

How good is your town's broadband?

A report from Point Topic's Broadband Geography Service

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1 Rising expectations

The availability of broadband has been a significant issue for many districts and regions ever since it started to roll out. But although there are important differences between areas the picture has been fairly static for the last few years.

Now the promise of £530m in UK government funding over the period of the October 2010 Spending Review provides an opportunity for anyone who wants to improve local broadband infrastructure. The money is much less than the £2 billion foreseen under the previous government's scheme. It will not be nearly enough to achieve the objective of 2Mbps broadband for virtually everyone. But it is still a lot of money. Public and private sector players need to grasp the opportunity and make the best of it where they can.

Driven by rising expectations and new technologies, large parts of the UK will see a step improvement in the level of broadband service over the next few years. On the other hand, many areas are in danger of being left even further behind. Local development agencies, communications providers and systems integrators all need to identify where the gaps are going to be and how to fill them. The solutions will vary from wide-area regional schemes, usually with substantial public funding, to small entrepreneurial projects taking advantage of particular local needs and circumstances.

Here, as a first step towards understanding what is needed, we compare the coverage and quality of broadband access infrastructure across the local authorities of the UK. We look at different measures of access network infrastructure and combine them in a single "broadband infrastructure index" which provides a simple way of comparing the overall situation in different areas. The data is all drawn from Point Topic's "BroadBand Layer" database of availability and take-up estimates for every postcode in the UK, using the new V12 edition of the BroadBand Layer.

2 Measures of infrastructure

There is a wide variety of ways of measuring the broadband infrastructure of an area. Here Point Topic focuses on six which cover the various different options between them. They are:

1. Local loop unbundling (LLU) availability; where do operators such as TalkTalk and Sky provide LLU-based services?
2. Twenty-first century network (21CN) roll-out; where is BT's 21CN technology implemented?
3. Cable coverage; where does Virgin Media offer broadband over its cable network?
4. 2Mbps downstream; where can end-users expect to get broadband services of at least 2 megabits per second download speeds, whether over the BT and LLU DSL networks, or by cable or fibre-based "next generation access" (NGA)?
5. Current (end-2010) NGA availability; which areas are enabled for some form of NGA service today?
6. Future NGA prospects; what is the average probability that this area will have NGA service by end-2015?

All these measures can be expressed in the same terms; the percentage of premises (homes and businesses) in the area which have access to each particular feature of broadband infrastructure. Each one is explained in more detail below.

Many broadband players will need to consider each measure separately. A local authority, aiming first to identify the broadband strengths and weaknesses of its area, and then to develop a strategy for leveraging or addressing them, needs to look at the pattern of infrastructure in detail and relate it to local resources. So do providers or communications services, broadband content or equipment.

But in many circumstances a single number which summarises the whole story can be more useful. It allows for simple comparisons between areas and an overall measure of how much the situation is improving over time. So Point Topic has devised a "Broadband Infrastructure Index" by the simple means of taking the average of all six measures.

3 Comparing local authorities

The Broadband Infrastructure Index can be calculated for any area, from a unit postcode upwards. Here Point Topic has done it for each of the 406 Local Authorities in the UK. The results are listed in a separate spreadsheet [Broadband Infrastructure Index 2010.xls](#), ranging from 97.7% for the London Borough of Haringey to 16.0% for Eilean Siar, more familiar to Sassenachs as the Outer Hebrides.

The range is huge reflecting the fact that, although the six infrastructure measures are different, they all tend to run in the same direction. Areas which are prosperous, compact and easy to reach tend to have better than average infrastructure by all the measures. Those which have a high index can expect to get high-speed infrastructure provided through the workings of market forces. Those with a low index will fall even further behind unless there is some degree of intervention, whether using public funds or private contributions.

The map (Figure 1) shows how the index varies by local authority across the UK. To clarify the picture they have been grouped in five bands, from band 1 with an index of under 20% to band 5 with an index of over 80%. It is almost entirely the towns and cities which have the best choice of infrastructure (index over 60%) but many more spread-out areas have a reasonable score (band 3, 40% to 60%).

Figure 2 below shows graphically how the index varies across all the local authorities, using the same bands, and Figure 3 provides the actual figures and describes the type of local authorities which fall in each band. Thus 42 LA's including some 3.7 million homes and businesses have an infrastructure index of over 80%. They are mostly London boroughs or compact urban local authorities in the South and East of England.

