

**Report for Openreach – *redacted*
for publication**

Demand for Ethernet over fibre (up to and including 1Gbit/s circuits)

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Contents

1	Executive summary	1
2	Introduction	2
3	Summary of survey results	5
3.1	Key findings from the survey	5
3.2	Usage of different types of fixed line connection	5
3.3	End-user expectations about future demand	9
4	Forecasts	13
5	Copper as an alternative to fibre	22
6	Migration from legacy to strategic portfolio	25

Annex A Survey questions

Annex B In-depth CP interview questions

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1 Executive summary

1. Analysys Mason was commissioned by Openreach to perform an analysis of the UK market for Ethernet over fibre (up to and including 1Gbit/s circuits) to understand the current and future demand, assess the threat of EFM and VDSL as a substitute to fibre, and gauge the level of migration from Openreach legacy products (WES, WEES and BES) to its strategic portfolio (EAD and EBD).
2. The main aims of the project were to assess:
 - the current and future demand for Ethernet over fibre circuits, split by circuit bandwidth and type
 - the use of EFM and VDSL as a substitute for Ethernet over fibre
 - the propensity and drivers for customers to migrate from Openreach's legacy products (WES, WEES and BES) to its strategic portfolio (EAD and EBD).
3. We conducted a survey of 500 end users covering their usage of various forms of high-speed connectivity, their future intentions for services and for details of their suppliers. Survey data was complemented with interviews with communications providers (CPs) and discussions with in-house experts to build a market forecast model of Ethernet over fibre in the UK over the period 2011–2016.
4. We size the market at 140 000 wholesale Ethernet circuits at the end of 2011, which gives Openreach a share in the mid-60% range. We forecast the number of Ethernet circuits to grow at a CAGR of 2.8% between 2011 and 2016, with an estimated total of 160 000 circuits by the end of the forecast period. We estimate that circuits with bandwidth of ≤ 10 Mbit/s will see the highest decline in numbers, with a CAGR of -15% , while the highest growth will come from circuits of above 100Mbit/s (CAGR of 19%) as bandwidth requirements increase.
5. According to the interviews with CPs and in-house experts, the use case for EFM and VDSL is distinct from Ethernet over fibre. EFM and VDSL are seen as an option to migrate from PPC, especially for bandwidth of ≤ 10 Mbit/s. However, they are not perceived as a threat to Ethernet over fibre. EFM and VDSL will have a marginal impact on the total number of fibre connections as we believe it unlikely that organisations will downgrade from fibre to copper.
6. CPs understand the difference between legacy and strategic portfolio, but their willingness to migrate depends on how the circuit is being used. CPs are resistant to migrate from WES to EAD circuits for access circuits and they expressed concerns over the disruption to the end user, which negates any potential financial benefit. CPs are much more willing to migrate backhaul circuits to the strategic portfolio.

2 Introduction

7. Analysys Mason has performed an analysis of the UK market for Ethernet over fibre (up to and including 1Gbit/s circuits) on behalf of Openreach. Issues explored as part of this project are:
 - the current and future demand for Ethernet over fibre circuits, split by circuit bandwidth and type
 - the use of EFM and VDSL as a substitute for Ethernet over fibre
 - the propensity and drivers for customers to migrate from Openreach's legacy products (WES, WEES and BES) to its strategic portfolio (EAD and EBD).
8. The project has centred on primary market research incorporating a survey of 500 end users, covering both users and non-users of Ethernet over fibre services as well as five interviews with CPs. The questionnaire and discussion guide are included in the annexes to this report.
9. Openreach asked Analysys Mason to produce a market forecast of demand for Ethernet over fibre between 2011 and 2016. This forecast has been developed using data from the survey and the interviews. A bottom-up approach was adopted using ONS data for the number of organisations in the UK in all sectors. Rather than use the survey data directly, we made certain adjustments when sizing the market where we believed that the results were unrealistic (for example, on future usage intentions).
10. The forecast is split into different bandwidths (≤ 10 Mbit/s, >10 Mbit/s-100Mbit/s, >100 Mbit/s - 1Gbit/s), backhaul and access circuits, and legacy and strategic Ethernet over fibre products.

We completed a survey with 500 end-user organisations and interviewed five CPs

11. We completed 500 interviews with organisations that range in size and sector. Quotas were selected to reflect the distribution of organisations in the UK (see below). We deliberately over-recruited larger organisations to provide a bigger and more representative sample of these organisations.

Figure 2.1: Mix of companies surveyed by segment and size [Source: Analysys Mason, 2012]

Sectors	Employees			
	10–19	20–99	100–499	500+
Manufacturing, retail, transport, hospitality	35	36	31	40
Publishing, communications & media	26	21	22	14
Financial and business services	24	26	20	13
Government, health, education, social services	26	30	27	26
Other	19	24	25	15

12. We also spoke to five CPs. Most elected to remain anonymous, in part due to concerns over the Ofcom's business connectivity market review (BCMR). The interviews were with one mobile operator (who asked for anonymity) and four fixed operators. Details of the four fixed operators are as follows:

- a large international operator with an extensive fibre network dedicated to businesses
- a regional provider of telephony and internet services
- a national player which offers telephony, broadband and TV services
- [name removed] was the final operator interviewed and the only one not to ask for anonymity.

13. We believe that the interviewees represented a reasonable cross-section of CP opinions.

14. Given the sensitive timing of this project, coinciding with Ofcom's consultation for the BCMR, recruiting CP interviewees has been a challenge. Two potential interviewees cited the BCMR as a reason for not participating. This may also explain why other CPs refused to participate.

15. We also asked analysts and consultants from across Analysys Mason for their opinion on the Ethernet market, including consultants from our Mason division, which is involved in network procurement for end-user clients.

16. The survey is representative of the UK economy by sector; we deliberately over-recruited larger organisations to provide a bigger sample of results. The charts below provide further details on our sample.

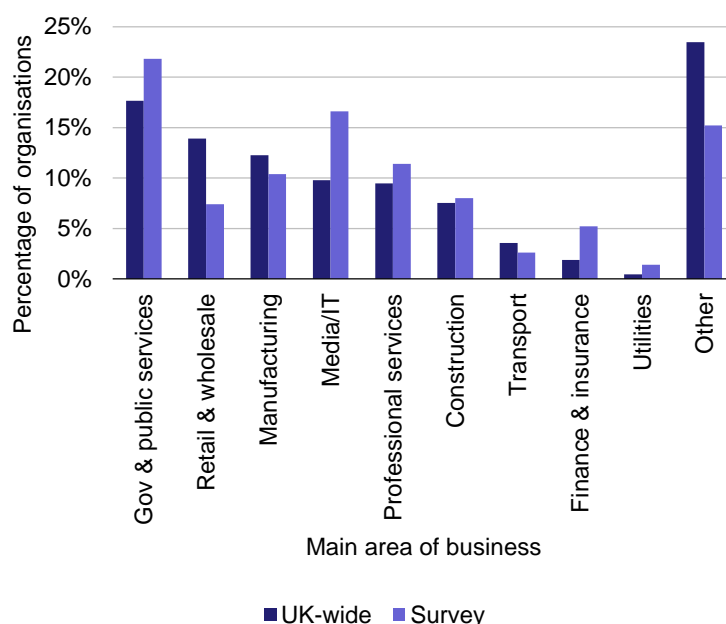


Figure 2.2:
Organisations by sector
– survey vs. UK¹
[Source: Analysys
Mason, 2012]

¹ Q1. Which is the main area of business your company is involved in?

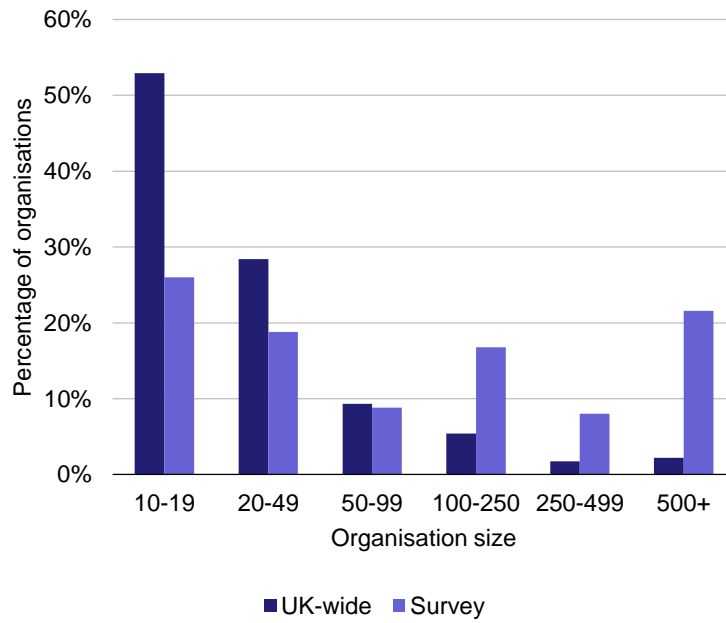


Figure 2.3:
Organisations by size –
survey vs. UK² [Source:
Analysys Mason, 2012]

²

Q2. How many employees does your company have?

