

umlaut

Part of Accenture

connect

THE 2022 FIXED-LINE BROADBAND BENCHMARK IN THE NETHERLANDS



Having tested the Dutch mobile networks various times, the benchmarking expert umlaut and connect magazine now also take a closer look at the fixed-line broadband connections in the Netherlands.

The fixed-line evaluation is based on a sophisticated crowdsourcing methodology, which provides informative insights about the actual data rates and latencies which arrive at the users' devices.



RESULTS IN A NUTSHELL

For the first time in the Netherlands, umlaut and connect have used umlaut’s sophisticated crowdsourcing approach to offer a comprehensive look at the user experience of Dutch fixed-line customers. The results reveal three very good fixed-line offerings and one follower achieving the overall grade “good”.

The network benchmarks conducted by umlaut, part of Accenture, and connect are widely accepted as the de-facto industry standard and for being highly objective. With a further refinement of the crowdsourcing methodology already known from umlaut’s accredited mobile network benchmarks, it became also possible to analyze the main performance KPIs of fixed-line services. Thus, umlaut and connect have taken a closer look at the fixed-line networks in the Netherlands.

The 2022 umlaut connect Fixed-Line Broadband Benchmark for the Netherlands is based on 3,048,708 samples which have been gathered in the 24 weeks between mid-July and end of December, 2021, from 53,000 fixed lines in the Netherlands. Its carefully designed methodology provides profound insights into the actual user experience of Dutch fixed-line customers. Using a complex set of rules and comprehensive checks, umlaut has ensured the validity of its evaluations.

ZIGGO IS THE OVERALL WINNER. KPN RANKS SECOND AND T-MOBILE THIRD – ALL THREE WITH THE GRADE VERY GOOD. TELE2 FOLLOWS ON A GOOD FOURTH RANK.

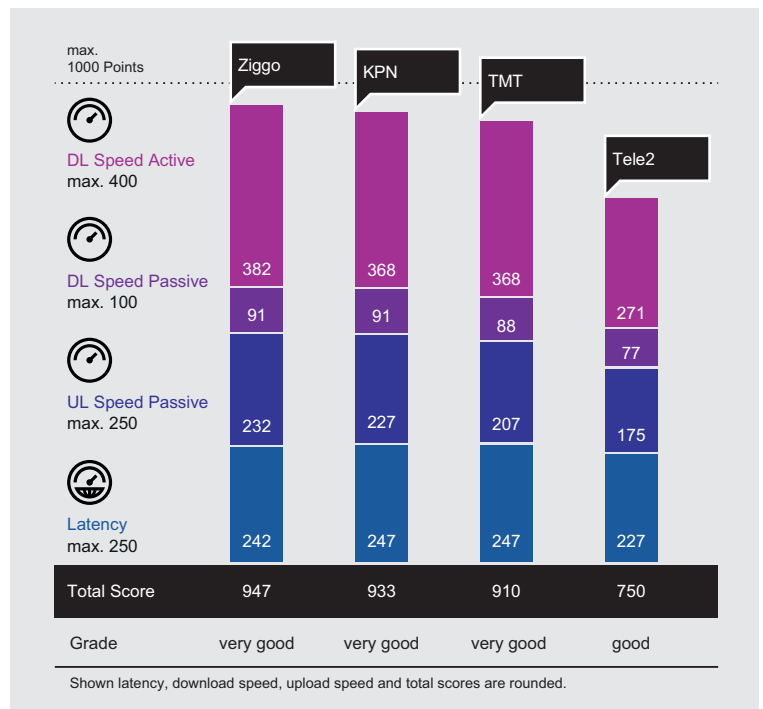
With very strong results overall and particularly in the categories of the active download tests and the passive upload observations, Ziggo is the overall winner with the grade “very good”.

KPN achieves a very good second rank, showing particularly strong results in the active and passive download assessments as well as in the observed latencies. Above that, KPN achieves particularly high data rates on its fibre lines – showing the effects of recent investments in this area. Furthermore, KPN is the local champion in the province of Limburg, also with the grade “outstanding”.

T-Mobile (in our tables “TMT”), rated as the operator of the fixed network of the same name, achieves also a very good overall result. The operator is also local champion in the province of Overijssel, where it even receives the grade “outstanding”. Although being part of T-Mobile now, Tele2 is evaluated separately based on the operator designation of its fixed-line connections. Overall, Tele2 ranks fourth, but still achieves a good result. It even manages to pass its parent company in Gelderland, Noord-Holland and Utrecht.



Ziggo is the overall winner with the grade “very good”. In the local analyses of larger Dutch provinces, Ziggo even receives the rarely awarded grade “outstanding” in Gelderland, Noord-Holland and Utrecht.



Overall Results	Ziggo	KPN	TMT	Tele2
Download Speed Active max. 400P.	382	368	368	271
in Percent	95%	92%	92%	68%
Download Speed Passive max 100P.	91	91	88	77
in Percent	91%	91%	88%	77%
Upload Speed Passive max 250P.	232	227	207	175
in Percent	93%	91%	83%	70%
Latency max. 250P.	242	247	247	227
in Percent	97%	99%	99%	91%
Connect Rating max. 1000P.	947	933	910	750

Percentages and points rounded to integer numbers.
For the calculation of points and totals, the accurate, unrounded values were used.