Figure 1 Broadband infrastructure index by local authority

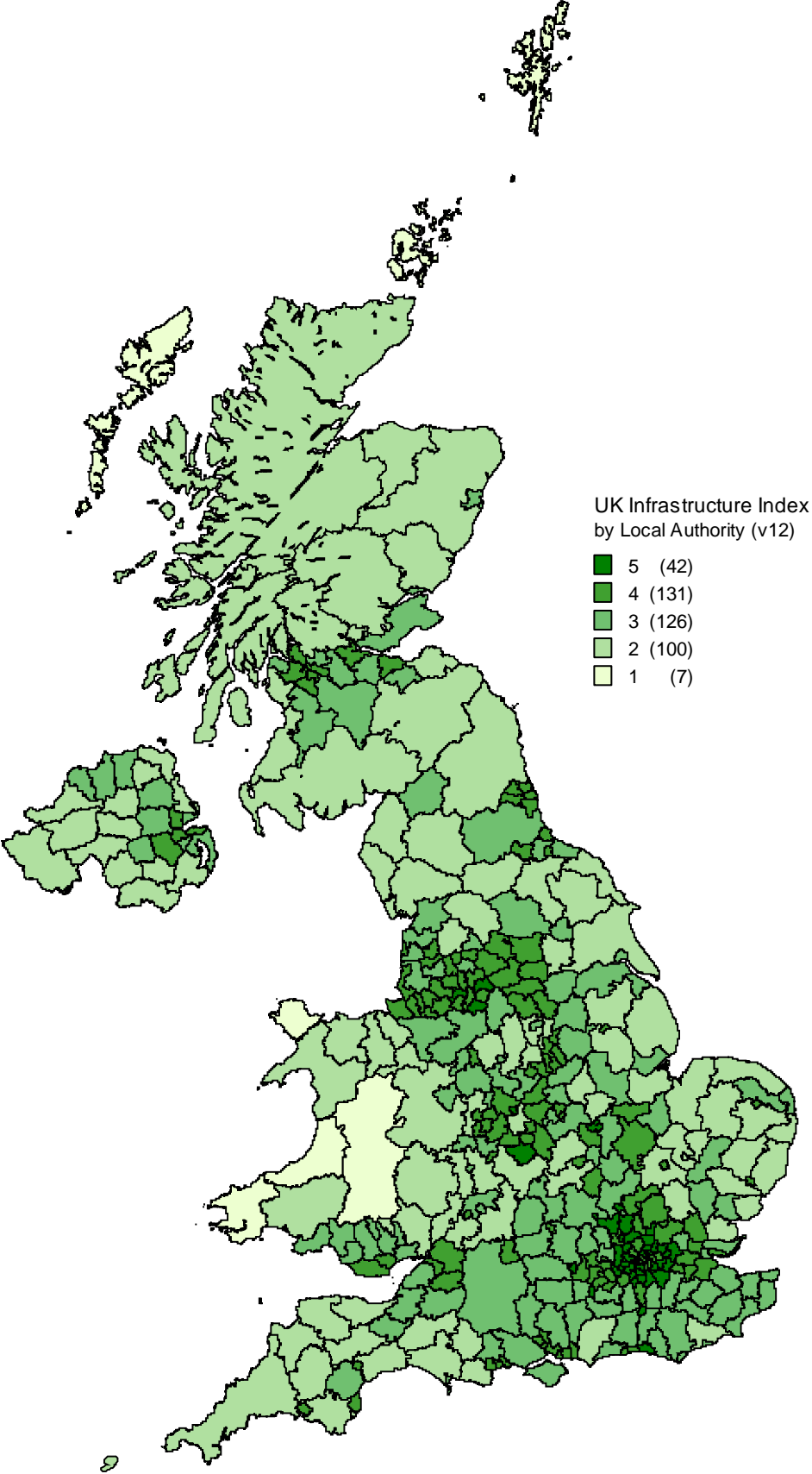


Figure 2 Distribution of the broadband infrastructure index

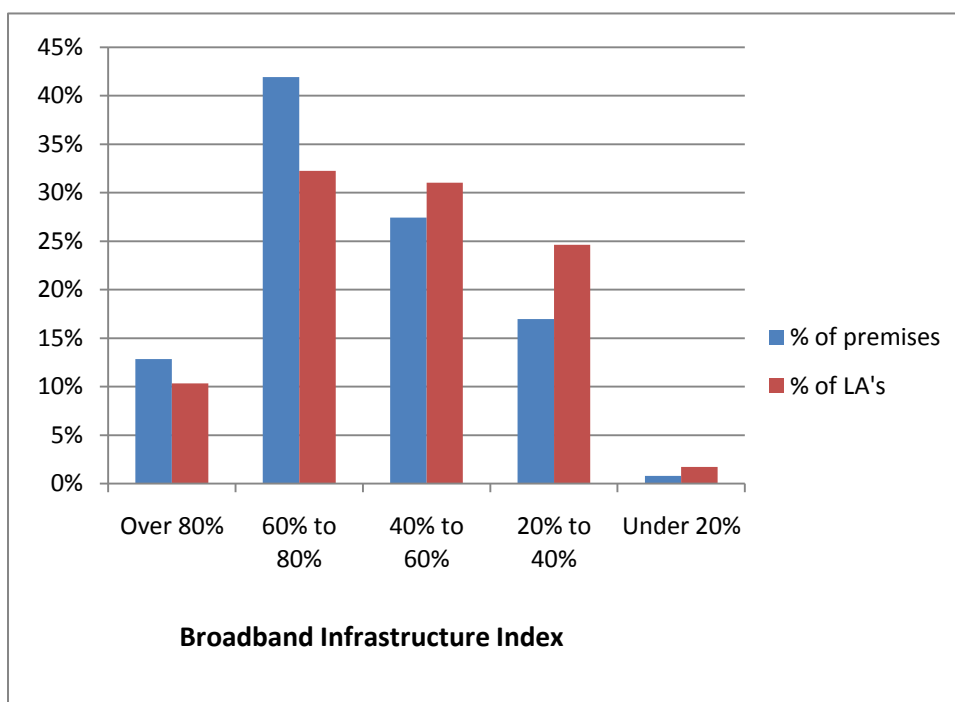


Figure 3 Broadband infrastructure index bands across the UK

Index range	Number of premises	Number of LA's	Typical local authorities	% of premises	% of LA's
Over 80%	3,656,991	42	Many London Boroughs, compact towns and cities, mainly in the south and east of England	12.8%	10.3%
60% to 80%	11,944,150	131	Urban England, the most high density and prosperous areas of Wales, Scotland and Northern Ireland, lower density prosperous areas in England	41.9%	32.3%
40% to 60%	7,812,462	126	Poorer towns and more densely populated country areas throughout the UK	27.4%	31.0%
20% to 40%	4,835,494	100	The more rural local authority areas throughout the UK	17.0%	24.6%
Under 20%	228,056	7	The most hard-to-reach and thinly populated areas of Scotland and Wales	0.8%	1.7%
Totals	28,477,153	406		100.0%	100.0%

Only 7 LA's, with a mere 230,000 premises, have an index of under 20%. They are all Scottish islands or Welsh countryside.¹ A bigger concern is the 100 LA's with 4.8 million premises which have an infrastructure rating of between 20% and 40%. These are mostly rural but a few at the higher end include substantial struggling towns well away from major centres, such as Scarborough or Barrow-in-Furness. These are the areas which will find it most difficult to bring in the investment they need.

4 Improving broadband infrastructure

LLU availability

Local loop unbundling has now reached about 1800 of the 5600 exchanges in the UK, mainly those with more than 4,000 lines. This means that 80% of the homes and businesses in the UK are now in reach of LLU broadband services. TalkTalk, O2 and Orange have built their own extensive networks to support LLU for their retail customers, Cable and Wireless has a wholesale network which is resold by several other ISPs, and a number of smaller ISPs have LLU installations in selected exchanges, mainly focused on business customers.

LLU coverage has brought significant advantages to the areas where it is available. The LLU operators have been able to offer higher broadband speeds, at least to premises which are close enough to the exchange, up to 24Mbps in theory compared with the limit of 8Mbps offered by BT from its ADSL Max exchanges. Perhaps even more important to ordinary consumers they have been able to offer a range of cost-busting bundles of broadband with voice or satellite TV services.

The problem for the have-nots is that the economics of LLU are only attractive for larger exchanges and in areas where the operator has the backhaul infrastructure – access to fibre trunk networks – needed to support large numbers of customers using high bandwidths. The areas which are still without LLU are in a double bind because the factors which made them unattractive for LLU operators will continue to make them difficult for rolling out next-generation networks in future.