3 Summary of survey results

3.1 Key findings from the survey

17. A survey of 500 organisations, covering both users and non-users of Ethernet over fibre services was conducted. Data gathered from the survey was useful in assessing the demand for Ethernet over fibre services at the access level only (we did not include questions about backhaul as they would not be relevant to the respondents).
18. The survey shows strong current and future demand for Ethernet over fibre access circuits. Out of the 500 organisations surveyed, 76 said that they are using Ethernet over fibre – this is equivalent to a penetration rate of 15% of interview respondents.
19. As expected, organisations with high employee head count are more likely to adopt Ethernet over fibre. Only 6% of organisations with 20–49 employees use Ethernet over fibre, while 31% of organisations with 500+ employees said that they purchased Ethernet circuits.
20. Most organisations surveyed currently use Ethernet circuits with bandwidth up to and including 100Mbit/s. 58% of the respondents have at least one circuit with bandwidth in the ≤ 10 Mbit/s category, while 55% of them have at least one circuit with bandwidth in the >10 Mbit/s- 100Mbit/s category; 18% of organisations surveyed have Ethernet circuits with bandwidth in the >100 Mbit/s- 1Gbit/s category; 9% of organisations surveyed claimed to have at least one circuit with >1 Gbit/s bandwidth.³
21. None of the organisations currently taking up Ethernet over fibre services expects to reduce demand. Conversely, demand for increased bandwidth is strong. Of the organisations that do not currently use Ethernet over fibre, 16% expressed an interest in taking up the service in the next 12 months. While this implies continued strong demand, we believe it should be treated with caution as it may be more of an expectation than a solid plan.

3.2 Usage of different types of fixed line connection

22. Leased lines, which include traditional interface circuits, EFM and Ethernet over fibre, were bought by 35% of organisations surveyed. However, DSL is the predominant type used to set up a data connection, followed by ISDN. We believe that the survey is broadly representative of typical end-user organisations, judged on the services adopted.
23. This reflects the large proportion of smaller organisations in the survey which are more likely to have basic data connectivity services such as DSL. Just over half of the organisations surveyed have indicated that they buy more than one type of data connectivity. A quarter of the

³

Note: the survey deliberately oversampled large organisations that are more likely to have >1 Gbit/s circuits.

organisations surveyed adopted a combination of DSL and leased lines. This is reflected in the charts below.

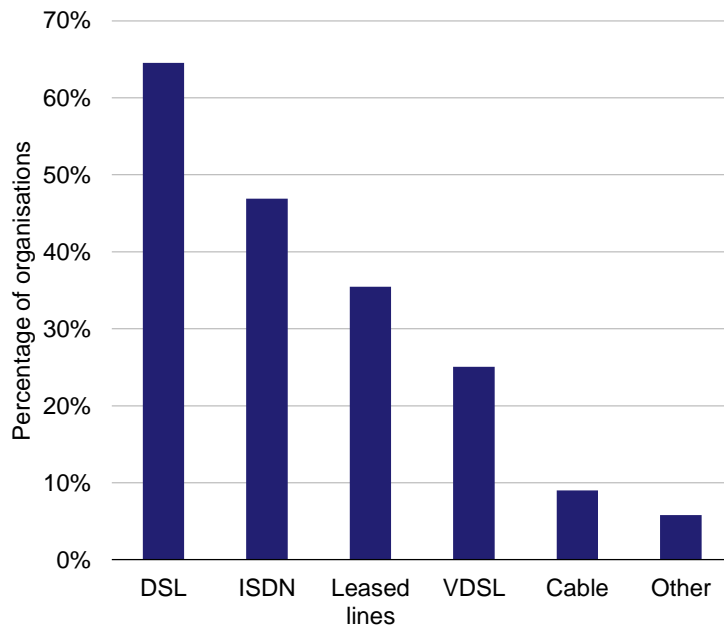


Figure 3.1:
Organisation
distribution by data
connectivity type⁴
[Source: Analysys
Mason, 2012]

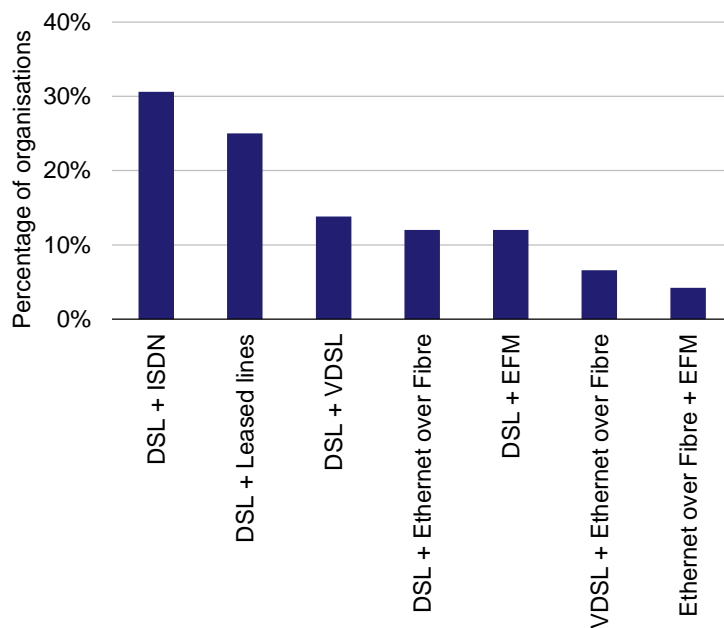


Figure 3.2:
Organisation
distribution by mix of
data connectivity
products [Source:
Analysys Mason, 2012]

24. Out of the 500 organisations surveyed, 176 indicated they have leased lines, and of those:

- 76 use Ethernet over fibre
- 37 use EFM

⁴

Q3. What fixed line data communications services does your organisation use?

- 80 use other technologies such as TDM. Note that this category also includes answers where the respondents did not know the specific technology used.

25. From the survey, we saw wider adoption of EFM circuits than we had expected. This strong demand for EFM was reflected in the CP interviews. Two of the four providers of fixed communications interviewed told us they were making heavy use of EFM. However, as discussed in Section 5, we believe that EFM market positioning is different from that of Ethernet over fibre, and does not constitute a significant threat to existing connections.

