it heavily when employing de-escalation techniques, building rapport in sales, and generally seeking to deliver an excellent customer experience. For the agent to deliver this experience however, the caller needs to get through to an agent in the first place and, when they do, good audio quality is essential to appreciate the full impact of the tone of voice being used.

## Audio quality's influence on credibility
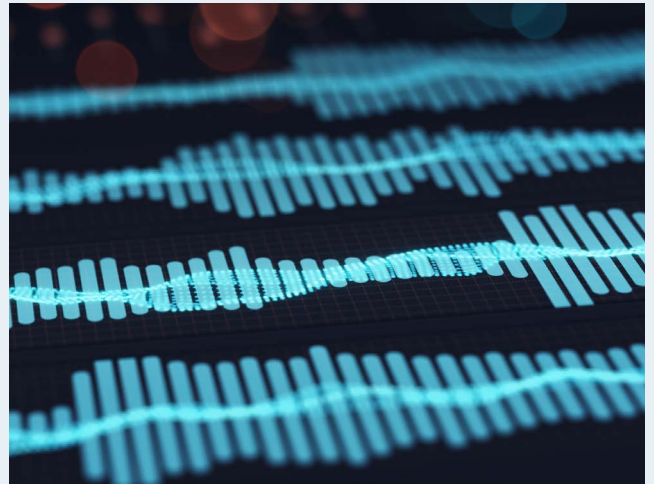
Joint research conducted by the University of Southern California and the Australian National University shows that audio quality influences whether people believe what they hear — and whether they trust the source of information.

"When you make it difficult for people to process information, it becomes less credible," said Norbert Schwarz, a co-director of the Mind & Society Center at the USC Dornsife College of Letters, Arts and Sciences.

In the study, scientists selected conference talk videos about engineering and physics for participant viewing. They showed one video with high quality audio while the other had poor sound. "When the video was difficult to hear, viewers thought the talk was worse, the speaker less intelligent and less likeable and the research less important," the scientists wrote.

"The findings can apply to countless situations in business, such as teleconference and videoconference calls, and job interviews over the phone", Schwarz said.

**Source:** USC Dornsife [8]

[6] Source: www.psychologytoday.com/us/blog/beyond-words/201109/is-nonverbal-communication-numbers-game
[7] Source: web.stanford.edu/group/ipc/pubs/2003LaPlante.pdf
[8] Source:  dornsife.usc.edu/new/stories/2792/audio-quality-influences-whether-you-believe-what-you-hear/

## How is quality of service typically measured?

Telecoms teams typically measure their quality of service (QoS) using network monitoring. This will look at their internal network infrastructure and effectively monitor uptime/downtime and outages within their network. It will also generate a MOS (mean opinion score) by analysing network performance metrics such as packet loss, jitter and latency. The score generated is an assumption of quality based on the performance of data on the internal network.

But there is a spectrum between QoS (managing the technical software/hardware) and QoE or QoP (Quality of Experience or Perception). In the battle for customers, organisations are increasingly looking to improve the experience their customers are getting through their contact centres.

With contact centres measuring their 'typical' KPIs - average talk time, cost-per-call, etc – and telecoms teams with their eyes on the holy grail of 99.999% uptime, audio quality can be left as an afterthought. Or simply 'someone else's' responsibility. Yet, as we've discussed, audio quality can have a major impact on the customer's experience.

## Measuring audio quality objectively

At Spearline, we measure audio quality using the ITU (International Telecommunication Union) standard PESQ

(Perceptual Evaluation of Speech Quality). PESQ is an objective, recognised industry standard that takes into consideration characteristics such as:

- Audio sharpness
- Call volume
- Background noise
- Variable latency or lag in audio
- Clipping
- Audio interference

The test compares an audio output (at the 'listener' end of a phone line) with the original voice recording (played at the 'talker' side), to form a completely objective measure of the real audio being experienced. This is more accurate than other methods of measuring audio quality, which often rely on predictions of audio quality based on network performance. PESQ returns a score from -0.5 to 4.5, with higher scores indicating better quality.

Call audio may never fully experience the ideal PESQ 4.5, where the listener may be completely at ease, with no effort required to focus on the audio message received, but audio experienced at PESQ 3.7 will have no appreciable effort required. With decreasing PESQ scores, the listener must focus, concentrate and work to understand the message, causing fatigue and creating frustration.

| PESQ | Listening effort scale | Codec required | Corresponding bandwidth |
|---|---|---|---|
| 3.80 - 4.50 | Complete relaxation possible; no effort required | G711 or above | 80Kbps |
| 3.30 - 3.79 | Attention necessary; no appreciable effort required | G729 or above | 32 Kbps |
| 2.80 - 3.29 | Attention necessary; small amount of effort required | GSM or above | 28 Kbps |
| 2.40 - 2.79 | Moderate effort required | - | - |
| 2.00 - 2.39 | Considerable effort required | - | - |
| 1.00 - 1.99 | No meaning understood with any feasible effort | - | - |

# Research methodology

The data used for this report comes from Spearline's testing of global inbound voice calls between January 1st 2018 and December 31st 2018.