THE DUTCH FIXED-LINE OPERATORS

Although there is a number of locally active smaller fixed-line providers, in order to ensure the statistical relevance of this broadband benchmark's results, umlaut and connect concentrate on the large, nationwide fixed-line network operators in the Netherlands. Behind the four largest networks are now three operators, because the formerly individual Tele2 network is now part of T-Mobile Netherlands.



The Dutch subsidiary of the international Vodafone Group acquired the operator Libertel in 2003, forming Vodafone Netherlands. In 2016, it merged with the cable and fibre operator Ziggo. Today, 50 per cent of the joint company Vodafone-Ziggo is owned by the Vodafone Group and another 50 per cent by Liberty Global.

In its Q3 2021 report, Vodafone-Ziggo specifies 3.7 million fixed (broadband, video and telephony) subscribers. 1.5 million of these households are designated as "converged households" – meaning that they use both the mobile and the fixed-line network of the operator. Based on this number, Vodafone-Ziggo has currently the biggest fixed-line market share in the Netherlands.

Also according to Vodafone-Ziggo's latest publications, the company's fixed-line network reaches approx. 7.3 million "homes passed" – the theoretical number of households to which the operator could provide its fixed-line services.



The Koninklijke PTT Nederland N.V. emerged from the privatisation of the formerly state-owned PTT in 1998. For the third quarter of 2021, the company reported to serve a total of 1,5 million fixed-mobile households and a total of 1.3 million fixed-only households. These numbers are amended by about 334,000 broadband lines supplied to business customers, resulting in approx. 3.1 million fixed-line customers altogether. Approx. 2.2 million of them are also interactive TV customers. Based on current customer numbers, KPN is the second largest fixed-line operator in the Netherlands. According to the figures published in KPN's annual reports, a large proportion of the fixed-line households are connected via fibre. This corresponds with the company's own disclosure that it has recently surpassed 3 millions "homes passed" by its FTTH network and a total of approx. 8.9 million homes and offices passed by its fixed line network on the whole. Also, in early 2021, KPN and the Dutch pension fund APG announced the start of their joint fibre company "Glaspoort", which is scheduled to invest more than €1 billion in the construction of approximately one million fibre connections in villages, small residential areas and business parks.



In 2000, Deutsche Telekom bought a minority of the Dutch mobile network operator Ben, which was later extended to a 100 per cent acquisition. In 2003, Ben was renamed T-Mobile Netherlands, with the brand "Ben" becoming a "no-frills" offer within its portfolio. In 2007, T-Mobile NL additionally acquired Orange. The acquisition of Thuis in 2016 marked T-Mobile NL's entry into the fixed broadband market. At the end of 2018, the company completed its acquisition of the smallest Dutch operator, Tele2, which brought both its own mobile as well as its own fixed-line network to the merger. By now, also the technical infrastructure of the formerly separate carriers has been merged, with Telekom holding 75 per cent and Tele2 holding 25 per cent of the assets. The company also announced a strategic partnership with Open Dutch Fiber in 2021. In the fall of 2021, T-Mobile Netherlands was acquired by the private equity investors Apax and Warburg Pincus. At this time, the company reported a total of 6.9 million customers, of which approx. 700,000 were fixed-line broadband customers. As many users currently still use their existing contracts, the fixed-line networks of T-Mobile NL and Tele2 appear separately in umlaut's crowd assessment.

A CLOSE LOOK AT THE DUTCH FIXED LINE NETWORKS

The network benchmarks conducted by umlaut and connect are widely accepted as a completely objective authority. In 2022, we present the umlaut connect Fixed-Line Broadband Benchmark in the Netherlands for the first time.



umlaut, headquartered in Aachen, Germany, is a world leader in mobile network testing. The company was formerly known as P3 communications, changed its name in autumn 2019, and has become a part of Accenture in 2021. umlaut has over 4,300 employees, distributed in over 50 locations all around the world, with a turnover of more than 400 million Euros. umlaut is partnering with the international telecommunications magazine connect, which has 28 years of editorial expertise and is one of the leading test authorities in Europe for telecommunication products and services. Together, we – umlaut and connect – have been conducting the most important mobile network benchmark test in Germany for almost 20 years, extending it to other European countries since 2009.

As the de-facto industry standard, the methodology of these benchmarks focuses on customer-perceived network quality. In addition to measurements performed in drive and walktests, they also include refined crowdsourcing analyses.