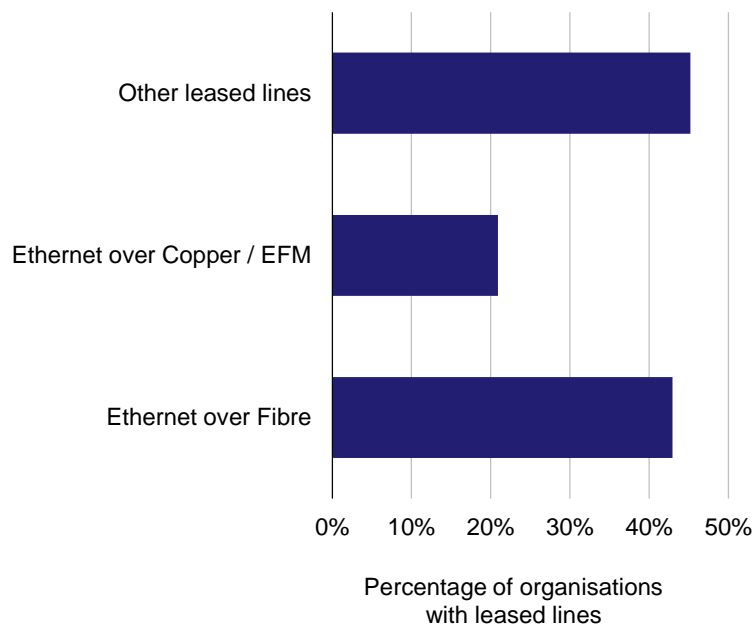


Figure 3.3: Distribution of organisations by type of leased lines⁵

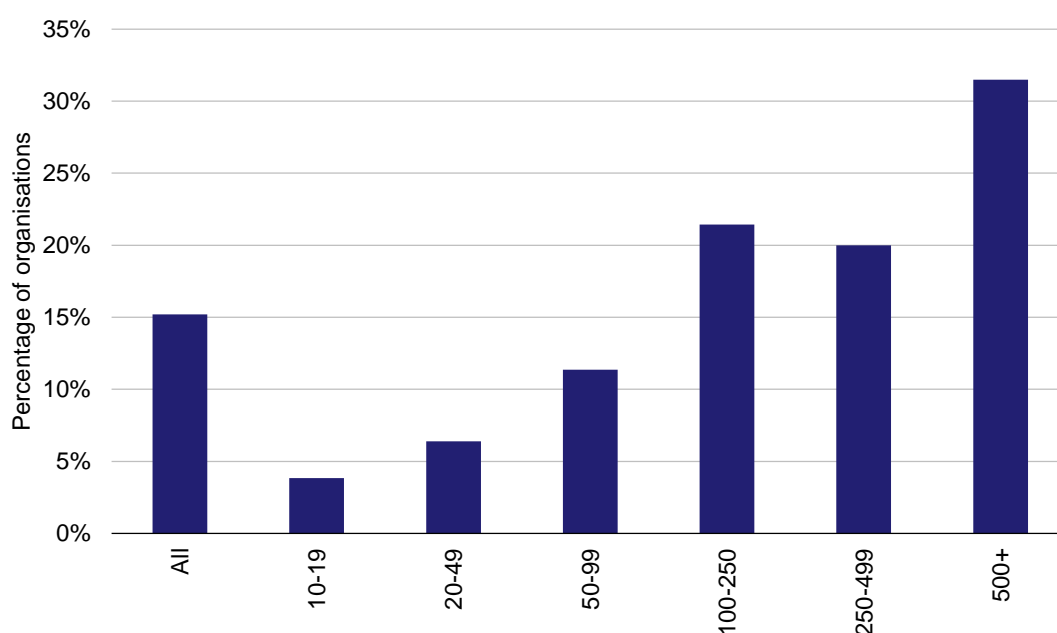
[Source: Analysys Mason, 2012]

26. Only 6% of organisations with 20–49 employees use Ethernet over fibre, while 31% of organisations with 500+ employees said that they purchased Ethernet circuits. The penetration of Ethernet over fibre by organisation size is shown in Figure 3.4.

⁵

Q3: What fixed line data communications services does your organisation use?

Figure 3.4: Penetration of Ethernet over fibre by organisation size⁶ [Source: Analysys Mason, 2012]



27. Survey results indicate that nearly 60% of organisations surveyed with Ethernet leased lines (Ethernet over fibre only) have bandwidth $\leq 10\text{Mbit/s}$. 55% of respondents said that they have bandwidth $>10\text{Mbit/s}$ - 100Mbit/s . 35% of organisations surveyed with Ethernet leased lines have bandwidth $>100\text{Mbit/s}$ - 1Gbit/s
28. These results are similar to those in Jigsaw Research's study reported in Ofcom's BCMR consultation document (June 2012). Jigsaw's figures are consistently slightly lower, however variances may be due to the use of different quotas for organisation size and sector, and slightly different question wording (e.g. Jigsaw provided respondents with a 'don't know' option, which was selected by 9% of end users).

⁶

Q3. What fixed line data communications services does your organisation use?

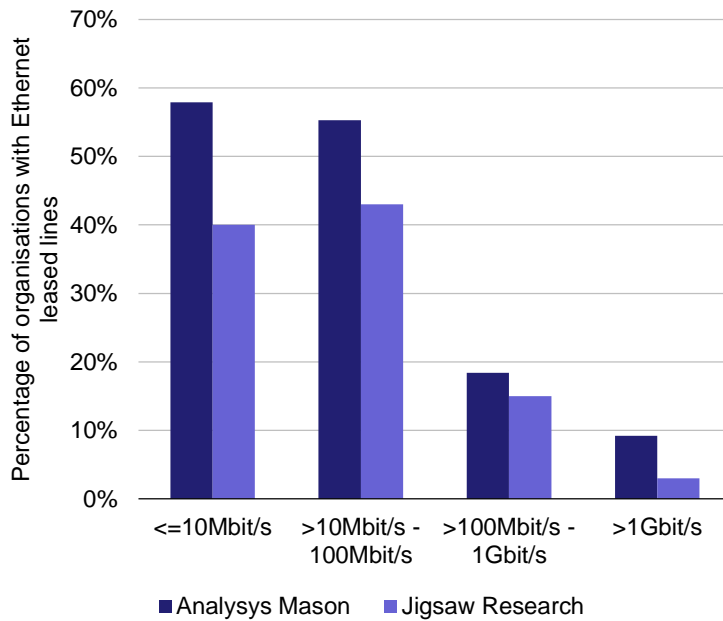


Figure 3.5: Distribution of organisations with Ethernet leased lines by bandwidth⁷ [Source: Analysys Mason, 2012]

3.3 End-user expectations about future demand

29. As part of the survey, we also asked end users about their expected future demand. A high portion of respondents expects bandwidth requirements to increase in the next 12 months.
30. None of the organisations currently taking up Ethernet over fibre expects to reduce its demand. This may suggest that they are not expecting to switch to EFM/VDSL (although awareness of these products may also be low).
31. Respondents had aggressive expectations of future bandwidth demand. For the lower speed circuits, 20%–30% of current users expect increased requirements. However, based on discussions with CPs, we expect this to translate into demand for 100Mbit/s circuits rather than 10Mbit/s circuits (i.e. we do not expect end users to adopt multiple 10Mbit/s circuits. Rather we would expect a user with an existing 10Mbit/s circuit to upgrade to a 100Mbit/s circuit.)
32. The results from the survey were not used directly when modelling the market forecast. We believe that organisations' responses of strong growth are over-estimated, especially for the 12-month plans. The results may represent more a loose expectation than a solid plan to purchase a higher bandwidth circuit. For current users of Ethernet over Fibre services, where surveyed organisations indicated a strong increase in demand for <=10Mbit/s circuits (figure 3.7), we expect this not to translate into strong demand for new <=10Mbit/s circuits. Instead, supported by our interviews of CPs, we believe that this will cause users to migrate from <10Mbit/s circuits to >10-100Mbit/s circuits. Given the relative price of circuits, it is more likely that an end user organisation will take one 100Mbit/s circuit than increase from one 10Mbit/s circuit to two

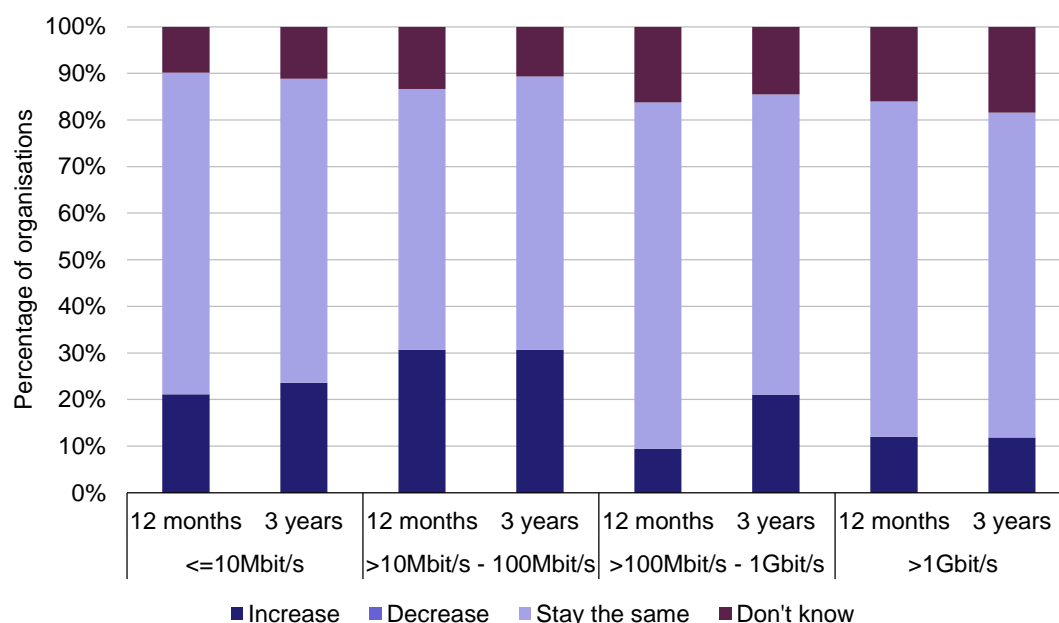
⁷ Note that the chart includes EFM in the case of Jigsaw Research, while we exclude it from Analysys Mason's results.

10Mbit/s circuits. We have taken a similar approach in interpreting the users increased requirements for >10-100Mbit/s circuits.

33. The results from 12 months and 3 years do not differ significantly at most bandwidths. This may be because organisations do not have a clear view of bandwidth demand beyond a 12-month horizon.

Figure 3.6: Future change of the requirements for Ethernet over fibre in the next 12 months and 3 years⁸

[Source: Analysys Mason, 2012]



34. A large portion of organisations that do not currently use Ethernet over fibre are expressing an interest in Ethernet over fibre (16% within the next 12 months and 21% within 3 years).
35. If the 12-month results were modelled directly, the survey would imply an additional 34 500 circuits if each of these organisations took just one circuit, or a very significant near-term growth in the size of the market. As with the results for organisations already taking up Ethernet over fibre, we have been somewhat cautious in translating the results into future growth of circuits because we believe they imply unrealistically strong demand for new Ethernet over fibre connections.
36. The results may also imply a limit of the threat of EFM/VDSL on fibre circuits (though this may be due to a lack of awareness of end users of these circuits). We did not ask about future plans to adopt EFM circuits.