It is unlikely that there will be much further development of LLU. The most attractive areas have already been covered and the competitive advantage of LLU will be much reduced by the rollout of BT's 21CN. The availability of LLU may actually delay the progress of NGA as LLU operators aim to maximise return from their existing investment. There will be little scope for local digital partnerships or other players to encourage further investment in this solution.

21CN roll-out

The roll-out of BT's "twenty-first century network" (21CN) will significantly reduce the advantages of LLU over the next few years. After a difficult and delayed start, 867 exchanges covering 55% of UK premises were enabled for 21CN by mid-2010. BT plans to raise coverage to about 75% by enabling about 500 more exchanges by Spring 2011. KCOM enabled its exchanges with the equivalent in 2008.

Having 21CN available puts BT on at least an equal footing with the LLU operators as far as speed and quality of broadband services are concerned. With regulatory changes and development of the BT Vision IPTV service it is also much freer to offer attractively priced bundles.

The customers of BT Retail, and the other ISPs which resell BT Wholesale products, are now being migrated to 21CN connections. Point Topic estimates that about 1.4 million of BT Wholesale's 8 million broadband connections had been migrated to 21CN by mid-2010, with corresponding improvements in performance.

The advantage of 21CN for areas with limited broadband infrastructure is that it should eventually bring ADSL2+ broadband with speeds up to 20Mbps or more to virtually the whole UK. Choosing which exchanges to enable and in what order is still a matter of judgement within BT so local partnerships have an opportunity to make the case for their area to be given priority.

However, one way or another, prices are likely to be higher in the areas not served by LLU. So the disadvantages of areas without LLU will be reduced but not removed entirely.

Cable coverage

A large proportion of homes and businesses, 48%, mainly in the cities, towns and suburbs, have the option of using Virgin Media's cable broadband services.

Clearly having the choice is good for end-users. Areas where Virgin Media cable is available average higher take-up than DSL-only areas. Broadband customers in cable areas have also had the option of download speeds up to 50Mbps since early 2009, and Virgin Media announced a 100Mbps offer in October 2010. The prices are high but very few other areas of the UK can get more than 20Mbps at best.

Having cable coverage is a definite plus but it is not a benefit which is going to be extended very much over the next few years. The cable network's footprint has changed little in size in the last decade. The various cable companies reported 12.4 million "homes passed and marketed" to the regulator in 2000. After a mixed decade of infilling in some areas and cutting back in others, Virgin Media was reporting about 12.5m by early 2009.ⁱⁱ

There is now some more definite forward progress. In 2009 Virgin Media announced plans for a modest extension to an additional 500,000 homes over "the next few years". 100,000 homes were added in 2009 and 72,000 in Q2 of 2010 alone. This is happening mainly in high density pockets of premises close to, or surrounded by, existing coverage areas. There may be scope for regions and districts to identify good candidate areas within their bailiwicks and persuade Virgin Media to include them in the company's plans.

2Mbps services

Virtually all the homes and businesses in the UK can get access to DSL broadband services over the copper telephone lines provided by BT (or KCOM in the Hull area). But as expectations increase the actual broadband download speed available over this connection is a growing issue. The key problem is not the difference between an advertised "Up to 20Mbps" and an actual of maybe 4Mbps, despite the headlines that attracts. The real problems arise where end-users are so far from their telephone exchange that their download speed is not enough to support the growing bandwidth demands of commonly used applications.

To address these "slowspots and notspots", the Coalition has taken over the previous government's target of a "Universal Service Commitment". The USC is intended to make broadband service of at least 2Mbps downstream available to virtually everyone in the UK. BDUK (Broadband Delivery UK) has been set up as

an entrepreneurial unit within the Department of Business to deliver on the target. Point Topic's data shows where the homes and businesses which should benefit from BDUK's activities are to be found. It provides a direct measure of what the level of service is likely to be, area by area.

The evidence shows that delivering the USC will not be straightforward. Field studies, for example by BT, and more recently by samknows.com, show that the actual download speeds which users get vary hugely even when they are at the same distance from their serving telephone exchange, or have lines tested to the same length.

The reasons for this are very varied. Some relate to conditions on the end-user's premises, such as the extent and condition of the home network and local interference. Others are down to the access network, such as line quality and outside interference. Cross-talk – interference from broadband services on other telephone-line pairs in the same cable bundle – is a growing problem. As the proportion of lines using broadband increases so does cross-talk, particularly where services use higher frequencies and higher power levels, as with VDSL.