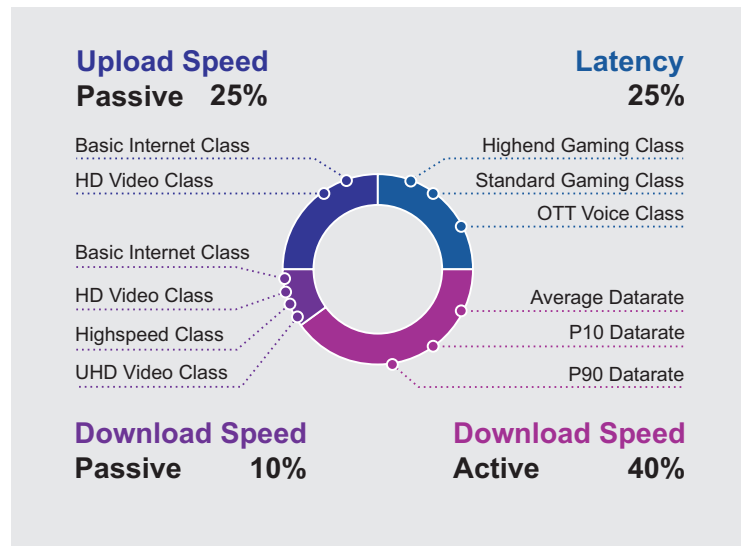
By carefully filtering and validating these crowdsourced data (also see Methodology on page 10 for details), umlaut can use its sophisticated crowdsourcing platform also for evaluating fixed-line connections. These evaluations investigate the results from active and passive speed measurements as well as the determined latencies of the network connections. The 2022 umlaut connect Fixed-Line Broadband Benchmark in the Netherlands is based on this approach. It takes into account 3,048,708 samples which have been gathered in the 24 weeks between mid-July and end of December, 2021, from 53,000 fixed lines in the Netherlands.

Congratulations to Vodafone-Ziggo for winning the 2022 umlaut connect Fixed-Line Broadband Benchmark in the Netherlands! Our assessment shows that great efforts in enhanced the fixed-line network expansion are worthwhile in order to offer customers reliability, high data rates and low latencies. The results achieved by KPN and T-Mobile are also very convincing and absolutely deserve the awarded grade “very good”. Tele2 shows some opportunity for improvement, but still reaches a good result. Overall, Dutch customers can be quite pleased with the user experience of their fixed-line connections.”

Hakan Ekmen, CEO umlaut

CROWDSOURCING FACTS

53,003 fixed-line connections providing relevant samples	3.05 million samples	24 weeks (mid-July to end of December, 2021)
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ACTIVE DOWNLOAD SPEEDS

The largest share of umlaut's scoring (40 percent) is assigned to the maximum download speed of the considered fixed lines. This is achieved by actively initiating measurements which utilise the connections to the max.

When passively observing the data rates of the downloads which are called up by the used applications, the results are depending on the requirements of these applications. As umlaut's approach is focused on the actual user experience, this method is of course valid. Still, the evaluation should also take into account the maximum performance of the connection between the user's devices and the networks. umlaut achieved this by actively initiating a speed measurement in the background from time of time. As fixed-line contracts typically do not have data contingents, this does not negatively affect the participating users.



ACTIVE DOWNLOAD SPEEDS A GLANCE

In the average and basic 90 percent (P90) aggregations of the active download data rate measurements, Ziggo leads the field. When focusing on the top 10 percent (P10) value, KPN is closely ahead of Ziggo. T-Mobile achieves the second place in the average and P10 evaluations – there, KPN follows closely at the third rank. Tele2 shows potential for improvement in all aggregations of the active measurements.

AVERAGE DATA RATE

ZIGGO

THE INVESTIGATED AVERAGE DATA RATES ARE HIGHEST IN THE ZIGGO NETWORK, FOLLOWED AT SOME DISTANCE BY T-MOBILE AND KPN

With 95 percent of the achievable points in this subcategory, Ziggo leads this consideration. T-Mobile (in our tables "TMT"), follows at some distance on the second rank, and KPN on the third. Tele2 users are somewhat lagging behind.

DL Speed Active

400 of 1000 Points



Ziggo
KPN
TMT
Tele2



BASIC 90 PERCENT (P10)

ZIGGO

ZIGGO AHEAD IN ACTIVELY DETERMINED DOWNLOAD RATES FOR 90 PERCENT OF THE SAMPLES, FOLLOWED BY T-MOBILE AND KPN

The P10 value of a distribution is the value which is surpassed by 90 percent of all samples. Thus it indicates the experience available to most users. In this consideration "across the board", Ziggo clearly leads the field, followed at some distance by T-Mobile and after that closely by KPN. Tele2 ranks last.



TOP 10 PERCENT (P90)

KPN

KPN IS AHEAD IN THE TOP 10 PERCENT RESULTS OF THE ACTIVE DOWNLOAD MEASUREMENTS. PARTICULARLY GOOD RESULTS ON KPN'S FIBRE LINES.

Reciprocally, the P90 value shows the top 10 percent in the results' statistical distribution – and thus what can be achieved at the peak. Here, KPN is closely ahead of Ziggo, with T-Mobile following close behind and Tele2 at some distance. A closer investigation of the data rates shows that KPN scores particularly well on its fibre lines, emphasizing the effects of their recent investments.