⁸ Q6/Q7. How will your requirements for Ethernet over fibre change in the next 12 months/three years?

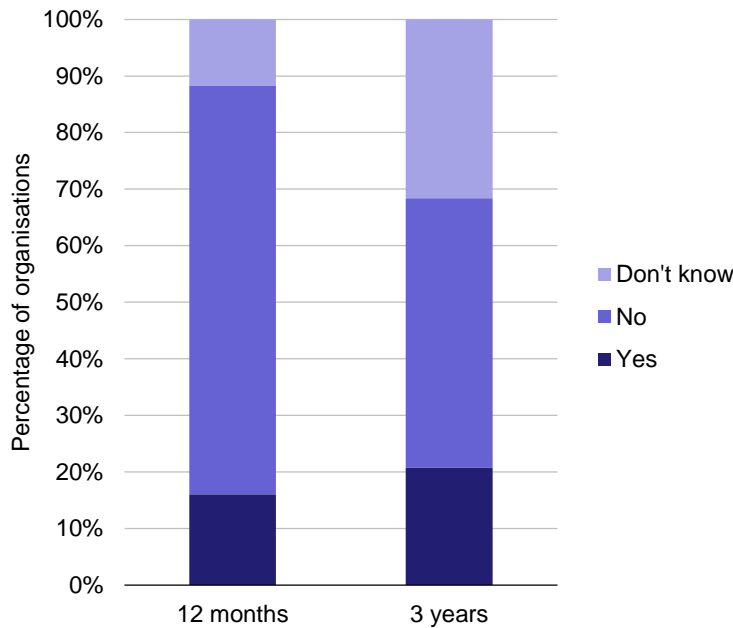


Figure 3.7: Future plans to buy Ethernet over fibre circuits in the next 12 months/3 years⁹
[Source: Analysys Mason, 2012]

37. A lack of a requirement is the key reason for not taking up Ethernet over fibre, although price is also an important factor. Of the 500 end users surveyed, 198 said they do not have plans to buy Ethernet over fibre in the next three years. If we exclude those that have not specified any reason or were unsure, then more than half said their current solution is sufficient to satisfy their requirements, and price and unavailability were equally cited by around 20% as a reason for not taking up Ethernet over fibre¹⁰.
38. Interestingly, only 3% of organisations that are not planning to buy Ethernet over fibre will use an alternative solution (presumably this means VDSL or EFM).
39. The other issues cited by the respondents include no plan in place to migrate to Ethernet, lack of understanding/knowledge about Ethernet over fibre products and decision is outside their control.

⁹ Q8. Does your organisation have plans to buy Ethernet over fibre connections in the next 12 months/3 years?

¹⁰ In our survey, 'service unavailable' was not included as an option. When 'other' was specified, we asked for further details. Of the organisations selecting 'other', a large portion specified that the service was unavailable (or similar). We believe that they meant that the service was unavailable at a reasonable cost, rather than it could not theoretically be supplied **Q10. What are the reasons for not planning to buy Ethernet over fibre connections?

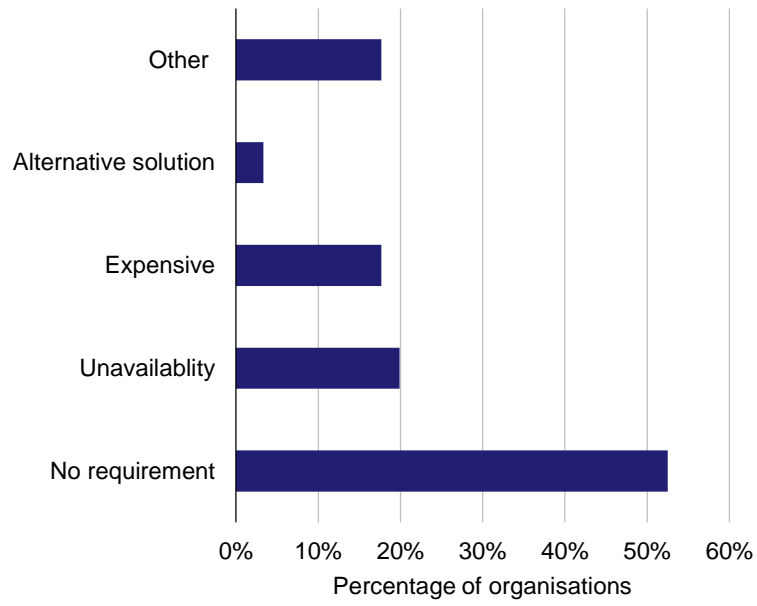


Figure 3.8: Reasons for not planning to buy Ethernet over fibre
[Source: Analysys Mason, 2012]

4 Forecasts

40. We have built a forecast model for Ethernet over fibre which considered the access and backhaul segments of the market separately. For the access segment, we have modelled the market bottom-up, using data from the ONS and survey response. Survey results were adjusted before using them in the model; especially the penetration figures for large organisations which we believe were low. For the backhaul segment, we produced a simple model to size the fixed and mobile backhaul market based on the number of base stations and LLU exchanges in the UK.
41. We have also broken down the total market forecast:
 - by bandwidth:
 - $\leq 10\text{Mbit/s}$
 - $>10\text{Mbit/s}$ – 100Mbit/s
 - $>100\text{Mbit/s}$ – 1Gbit/s .
 - by type:
 - access
 - backhaul.
 - by vendor:
 - Openreach
 - other vendors.
42. We have also used interviews with CPs and BT sales data to forecast the market for Openreach legacy products (WES/BES) and strategic products (EAD/EBD).
43. From our data, we are estimating around 140 000 wholesale Ethernet circuits at the end of 2011. This gives Openreach a market share in the mid-60% range.
44. The number of Ethernet circuits is forecast to grow at a CAGR of 2.8% between 2011 and 2016, to a total of 160 000 circuits.
45. As well as growth in the overall size of the market, we expect significant migration of existing users to higher bandwidths. Circuits with bandwidth $\leq 10\text{Mbit/s}$ will see the highest decline with a CAGR of -15% over the forecast period, while the highest growth in terms of number will come from the $\leq 1\text{Gbit/s}$ category (CAGR of 19%).
46. Assuming that the market share of Openreach will remain constant over the forecast period:¹¹

¹¹ We have assumed that Openreach's share is constant for simplicity. We do not expect any significant changes in share as the supply side is relatively stable (i.e. we do not expect any major new entrants to, or exits from, the market) and market share has been stable in recent years.

- By the end of 2016, 75% of WES circuits, compared to 2011, will have migrated to EAD. (We assumed residual WES circuits beyond 2015. From our interviews, CPs were unwilling to migrate to EAD.)
- BES to EBD migration will happen at a faster pace, with all circuits migrated to EBD by 2015.

47. We have used data from the survey to build the market model for Ethernet over fibre in the UK. Results from the survey data indicate that 15% of organisations use Ethernet over fibre across all size categories. We have adjusted the penetration figures by organisation size, especially for organisations with 250–499 employees and 500+ employees, before applying them to the model. We believe that the survey results are low, possibly due to a relatively small sample size.

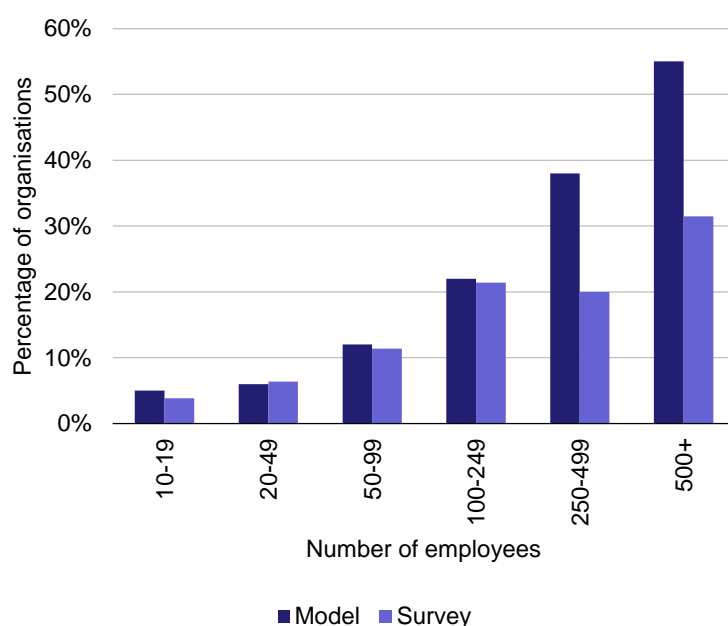


Figure 4.1: Percentage of organisations that use Ethernet over fibre by organisation size (2011) [Source: Analysys Mason, 2012]

48. Our forecast shows that the total market for Ethernet over fibre in the UK is 140 000 circuits. This includes both the access and backhaul segments of the market and gives Openreach a market share in the mid-60% in 2011.
49. We combined information from the survey as well as BT sales data to show the breakdown of the market by bandwidth. For the access segment, we assumed an average number of Ethernet over fibre circuits by size of organisation. The larger the organisations, the higher the number of circuits, and the more likely they are to use Ethernet over fibre circuits. For the backhaul segment, we used the number of mobile base stations and LLU exchanges in the UK.