By inbound calls, we mean calls generated in the country in question (i.e the location of a global toll/toll free contact number), following a call path to a contact centre located in another country.

Calls are generated from physicals servers, located in-country. Testing is enabled to and from 64 countries (as at January 2019).

Through this proprietary infrastructure, over 70 million tests have been conducted since 2011.

The countries included in the analysis for this report have met the following criteria:

- Had regular testing since January 1st 2018
- All tests included in the analysis carried out using in-country PRI lines
- As a minimum, a dataset of 100,000 test calls from that country during 2018

## 56 countries met the criteria to be included in the analysis:

| | | |
|---|---|---|
| Argentina | Indonesia | Singapore |
| Australia | Ireland | Slovakia |
| Austria | Israel | Slovenia |
| Belgium | Italy | South Africa |
| Brazil | Japan | Spain |
| Bulgaria | Kazakhstan | Sweden |
| Canada | Korea South | Switzerland |
| Chile | Latvia | Taiwan |
| China | Lithuania | Turkey |
| Colombia | Malaysia | Ukraine |
| Croatia | Mexico | United Kingdom |
| Czech Republic | Netherlands | United States |
| Denmark | New Zealand | Uruguay |
| Ecuador | Norway | Vietnam |
| Finland | Peru | |
| France | Philippines | |
| Germany | Poland | |
| Greece | Portugal | |
| Hong Kong | Romania | |
| Hungary | Russia | |
| India | Saudi Arabia | |

# Insights - connectivity and audio quality

We looked at the results of test calls placed in each of the 56 countries selected for analysis and this report highlights the poorest and best performing countries for both connectivity and audio quality.

## 2018's poorest performers for connectivity

The three lowest performing countries for average connection rates/ASR (answer-seizure ratio) in 2018, were:

| Country | Connectivity rate/ASR |
|---------|----------------------|
| Turkey | 93.52% |
| Mexico | 96.23% |
| India | 96.46% |

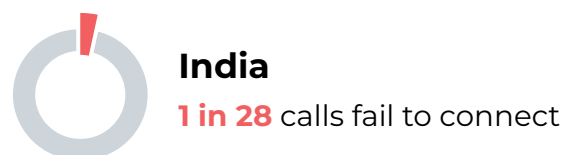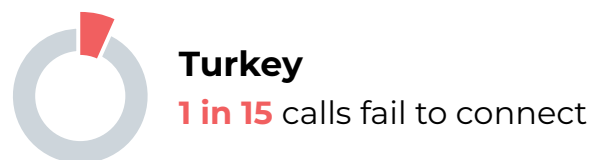## Factors that impact quality in these countries

There are some factors which influence connectivity in every country, including local management of public infrastructures, carrier-level change management, and natural disasters. All three of these countries were also impacted by other varying pressures though.

In Turkey, the tightening of regulations caused interconnect difficulties between carriers and had a large impact on connection rates, especially for numbers terminating internationally.

In Mexico, a large percentage of toll free numbers (TFNs) are ultimately provided by one carrier. During 2018, this carrier experienced ongoing capacity issues, which resulted in

customers being played a message from the carrier, stating that the number was experiencing high volume and to call back later. This had a detrimental effect on connection rates throughout 2018.

While Mexico and Turkey have traditionally had connection issues, the scale of the issues India saw in 2018 is new. The well documented transition[9] which Reliance Communications Group is currently going through has caused issues, not just on their services, but also on the interconnections with other carriers. Added to this, the construction work surrounding a long-awaited new metro (rapid transit) service in Mumbai had a surprise negative impact on telecoms performance when multiple fibre optic cables were accidentally cut, causing numerous large outages.

### Turkey
**1 in 15** calls fail to connect

### Mexico
**1 in 26** calls fail to connect

### India
**1 in 28** calls fail to connect

[9] Source: timesofindia.indiatimes.com/business/india-business/reliance-communications-group-head-count-falls-94-to-3400-people/articleshow/64582711.cms

## 2018's highest performing countries for connectivity

The three top performing countries for average connection rates/ASR in 2018 were:

| Country | Connectivity rate/ASR |
|---|---|
| Slovakia | 99.87% |
| United Kingdom | 99.84% |
| Germany | 99.83% |

## Factors that support quality in these countries

Connection rates in Germany, Slovakia and the UK remained excellent in 2018. This is mainly driven by the number of carriers who continue to deliver excellent levels of service. Carriers such as Colt, Tata and Orange feature as the best performing carriers across all three countries.

It is worth noting that the top performing countries do see variations in connectivity rates. Continuous changes in the network environment as technologies transition, capacity expands, and carrier partnerships and alliances evolve, impact stability and performance. However, anyone seeing average connection rates consistently below the above levels in these countries should probably question the service levels being delivered by their carrier(s).

## 2018's poorest performing countries for audio quality

The three lowest performing countries for average PESQ (audio quality) scores in 2018 were:

| Country | PESQ score |
|---|---|
| Peru | 3.33 |
| Israel | 3.50 |
| Ukraine | 3.56 |

There are many factors which can have an impact on audio quality, such as low volume, clipping and audio distortions, but the main cause of poor quality across the world is transcoding.