Operator	Ziggo	KPN	TMT	Tele2
DL Speed Active		KPI values		
Average Datarate (kbps)	71267	51303	57037	26839
P10 Datarate (kbps)	9082	9242	7626	5096
P90 Datarate (kbps)	181246	100633	106754	54859

Percentages and points rounded to integer numbers. For the calculation of points and totals, the accurate, unrounded values were used.



PASSIVE DOWNLOAD SPEEDS

10 percent of the overall score are derived from the passive measurement of download speeds in the background. This takes into account the performance of applications that users really use in everyday life.

When users are surfing the web, communicating via messaging services or use specific apps, this automatically results in the transmission of data in both directions – downloads and uploads. Although these data rates are influenced by what requirements the respective apps have, they are a valid representation of the users’ network experience. In addition, the large number of connections taken into account largely balances out individual user profiles.



PASSIVE DOWNLOAD SPEEDS AT A GLANCE

In the passive download assessment, Ziggo and KPN are on a par and leading the field. In the basic speed class, requiring a minimum of 2 Mbps, the “HD Video” class (minimum 5 Mbps), and the “UHD Video” class (minimum 20 Mbps), KPN leads the field. In the highest requirement class, “Highspeed”, Ziggo scores best, closely followed by KPN and T-Mobile. In each of the aggregations, Tele2 shows potential for improvements.

BASIC INTERNET CLASS

KPN

KPN LEADING CLOSELY AHEAD OF ZIGGO IN BASIC INTERNET SPEEDS

In the “Basic Internet” speed class, a minimum of 2 Mbps is required – typical data rates for surfing or messaging. In this aggregation, KPN scores slightly ahead of Ziggo and – at a larger distance – T-Mobile and Tele2.

HD VIDEO CLASS

KPN

KPN ALSO CLOSELY AHEAD OF ZIGGO AND T-MOBILE IN HD VIDEO SPEED CLASS

The “HD Video” class is defined by a minimum data rate of 5 Mbps. Again, in this aggregation KPN scores minimally higher than Ziggo, and at a little more pronounced gap T-Mobile. Tele2 once more shows some potential for improvement.

UHD VIDEO CLASS

KPN

KPN TAKES THE LEAD AHEAD OF ZIGGO AND T-MOBILE IN DOWNLOAD DATA RATES IN UHD VIDEO SPEED CLASS

In the “UHD Video” class, umlaut requires a minimum data rate of 20 Mbps. Again, KPN scores ahead of Ziggo and T-Mobile, each at close distance. This time as well, Tele2 scores a little behind.

HIGHSPEED CLASS

ZIGGO

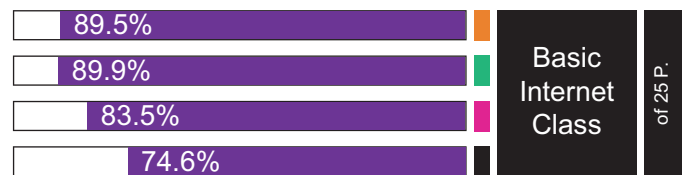
ZIGGO IS CLOSELY AHEAD OF KPN AND T-MOBILE IN THE MOST DEMANDING HIGHSPEED DOWNLOAD CLASS

With a minimum requirement of 50 Mbps, “Highspeed” is the most demanding speed class. Here, Ziggo leads the field at a close gap ahead of KPN and T-Mobile. Tele2 falls a little further behind.

DL Speed Passive

100 of 1000 Points

- Ziggo
- KPN
- TMT
- Tele2



Operator	Ziggo	KPN	TMT	Tele2
DL Speed Passive		KPI values		
Basic Internet Class	96.1%	96.2%	95.0%	93.4%
HD Video Class	88.2%	88.4%	87.3%	80.8%
Highspeed Class	10.3%	10.1%	9.7%	8.1%
UHD Video Class	35.4%	35.9%	35.1%	29.7%

Percentages and points rounded to integer numbers. For the calculation of points and totals, the accurate, unrounded values were used.



PASSIVE UPLOAD SPEEDS

The passively observed upload data rates contribute 25 percent to the total score. This is particularly relevant for users who regularly send large amounts of data into the net or to other users.

Network access targeted at private customers, generally prioritizes downloads over uploads. This is based on the expectation that users overall retrieve much more data from the net than they send back themselves. And it is the reason why in typical consumer lines, the download bandwidth is usually much higher than the possible upload data rates. While this is justified in most cases, it can lead to bottle necks when users want to send large amounts of data such as photos, videos or large files. Thus, the upload measurements are also an important aspect of evaluating fixed-lines. As the available data rates are generally more limited in this category, noteworthy shares of the evaluated samples are only achieved in the speed classes below 20 Mbps.



PASSIVE UPLOAD SPEEDS AT A GLANCE

It is particularly the upload category in which Ziggo makes its overall victory clear. In both considered speed classes, the lead of this operator is undisputed. In both cases, KPN follows at close distance, and T-Mobile at a more distinct gap. The distance of Tele2 to the rest of the field is somewhat less pronounced than in the download category – which can be explained by the generally lower upload bandwidths.