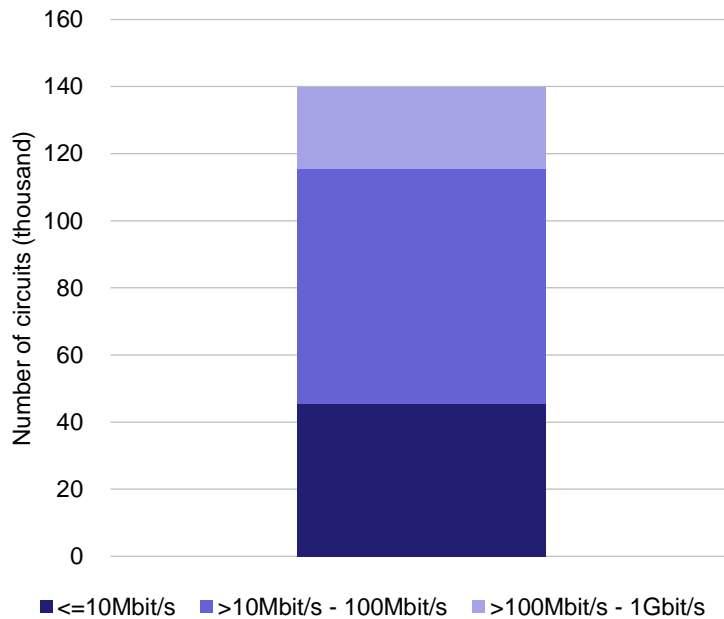
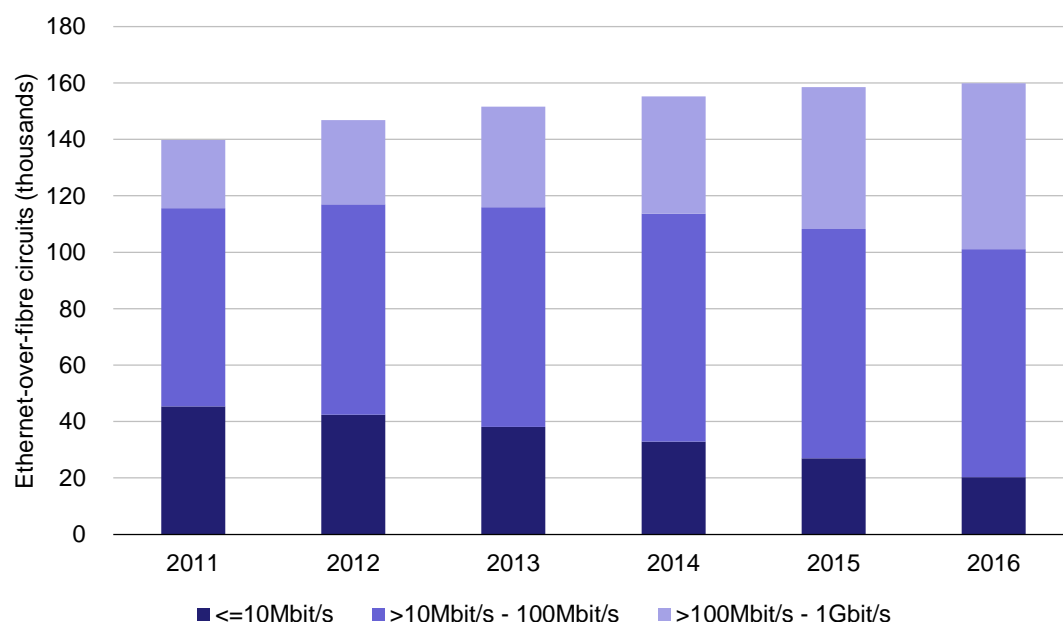


Figure 4.2: Forecast of Ethernet over fibre circuits (2011) [Source: Analysys Mason, 2012]

The total number of circuits will grow at a CAGR of 2.8%; more significant is the shift to higher bandwidth circuits

50. The results show that the majority of circuits (83%) deployed at end of 2011 have a bandwidth of 100Mbits or below. The breakdown of circuits by bandwidth for 2011 was based on the survey data and BT sales data.
51. For future years, circuit demand will progressively evolve toward higher bandwidths. CPs will seek to upgrade their backhaul bandwidth capacity, while end-user organisations and consumers will require faster access. We are forecasting a declining trend for the <=10Mbit/s market (CAGR of -15%), and stronger growth for >100Mbit/s-1Gbit/s markets (CAGR of 19%).
52. We believe copper-based services, EFM and VDSL, will only have a marginal impact on the number of fibre connections as end users who currently have fibre are unlikely to migrate to copper-based solutions, and also because EFM and VDSL meet a different market need (see Section 5 for further discussion of this issue).
53. We have assumed that pricing, and relative pricing of different bandwidth circuits, will remain broadly in line with current levels.

Figure 4.3: Forecast of Ethernet over fibre circuits in the UK, per bandwidth (2011–2016) [Source: Analysys Mason, 2012]



Growth in the market for Ethernet over fibre is driven by demand for new access circuits

54. We provide a breakdown of the Ethernet market by type of circuit. Access represents the Ethernet over fibre market of circuits that connect an end-user site to a remote CP site or another end user. Backhaul represents the Ethernet over fibre market of circuits that connect mobile base stations and unbundled exchanges to a CP's core network.
55. In terms of number of circuits, the access segment represents 86% of the Ethernet over fibre market at the end of 2011. We estimate that this proportion will grow to 88% by end 2016.
56. The access and backhaul segments are discussed in more details in the following sections.

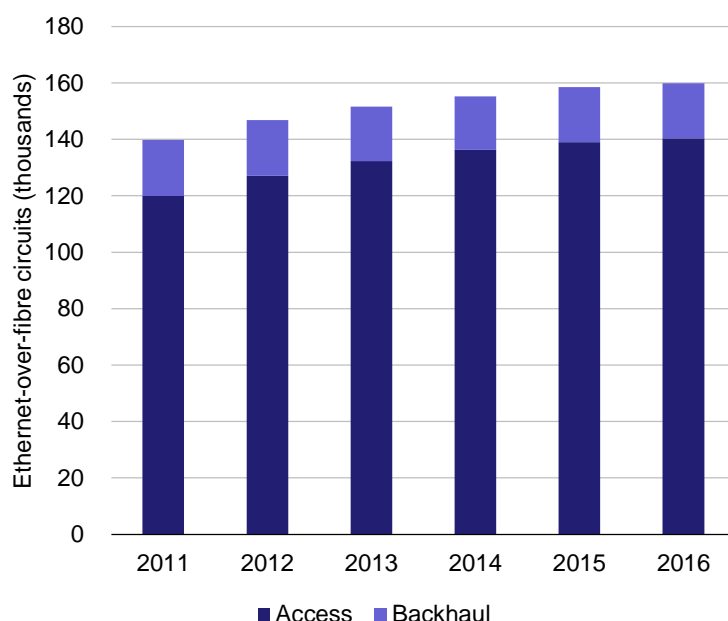
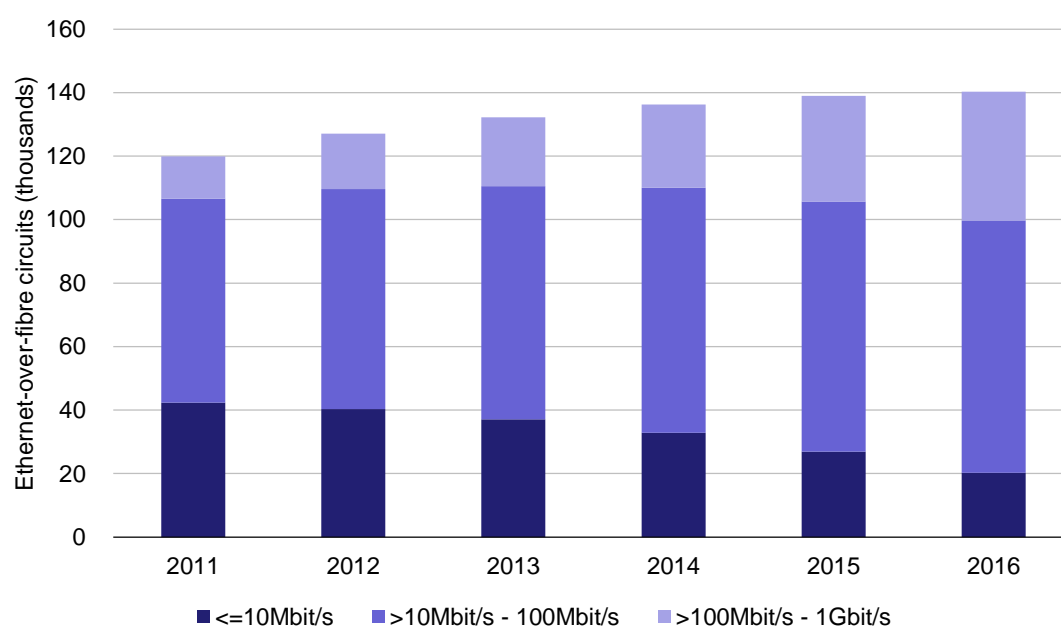