The practical implication is that the USC cannot be achieved simply by drawing a neat boundary with all the users getting less than 2Mbps on one side and all the more favoured ones on the other. Instead, even after removing the effects of poor-performing home networks, many premises getting less than 2Mbps will be in areas where a large proportion of premises actually do get 2Mbps or more. But these areas will still need to be upgraded throughout to deliver the commitment to 2Mbps for everyone.

Thus the need for new investment to provide 2Mbps will not be limited to the 8% of premises which the government acknowledges cannot get 2Mbps today. Instead, the investment will need to cover a much wider area – over 18% of homes and businesses by Point Topic's estimates.

Here again the Availability fields in the V12 database provide the data local partnerships need to identify where they should be getting help to achieve the USC. Prospective communications providers can use the same resource to identify opportunities, make the business case for investment, and qualify for gap funding from the public purse where necessary.

Current NGA coverage

BT's Openreach is racing ahead to enable its exchanges for Next Generation Access (NGA). By the end of 2010 it is due to have reached 343 exchanges covering 22% of homes and businesses in the UK. The BT roll-out has now far overtaken the coverage achieved by alternative next-generation fibre-based networks, which will reach only 4% of premises at most by the end of 2010. Converting coverage into live end-users looks like being a much slower process, at least for the time being.

Allowing for the overlaps between BT and the altnets this means that maybe 24% of the 26.8 million homes and business premises in the UK will have NGA services available to them at least in principle by the end of this year. But the proportion varies hugely by region and district. This is one measure which emphasises the gap between the have and have-not areas.

Future NGA prospects

Looking ahead five years, Point Topic's most recent forecast is that 73% of the country will have access to fibre-based services by the end of 2015, whether

provided by BT, KCOM or altnets. The variation between areas will still be large although the gap will not be as wide as it is in 2010. The forecast is also looking optimistic in view of the limited funds provided for broadband by the Spending Review.

To make these forecasts, Point Topic takes its estimate for national NGA coverage and breaks it down into projections for different areas by combining what has already been announced – the exchanges for BT's rollout, the postcodes covered by altnet plans - with estimates of the economic attractiveness of different areas as far as NGA projects are concerned. The more attractive an area is, the more likely it is to get NGA even if nothing has been announced as yet. The forecast NGA coverage for a larger area, such as a local authority, is produced by summing the products of the probabilities and the number of premises for each smaller area within it.

The approach is simple but Point Topic believes it gives a useful indication of how much progress each area is likely to make towards complete NGA coverage – which would also achieve the USC objective, almost as a by-product. And it shows starkly how big the variation will be between have and have-not areas. Government at all levels needs to know where the gaps are and to ensure that the people and businesses which are affected have the best possible chance of getting the services which will connect them with the modern world. Established and would-be communications providers can use the same data to identify where the best opportunities are for creating new infrastructure.

The main hope for less well-served areas looks likely to be from regional projects. The model for bringing services to digitally-deprived communities is starting to get established. Digital Region should be serving 600,000 premises in South Yorkshire by 2012. The Next Generation Broadband Project will bring fibre-based services to 85% of Northern Ireland by about the same time. The whole of Cornwall is due to get next-generation broadband by 2014 as well. All three will require substantial investments from the EU and other public-sector sources.

At the other end of the scale, small local projects will have some role. They may take up very specific opportunities, such as bringing fibre to a new estate or apartment block, or they may serve the needs of close-knit and supportive communities, where costs are made to disappear through voluntary effort and free provisions.

The players in the middle may find life more difficult, too small to achieve economies of scale and too big to gain the benefits of community action. No doubt some altnets will find strategies to survive in this area too, perhaps relying on unique advantages in specific locations.

ⁱ Some of these 7 LA's and other rural areas are actually better off than shown because they have fixed-wireless access (FWA) broadband networks which are not included in Point Topic's database. Examples include the Hebrides network covering much of Eilean Siar, another one on Tiree, and small networks in under-served areas such as West Dorset and Somerset, South Cambridgeshire and mid-Sussex.

ⁱⁱ The dozens of local cable networks created in the 1990s were eventually absorbed into two big groups, Telewest and NTL, which in turn came together as Virgin Media. Two small cable operators remain independent; Smallworld, which has a service area in south-west Scotland, and Wight Cable on the Isle of Wight. These are not included in Point Topic's database.