BASIC INTERNET CLASS

ZIGGO

ZIGGO LEADS AHEAD OF KPN IN BASIC INTERNET UPLOAD SPEED CLASS

In the “Basic Internet” speed class, which requires upload data rates of at least 2 Mbps, Ziggo achieves the highest number of samples fulfilling this requirement. KPN follows at a close gap, while the distance over T-Mobile is a little more distinct. Tele2 ranks last, but its gap to the third-ranking contender is smaller than in other categories of this benchmark.

HD VIDEO CLASS

ZIGGO

ZIGGO IS ALSO AHEAD OF KPN AND T-MOBILE IN HD VIDEO UPLOAD SPEEDS

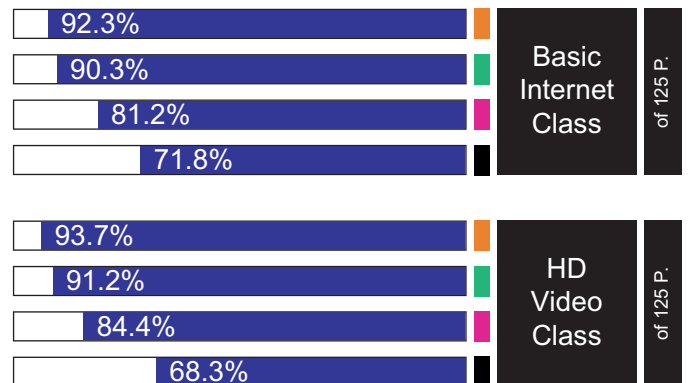
More or less the same that in the “Basic Internet” speed class also applies to the speed class above it, “HD Video“. Again, Ziggo leads the field, at a small but noticeable gap ahead of KPN. T-Mobile ranks third and Tele2 fourth – but this time the gap between the third and the second rank is a little smaller, while the distance between the third and the fourth ranking contenders becomes a little more pronounced.

UL Speed Passive

250 of 1000 Points



- Ziggo
- KPN
- TMT
- Tele2



Operator	Ziggo	KPN	TMT	Tele2
UL Speed Passive	KPI values			
UL Basic Internet class	53.4%	47.8%	44.4%	41.5%
UL HD Video class	50.2%	44.3%	39.6%	33.9%

Percentages and points rounded to integer numbers. For the calculation of points and totals, the accurate, unrounded values were used.

LATENCIES

Depending on the applications, the latency or reaction time of data transfers becomes increasingly more important. Thus, umlaut's assessment of this value contributes 25 percent to the overall score.

The latencies or reaction times of data transfers influence the user experience to a large extent. Even when using OTT (over the top) services such as telephony or interactive media, a too pronounced lag has a disturbing effect. This becomes even more relevant when it comes to gaming – when ultrafast reactions are required, the technical latency of a player's connection can make all the difference. For the crowd-based assessment, umlaut actively initiates latency investigations – they are carried out in direct succession after the active download measurements.



LATENCIES AT A GLANCE

In the latency assessment, KPN and T-Mobile are on a par and leading, with Ziggo following. In the "OTT Voice" class, KPN leads closely ahead of T-Mobile and Ziggo – with a thin margin of 0.2% between each of them. In the "Standard Gaming" class, T-Mobile is ahead of KPN by just 0.1%, followed by Ziggo. In "Highend Gaming", KPN and T-Mobile are on a par, ahead of Ziggo. The gaps to Tele2 are existant, but smaller than observed in the download categories.

OTT VOICE CLASS

KPN

KPN CLOSELY WINS NECK AND NECK RACE FOR OTT VOICE CLASS LATENCY JUST AHEAD OF T-MOBILE AND ZIGGO

In the lowest determined latency class, "OTT Voice" (up to 100 ms), KPN, T-Mobile and Ziggo score extremely close together. KPN wins this neck and neck race, followed by T-Mobile and Ziggo – each at a thin margin of 0.2%. The gap of Tele2 is more pronounced.

STANDARD GAMING CLASS

T-MOBILE

T-MOBILE LEADS LATENCIES CATEGORY IN STANDARD GAMING CLASS AT RAZOR THIN MARGIN AHEAD OF KPN

umlaut defines the "Standard Gaming" class as samples with a latency of up to 50 ms. Here, T-Mobile leads by a razor thin margin of just 0.1% ahead of KPN. The gap to Ziggo is a little wider and the distance between Ziggo and Tele2 a little more distinct.