Figure 4.4: Forecast of Ethernet over fibre circuits in the UK, per type (2011–2016)
 [Source: Analysys Mason, 2012]

We forecast the market for Ethernet over fibre access circuits with bandwidth up to and including 1Gbit/s to grow by 3.2% CAGR

57. The market for Ethernet over fibre used for access will grow from 120 000 circuits in 2011 to 140 000 circuits in 2016. The market will flatten out towards the end of the forecast period due to circuit aggregation and migration to very high speed circuits (>1Gbit/s circuits).
58. The migration to higher bandwidths is based on the survey data and our discussions with CPs. For example, we believe, following discussions with CPs, that there will be no growth in 10Mbit/s circuits as CPs indicated that new connections were very rarely at less than 100Mbit/s.

Figure 4.5: Forecast of access Ethernet over fibre circuits in the UK (2011–2016) [Source: Analysys Mason, 2012]



Demand for new backhaul circuits will be offset by the effect of site sharing and some migration to very high speed circuits (e.g. WDM)

59. We have used a separate model to estimate the number of Ethernet over fibre circuits used for backhaul. The fixed backhaul model is based on the number of LLU exchanges and an estimate of the average number of Ethernet circuits per exchange per LLU unbundler.
60. We assumed that, on average, each LLU unbundler has two connections from the exchange to its site, and that 80% of these circuits are Ethernet over fibre. We also assumed that in the future CPs would choose to aggregate lower bandwidth circuits into one and maintain the same number of backhaul circuits to support growing demand for capacity from businesses and consumers.
61. The mobile backhaul model is based on the number of existing mobile sites in the UK and a forecast of the number of newly built sites. We have estimated the proportion of sites that use Ethernet, and excluded those that use microwave.
62. These backhaul forecasts should be treated with caution as we recognise the complexity of modelling backhaul demand by CPs given their dependency on a number of additional factors such as increase in demand at the exchanges, extent to which 3G traffic moves to using Ethernet, and extent of site sharing (and backhaul sharing).

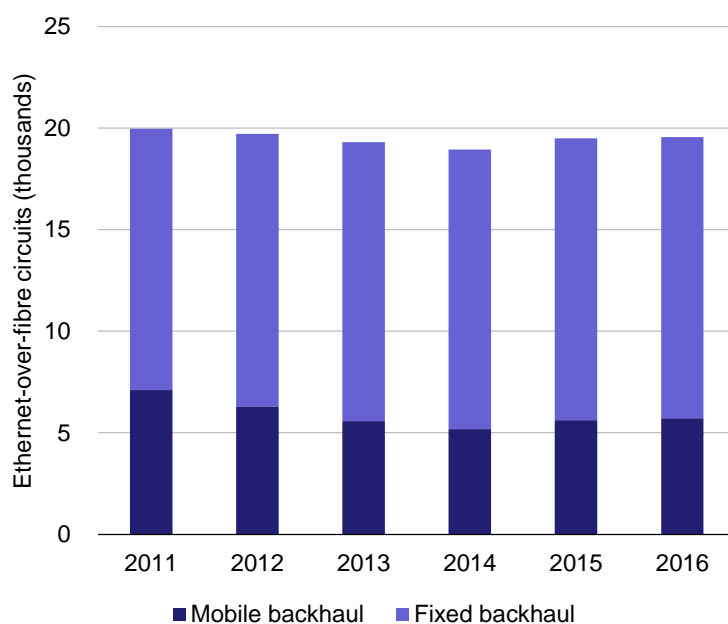


Figure 4.6: Forecast of backhaul Ethernet over fibre circuits in the UK, by CP type [Source: Analysys Mason, 2012]

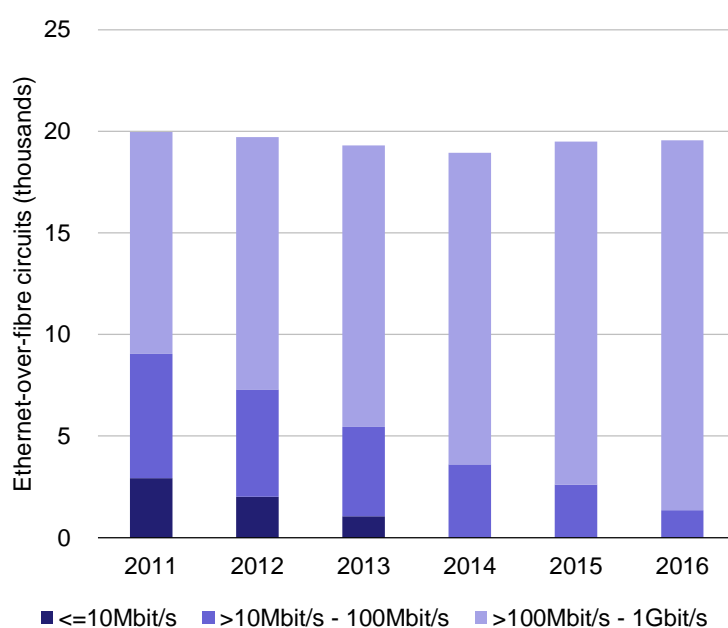


Figure 4.7: Forecast of backhaul Ethernet over fibre circuits in the UK, by bandwidth [Source: Analysys Mason, 2012]

While we expect relatively rapid migration from BES to EBD, the migration from WES to EAD will take longer

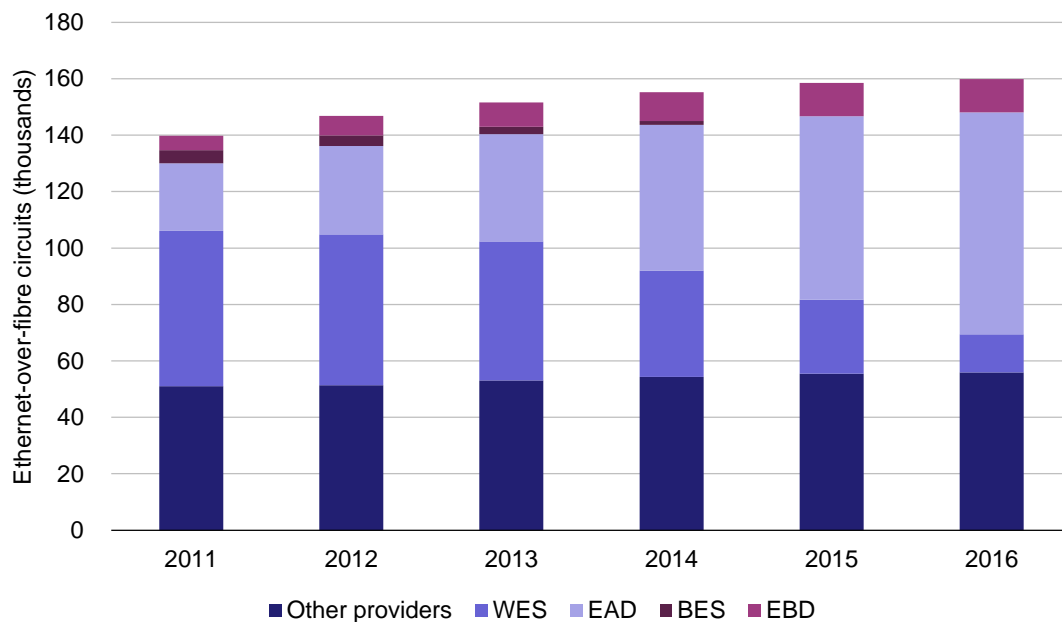
63. Based on BT sales data, we believe that the market share of Openreach was in the mid-60% range in 2011. We have assumed that the market share of Openreach remains constant throughout the forecast period¹² and also that WES circuits remain beyond the current planned 2015 retirement. While we have assumed that migration to EAD accelerates towards 2015, the large number of

¹² We have assumed that Openreach's share is constant for simplicity. We do not expect any significant changes in share as the supply side is relatively stable (i.e. we do not expect any major new entrants to, or exits from, the market) and market share has been stable in recent years.