Transcoding is the compression of audio in order to reduce the bandwidth needed to conduct a call. While transcoding saves on bandwidth it does have an affect on audio quality.

With the majority of our customers terminating calls internationally, the distance calls in these countries traverse is a factor, but excellent audio quality is still possible. In all three of the above countries transcoding was very apparent throughout 2018, with many carriers only ever achieving a maximum of G729 levels of audio quality, regardless of agreed service levels.

Not everyone has to accept such poor performance however. Organizations that are proactively testing their audio quality performance and gaining evidence of transcoding are often able to force change with their carriers when armed with the correct data. There will be more on this when we discuss Israel later.

## 2018's highest performing countries for audio quality

Top performing countries for average PESQ (audio quality) scores in 2018:

| Country | PESQ score |
|---|---|
| Slovenia | 4.21 |
| Australia | 4.12 |
| Switzerland | 4.09 |

With many carriers transcoding in the poorest performing countries, the opposite is true in the above three countries, with most carriers performing excellently. There is still variation within these markets however, with some carriers scoring well below the in-country benchmark.

# Insights - other key findings

With a dataset containing hundreds of millions of individual data points for 2018, we can glean a lot of insights. Here are some of the other trends and headlines we found in our analysis.

## Best country overall for audio quality and connectivity

The highest performing country overall, that's not already been mentioned in this report, was Sweden. Ranking 6th for connectivity and 7th for average PESQ score, it was one of only three countries to rank in the top 10 for both connectivity and audio quality.

## The award for most improved audio quality goes to ...

Having been mentioned as one of the poorest performing countries for audio quality, Israel can perhaps take consolation from also finding itself one of the most improved throughout 2018. While its average PESQ score for the year was 3.50, significant improvements were made in the last quarter. The main factor driving these improvements is carriers now offering G711-level quality of service. If this trend continues, Israel will most definitely not be finding itself as one of the poorest performing countries in 2019.

## Who saw the biggest fall in the connectivity charts?

Chile hasn't featured on any of the other lists in this report, but stand out as having suffered the biggest degradation in connectivity throughout 2018. It experienced the largest drop in connection rates, with 97.94% of all calls connecting in January compared to 95.03% in December. Capacity issues have been a factor for some carriers in Chile throughout 2018 but we're watching it closely and it's worth noting that improvements can already be seen in 2019.

## Post dial delay

We measure post dial delay (PDD) as the time between dialling and the call being answered. For a customer, a long delay before hearing their call being answered can be an early red flag as to the quality of the call. ITU standards indicate a global benchmark target of no more than 8s PDD for international connections. Our testing reveals that, while some countries enjoy PDD significantly under this benchmark, others are performing at levels significantly over the 8s target.

| 3 worst countries for PDD: | | 3 best countries for PDD: | |
|---|---|---|---|
| Vietnam | 13.65s | Slovenia | 2.43s |
| Philippines | 10.91s | Bulgaria | 2.83s |
| Brazil | 10.18s | Belgium | 2.83s |

## China vs. USA

Some of the winners and losers identified in this report may be seen as smaller players in the global war for customers and market share. So how do the two big hitters compare? Well, in the battle for telecoms performance at least, the USA is still in the lead across the board:

**USA rankings:**

| 9th for audio quality (4.03 PESQ score) |
|---|
| 26th for connectivity (99.5%) |
| 20th for PDD (4.33s) |

**China rankings:**

| 30th for audio quality (3.82 PESQ score) |
|---|
| 33rd for connectivity (99.09%) |
| 50th for PDD (8.37s) |

# Conclusion

Connection and audio quality can both be very variable, both across and within countries. And it may be surprising to learn that the best and worst countries are not necessarily the same across connectivity and audio quality. Indeed, they're not.

Perfect quality is impossible to achieve, even in a high performing country. Even still, you can make significant improvements by choosing the right routes and the right carriers, even in a poor performing country. Achieving these improvements requires paying close attention to the quality you are achieving on a daily, hourly or even more granular basis, to identify when and where issues are occuring. This is especially important for the countries that perform poorly, but not just the six highlighted in this report. Many countries in our analysis failed to reach an average PESQ score of 3.8 (the threshold for when audio quality is deemed to allow complete relaxation; with no effort required from the listener.)

That said, results of the testing Spearline carried out in 2018 showed overall improvements in both connection rates and audio quality for the majority of our customers throughout the year.

**Disclaimer:** The consistent improvements seen by the majority of our customers throughout the year are more than likely attributable to them having improved visibility of their performance, and that of their carriers through regular testing.

Typically, when armed with evidence of poor performance, organizations are better able to hold suppliers to agreed service level agreements, as well as making better-informed routing decisions, thus improving the audio quality seen over time. We can't guarantee that this pattern would have been seen by everyone outside of our customer-base.

![Spearline logo] spearline®

For more information on testing your connectivity and audio quality, visit **www.spearline.com**

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