HIGHEND GAMING CLASS

KPN & T-MOBILE

KPN AND T-MOBILE ON A TIE IN LATENCY ASSESSMENT FOR HIGHEND GAMING CLASS

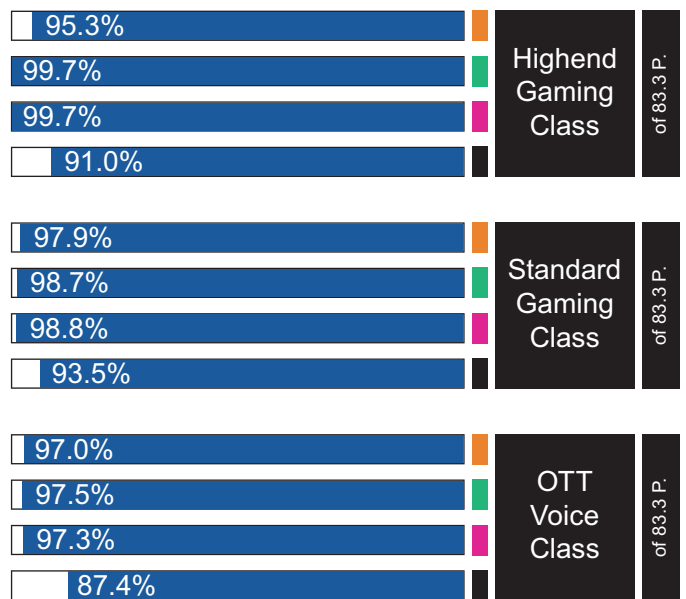
"Highend Gaming" such as ultra fast action games require latencies of 20 ms and below. In this category of umlaut's latency evaluations, KPN and T-Mobile are on a par, with Ziggo and Tele2 each following at not much distance.

Latency

250 of 1000 Points



Ziggo
KPN
TMT
Tele2



Operator	Ziggo	KPN	TMT	Tele2
Latency	KPI values			
Highend Gaming Class	61.4%	74.3%	74.1%	48.8%
Standard Gaming Class	95.5%	96.4%	96.6%	90.2%
OTT Voice Class	98.6%	98.8%	98.7%	94.5%

Percentages and points rounded to integer numbers. For the calculation of points and totals, the accurate, unrounded values were used.

THE DUTCH PROVINCES

In addition to the nationwide assessment, umlaut has also evaluated the local results achieved in the larger of the Dutch provinces. With these analyses, inhabitants of the included parts of the country can check which operator may locally be the best choice.



umlaut’s crowdsourcing methodology allows to take smaller local entities under the magnifying glass. This was executed for the larger of the Dutch provinces. However, to ensure statistical robustness, the following evaluations had to be limited to provinces with at least one million inhabitants. This is why provinces such as Drenthe, Friesland, Groningen or Zeeland could not be part of these even more detailed analyses.

GELDERLAND, NOORD-HOLLAND AND UTRECHT: ZIGGO LEADS AHEAD OF KPN, TELE2 PASSES T-MOBILE

In Gelderland, Noord-Holland and Utrecht, with scores of or above 950 points, Ziggo even achieves the seldomly awarded grade “outstanding”. KPN is overall very good in these three provinces. Also, in all three of them, Tele2

manages to outscore its parent company T-Mobile – mostly due to strong results in the active download category.

LIMBURG: KPN AHEAD OF ZIGGO, T-MOBILE RANKS THIRD

In Limburg, KPN manages to outscore Ziggo due to strong upload results – and is also awarded the rare grade “outstanding”. Ziggo ranks second, followed at some distance by T-Mobile. In this province, Tele2 only achieves the grade “satisfactory”, as it loses valuable points in all data rate categories.