WES circuits currently in the market and lukewarm reception to EAD by some CPs could undermine completion of the migration by 2015.

64. We have used information from the in-depth interviews and discussions with our experts to gauge the proportion of Ethernet over fibre circuits that are substituted by alternative access technologies and the rate at which organisations migrate Ethernet over fibre products from legacy to strategic portfolio.
65. Interviewed CPs expressed more readiness to migrate their backhaul circuits than their access circuits. Some CPs are aware that legacy products will be discontinued by 2015, and they have initiated talks with their customers to discuss migration. Other CPs are resisting as they are satisfied with the current products and do not want to disrupt their customers.

Figure 4.8: Forecast of Openreach's share of Ethernet over fibre market (2011–2016) [Source: Analysys Mason, 2012]



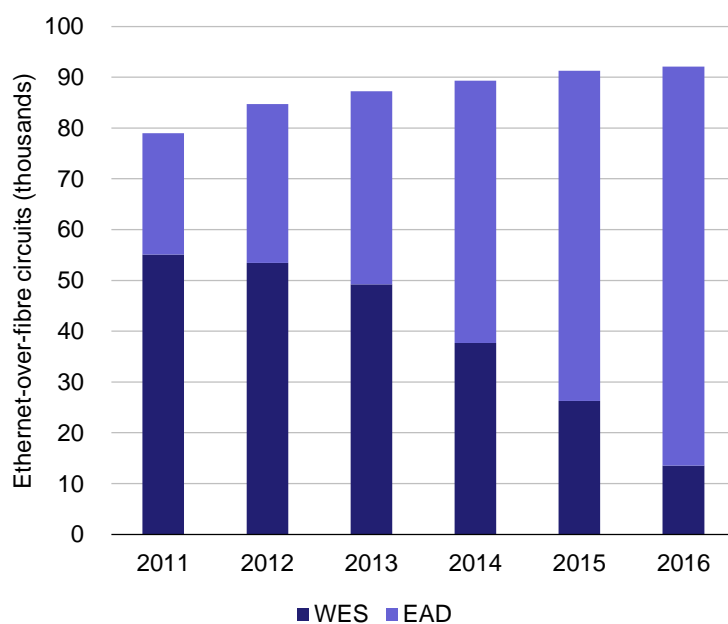


Figure 4.9: WES and EAD market forecast (2011–2016) [Source: Analysys Mason, 2012]

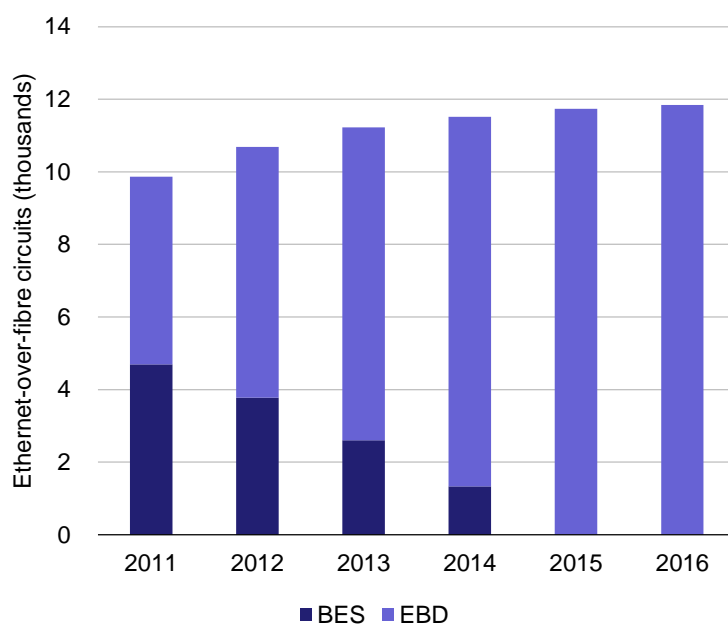


Figure 4.10: BES and EBD market forecast (2011–2016) [Source: Analysys Mason, 2012]

5 Copper as an alternative to fibre

We do not believe that copper-based products are having or will have a significant impact on sales of fibre services.

66. From our interviews, we believe that there is a distinct use case for copper- and fibre-based services. While that continues to be the case, we believe that copper-based services will not reduce growth in fibre connections.
67. It is possible that, in future, some in the SME market will opt for EFM- and VDSL-based services, driven by cost considerations, which would dampen the growth rate of fibre. However, we believe that this will have a marginal impact on the total number of fibre connections (as we believe it is unlikely that companies will downgrade from fibre to copper).
68. The people we have spoken to in the course of this project had distinct views on EFM, which is already prominent in the market discussed in more details on the following slide, and VDSL services, over which there is a fair degree of uncertainty. This is treated further down in this section.
69. A key common factor around the copper-based services was the level of service that could be offered. A key point for our interviewees was the SLAs for fibre (e.g. four-hour repair times), which are currently not matched by copper products.
70. At least one of our interviewees (a small CP) supported the ongoing distinction in products, by Openreach/Wholesale, of copper and fibre products, as this justified charging higher prices for fibre.
71. Overall, we believe that there will continue to be growth in the number of circuits because Ethernet over fibre satisfies a need that copper-based products cannot.

EFM appears to be gaining more market traction than we had expected, though probably not at the expense of fibre

72. Both in our survey and in our interviews, it was clear that EFM has gained a much higher level of take-up than previously thought. Our Research division published a report in 2011 suggesting that the market would peak at 22 000 EFM circuits in the UK. We now believe this may have underestimated the potential for EFM.
73. As well as being lower cost, it is also much faster to install than fibre (typical install times are <20 days, compared to ~3 months).
74. Despite these benefits, comments from CPs suggest that it is fulfilling a market need between broadband and Ethernet over fibre (rather than competing directly with either). EFM is used for a

specific type of demand of relatively low bandwidth services (i.e. $\leq 10\text{Mbit/s}$) or where the service that is being supported is not mission-critical (so the end user is satisfied with the low SLAs and the lack of resilience).

75. We believe that end users who already have fibre are unlikely to switch to EFM. Organisations with higher requirements (i.e. $>10\text{Mbit/s}$ and/or the need for a high level of SLAs) will adopt fibre solutions rather than EFM. A selection of interview responses is shown below.

- “We are seeing some strong growth in EFM right now – there is more EFM than fibre from new customers” – [name removed]
- “EFM is good not just for lower cost, but also much faster install time. On a recent project 70 of the 75 sites already had the extra pairs so total install time was less than 20 days. Where we had fibre, we had an average of 3 months for each fibre circuit” – Adrian Dain, Mason consultant (*Adrian assists public-sector clients procuring telecoms services for our Mason division*).
- “EFM is for non-critical, low bandwidth users. It is more an obvious replacement for 2Mbit/s circuits or as a step up for customers who were on broadband. It is not something that is replacing Ethernet over fibre and I can’t see this changing. It is not really cannibalising fibre” – [name removed]

Interviewees who use VDSL do not see it as a material threat to Ethernet over fibre services

76. From our interviews, we have seen very limited evidence of VDSL take-up by business. This will change but for the time being it is not seen as an alternative to EFM services, let alone as a replacement for Ethernet over fibre.
77. A number of factors will make VDSL-based services more appealing, including greater geographic reach, an uncontended service, more robust support levels, higher guaranteed minimum throughput levels and incentives for long-term contracts.
78. Interviewees felt that a better VDSL service would provide a stronger competitor to EFM, rather than fibre products.
79. However, assuming that there continues to be a wide degree of separation between the level of service offered by copper and fibre products (something that some interviewees argued should remain the case), we do not believe that existing users of Ethernet over fibre would migrate to VDSL services.
80. There may be some impact of customers migrating from broadband and selecting VDSL rather than Ethernet over fibre services, though we believe that there is a market niche between fibre and broadband for EFM and VDSL services. A selection of interview responses is shown below.

- “VDSL may have some impact but not yet, and not until it is offered uncontended” – [name removed]
- “It’s not like for like product. While EAD and WES are similar products, moving to VDSL is not” – Anonymous.
- “Fibre is fibre – it is a class above copper-based services and we want to keep the separation. We want fibre to remain as a premium product (with higher revenues and higher margins), and VDSL to be a consumer/SoHO service” – Anonymous.
- “[Improvements to VDSL] this will make it a better alternative to EFM, not an alternative to fibre” – Anonymous.
- “Business type features such as guaranteed download and repaid SLA you don’t get with VDSL” – [name removed]

6 Migration from legacy to strategic portfolio

CPs understand the differences between the legacy and strategic portfolio; willingness depends on how the circuit is used

81. As part of our interviews with CPs, we asked about migration from Openreach's legacy portfolio (e.g. WES, BES) to its strategic portfolio (EAD and EBD). As responses differed depending on what the circuit was used for (e.g. for backhaul or for connecting an end user), we will treat each type of circuit separately. Broadly speaking:

- CPs are resistant to migrating from WES to EAD circuits, with the exception of mobile CPs.
- CPs are more willing to migrate backhauls circuits to EBD.