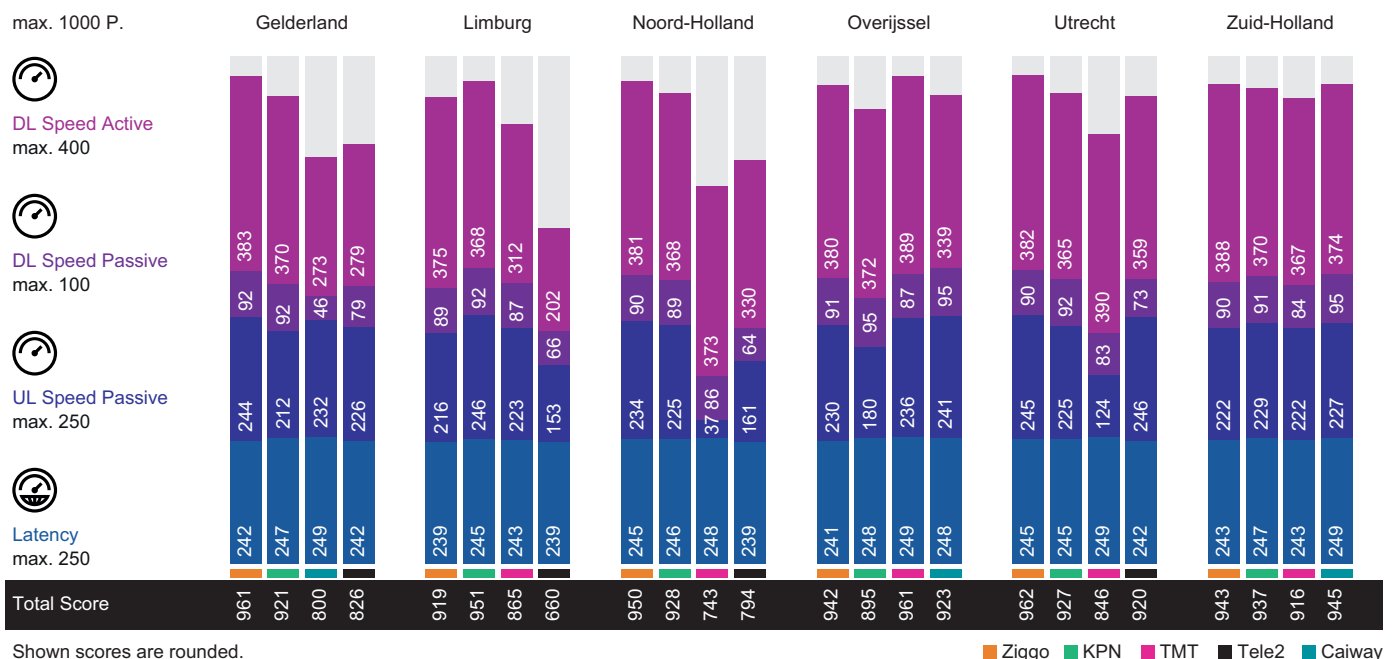
OVERIJSEL: “OUTSTANDING” T-MOBILE IS LOCAL CHAMPION, AHEAD OF KPN AND CAIWAY

In Overijssel, T-Mobile is not only awarded the highest score, but also achieves the grade “out-

standing”. Ziggo ranks second. The third rank is achieved by the local fixed-net operator Caiway, which for reasons of statistical robustness was only taken into account in Overijssel as well as in Zuid-Holland. In Overijssel, KPN ranks fourth – but still with a very good results, the same as Ziggo and Caiway.

ZUID-HOLLAND: LOCAL CHAMPION CAIWAY OUTSCORES ZIGGO AND KPN

In Zuid-Holland, the local operator Caiway even leads the field – mostly due to very good upload results. Caiway is closely followed by Ziggo and KPN. Here, T-Mobile ranks fourth – but all four operators deservedly receive the grade “very good”.



METHODOLOGY

The methodology of the umlaut connect Fixed-Line Broadband Benchmark is based on a sophisticated crowdsourcing approach. It was carefully designed to evaluate and objectively compare the performance of fixed-line networks from the users' perspective.

The umlaut connect Fixed-Line Broadband Benchmark in the Netherlands is based on a sophisticated crowdsourcing approach.

DATA GATHERING

The analyses are based on data gathered in the 24 weeks between calendar week 29 (mid-July) until calendar week 52 (end of December), 2021.

In the process, a total of 3,048,708 samples from 53,003 Dutch fixed lines were evaluated.

For the data collection, umlaut has integrated a background diagnosis process into more than 1000 diverse Android apps. If one of these applications is installed on the end-user's phone and the user authorizes the background analysis, data collection takes place 24/7, 365 days a year. Samples are generated in specific intervals (from one second up to 15 minutes and sent daily to umlaut's cloud servers, where the data is further processed.

By filtering the network access technology to those samples collected via Wi-Fi (in contrast to mobile network connections) and identifying the network operator, the

collected samples can be confined to fixed-line connections. Using a complex set of rules and comprehensive checks, umlaut hardens the validity of the evaluations. Among other things, data recorded when the smartphone battery is low is filtered out, as are measurements when the transfer volume is too low or extremely low data rates indicate interference. The influence of the mobile devices is likely to be small. The Wi-Fi speeds achievable on current smartphones are usually significantly higher than the total data rates shown.

PASSIVE DATA RATES

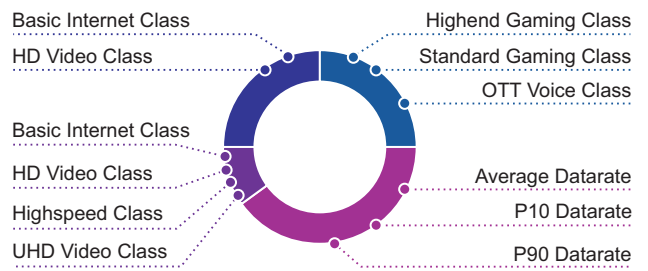
The passive gathering of the data rates observed for downloads and uploads take place in the background while the user's employ everyday applications on their devices such as web browsing, messaging or gaming. In order to classify the observed speeds, umlaut has defined four application-related speed classes: "Basic Internet" requires a minimum of 2 Mbps, "HD Video" requires 5 Mbps, "UHD Video" requires 20 Mbps and "Highspeed" requires 50 Mbps.



The data gathering for umlaut's crowd analyses takes place in the background while the users employ everyday application on their smartphones via fixed-line connections.

Upload Speed
Passive 25%

Latency
25%



Download Speed
Passive 10%

Download Speed
Active 40%

The observed passive download speeds make of 10% of the total result, the upload speeds contribute 25% to the total result.

ACTIVE DATA RATES

As the passively observed speeds depend on the demands of the applications actually used, umlaut's platform also initiates active speed measurements from time to time. They can determine the maximum performance available on the end device, thus reflecting the user-oriented fixed network experience – including additional influencing factors such as the performance of the Wi-Fi router used. The tables indicate the active download data rate that exceeds 90% of the measured values. This parameter thus shows how good the user experience of a network operator is across the board. What is possible at the peak is shown by the "maximum speed", which the best 10% of the connections have achieved or even topped. The active speed measurements make up 40% of the overall rating.

LATENCIES

The latency measurements are carried out in the same cycles which are performed for the active download tests – "pings" take place in direct succession to the downloads and make up 25% of the total score. The results are also assigned to an application-related class: Roundtrip times up to 100 ms are sufficient for "OTT Voice", less than 50 ms qualify a sample for "Standard Gaming" and less than 20 ms for "Highend Gaming". The tables in this report show the percentage of the examined connections that were able to achieve the required threshold values in the different classes or did even better.

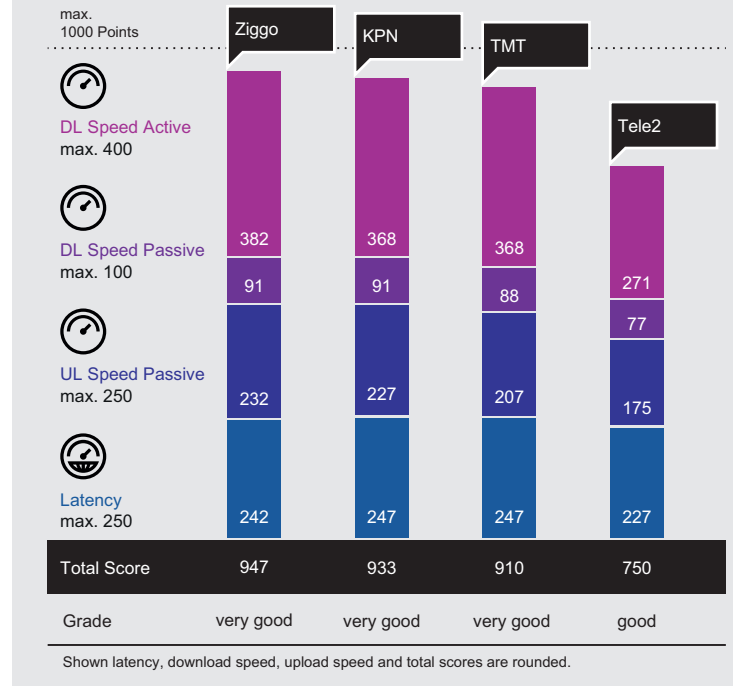
CONCLUSION

The joint company Vodafone-Ziggo is the winner of the 2022 umlaut connect Fixed-Line Broadband Benchmark for the Netherlands. KPN and T-Mobile also achieve very good results, Tele2 receives the overall grade “good”.

With very strong results overall and particularly in the categories of the active download tests and the passive upload observations, Ziggo is the overall winner with the grade “very good”. In the local analyses of larger Dutch provinces, Ziggo even receives the rarely awarded grade “outstanding” in Gelderland, Noord-Holland and Utrecht.

KPN achieves a very good second rank, showing particularly strong results in the active and passive download assessments as well as in the observed latencies. Above that, KPN achieves particularly high data rates on its fibre lines – showing the effects of recent investments in this area. Furthermore, KPN is the local champion in the province of Limburg, also with the grade “outstanding”.

T-Mobile, rated as the operator of the fixed network lines of the same name, achieves also a very good overall result. The operator scores particularly well in the assessment of latencies in the classes of Standard as well as Highend Gaming is also local champion in the province of Overijssel, where it even receives the grade “outstanding”. Although being part of T-Mobile now, Tele2 is evaluated separately based on the operator designation of its fixed-line connections. Overall, Tele2 ranks fourth, but still achieves a good result. It shows particular strength in the latency evaluations and manages to pass its parent company in Gelderland, Noord-Holland and Utrecht.



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in Percent	93%	91%	83%	70%
Latency max. 250P.	242	247	247	227
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Percentages and points rounded to integer numbers. For the calculation of points and totals, the accurate, unrounded values were used.



1
The Vodafone subsidiary clearly wins this benchmark, particularly due to the best results in the active download and passive upload evaluations. Achieving a very good result in the nationwide assessment, Ziggo is also local champion in the provinces of Gelderland, Noord-Holland and Utrecht, where it even receives the grade “outstanding”.

2
The former incumbent achieves a very good second rank. KPN is particularly strong in the P10 evaluation of the active download tests, in the passive download assessments within the Basic and HD video speed classes as well as in the latency evaluation for the Highend gaming class. Also, KPN is local champion in the province of Limburg with the grade “outstanding”.

3
T-Mobile ranks third overall, but still achieves an overall very good result. Above that, it is a local champion in the province of Overijssel, where it even receives the grade “outstanding”. Also, the operator scores particularly well in the assessment of latencies assigned to the classes of Standard as well as Highend gaming.

4
Although Tele2 is now owned by T-Mobile, their fixed lines still carry their own designation, which is why umlaut reports its results separately. However, Tele2 products are no longer for sale, and existing customers are scheduled to be moved to T-Mobile. Overall, Tele2 ranks fourth, but still achieves a good result. It shows some strength particularly in terms of latencies.