82. Some points that CPs made apply to both types of circuits:

- CPs have a good understanding of the differences between the legacy and strategic portfolio. Without prompting, it was clear from their responses that most CPs knew what the differences were and what the benefits of EAD/EBD were, as well as the downsides.
- CPs have expressed concerns over the migration process due to the incurred cost and disruption caused to end users.

For circuits connecting end users (e.g. WES/EAD), CPs are reluctant to migrate to the strategic portfolio

83. The typical strategy of a CP is to remain with the existing circuits and not migrate to the strategic portfolio. A number of reasons explain this:

- *CPs are satisfied with the existing product set.* At least from the discussions we had, none of the CPs expressed dissatisfaction with the legacy portfolio. The technical benefits of the strategic portfolio are not seen as a major driver for migration.
- *CPs do not want to disrupt their customers.* CPs are understandably reluctant to disrupt customers on an existing service that they are happy with. It is not necessarily that the disruption would be impossible to manage for most end users – for most, downtime of an hour or two would be manageable but:
 - the CP would need to explain what was causing the disruption. Many end users would understand (or be able to research) the price benefit of EAD and would expect the saving to be passed on
 - any disruption could trigger the end user to review its contract and potentially explore different providers.

84. The CPs that we spoke to therefore do not have a plan to switch to EAD. As with other product changes, they expect the transfer to be managed by Openreach when the WES circuits are withdrawn in 2015. A selection of interview responses is shown below:

- “Yes, we’re happy with them [the current products] – it’s probably the main reason for not switching. The benefits [of the new products] don’t justify the disruption” – Anonymous
- “2015 is too far away to think about. We don’t have an analytical view on our estate. We will be reactive and depend on Openreach account managers taking the lead” – Anonymous.

CPs appear to be much more willing to move fixed backhaul circuits to the strategic portfolio

85. For CPs considering circuits for their own use (i.e. for backhaul), there is greater willingness to adopt the strategic portfolio. This is because:

- The financial benefits are much clearer. Our interviewees stated that the cost saving of EBD was a clear incentive to migrate (though we understand not all EBD circuits are cheaper than their BES equivalent). For any backhaul circuit, the connection will be used for many years not just for one year or three years. Over the longer time period, the short-term disruption is worth it.
- The short-term disruption is, in any case, minimal. Most sites with a backhaul connection have some sort of resilience. For example, an unbundler may have each exchange connected by two wholesale providers. In this case, the downtime caused by transferring to BES can be managed so that problems are negligible for the end users.

86. This was not uniform. One interviewee said that as with access circuits they did not see a major incentive to switch backhaul circuits to the strategic portfolio.

87. The lack of daisy-chain option for EBD circuits was a cause for concern to interviewees. One interviewee mentioned that the lack of this option meant that they were looking at alternative approaches, including WDM, for backhaul. Comments from our interviews included:

- “We’ve already move most if not all of our circuits to EBD. For the lifetime of a contract, this [i.e. EBD] makes sense” – Anonymous.
- “For our [unbundled] exchange, we like to have two providers – typically Virgin and BT. A small amount of outage [due to the switch from BES to EBD] wouldn’t be a big issue” – Anonymous.

Annex A Survey questions

Q1. Which is the main area of business your organisation is involved in?

- Construction
- Publishing, broadcasting, media, software, IT consultancy, telecommunications
- Utilities
- Retail
- Logistics, transport
- Professional services, including consulting and legal
- Finance, insurance
- Government and public services, including education and health
- Other (Please specify)

Q2. How many employees does your organisation have?

- Under 10
- 10–19
- 20–49
- 50–99
- 100–250
- 250–499
- 500+

Q3. What fixed line data communications services does your organisation use? Please select those that apply:

- ISDN
- DSL
- Superfast Fibre Broadband (e.g. Infinity from BT)
- Cable broadband from Virgin Media
- Leased lines (e.g. Ethernet)
- If yes to leased lines,
 - Do you have Ethernet leased lines?, If yes to Ethernet leased lines
 - Ethernet over fibre
 - Ethernet over copper/Ethernet First Mile (EFM)
 - Unsure
- Other (please specify)
- None

Skip to Q8, if answer is not Ethernet over fibre

Q4. Not including any DSL, Superfast Fibre Broadband, cable or Ethernet over copper/Ethernet First Mile connections, how many Ethernet over fibre connections are you using at each of the following speeds

- Up to and including ten megabits per second
- Greater than ten megabits per second, and up to and including a hundred megabits per second
- Greater than a hundred megabits per second, and up to and including one thousand megabits per second (that is, greater than a hundred megabits per second and up to and including one gigabit per second)
- Greater than one gigabit per second

Q5: Who provides your Ethernet over fibre connection?

- BT
- C&W
- Colt
- Global Crossing / Level 3
- Exponential-e
- KCom
- Verizon Business
- Geo
- Virgin Media
- Other (please specify)

Q6. How will your requirements for Ethernet over fibre change in the next 12 months? For each of the following speeds, please indicate if you expect this to increase / decrease / stay the same.

- Up to and including ten megabits per second
- Greater than ten megabits per second, and up to and including a hundred megabits per second
- Greater than a hundred megabits per second, and up to and including one thousand megabits per second (that is, greater than a hundred megabits per second and up to and including one gigabit per second)
- Greater than one gigabit per second

Q7. How will your requirements for Ethernet over fibre change in the next three years? For each of the following speeds, please indicate if you expect this to increase / decrease / stay the same.

- Up to and including ten megabits per second
- Greater than ten megabits per second, and up to and including a hundred megabits per second
- Greater than a hundred megabits per second, and up to and including one thousand megabits per second (that is, greater than a hundred megabits per second and up to and including one gigabit per second)
- Greater than one gigabit per second

Q8. A) Does your organisation have plans to buy Ethernet over fibre connections in the next 12 months?

- Yes
- No

Q8. B) Or over the next three years

- Yes
- No

Q9. If Yes to Q8.A: How many Ethernet over fibre connections do you plan to buy at each of the following speeds in the next 12 months?

- Up to and including ten megabits per second
- Greater than ten megabits per second, and up to and including a hundred megabits per second
- Greater than a hundred megabits per second, and up to and including one thousand megabits per second (that is, greater than a hundred megabits per second and up to and including one gigabit per second)
- Greater than one gigabit per second

If Yes to Q8.B: Or over the next three years

- Up to and including ten megabits per second
- Greater than ten megabits per second, and up to and including a hundred megabits per second
- Greater than a hundred megabits per second, and up to and including one thousand megabits per second (that is, greater than a hundred megabits per second and up to and including one gigabit per second)
- Greater than one gigabit per second

If No to Q8.A and No to Q8.B: What are the reasons for not planning to buy Ethernet over fibre connections (Select those that apply):

- No requirement for additional bandwidth
- Plan to use alternative technologies (e.g. superfast fibre broadband, like Infinity, cable, DSL)
- Lack of Ethernet over fibre suppliers
- Ethernet over fibre connections are too expensive
- Other (Please specify)

Annex B In-depth CP interview questions

Q1. Details on the current network

- Which Openreach products are you using and at what speeds?
- When do you decide when to use Openreach products and how do you make this decision (e.g. build vs. buy decisions)?
- Any comment on price sensitivity/elasticity?

Q2. Details on future plans

Q2.1 On the overall market

- How do you expect demand for Ethernet over fibre to develop over the next 12/24/36 months?
- How will you meet this demand (e.g. self-build, purchase from Openreach, purchase from other providers)?
- Do you expect any significant change in the total volumes of circuits you will require, and why?

Q2.2 On migration to EAD and EBD

- (*If not already using EBD/EAD*), how aware are you of EAD and EBD?
- Are you thinking of migrating to these products in the next 12/24/36 months?
- If not, what are the barriers (out of the following):
 - Satisfied with current products
 - No business case for migration
 - Fear that current customers will look at alternatives from competitors
 - Contract terms with end user?
 - Other (specify)
- What triggers do you think will influence your decision to migrate to these products?
- Openreach plans to discontinue supplying legacy services (WES, WEES and BES) after 2015. What planning have you done to respond to this change? How will you respond to this change?

Q2.3 On replacement by NGA or EFM

- Of the existing sites connected with Ethernet over fibre, are you considering replacing any services with either VDSL or Ethernet over copper?

If yes,

- For which sites would you consider using VDSL and/or Ethernet over copper?
- What factors other than cost would affect this decision?

- Are there product enhancements you would need to have on NGA or EFM that would increase replacement of Ethernet?
- Over what timeframe would you make this change?
- Which sites would you certainly NOT consider VDSL/Ethernet over copper?

If no, why not?

Q3. Are there other questions or issues that we should cover?

