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OPENREACH CHARGES FOR HARD CEASES AND VLAN MOVES

A report for Sky – Non-Confidential Version

22 DECEMBER 2025

Contents

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EXECUTIVE SUMMARY

Openreach levies a range of ancillary charges alongside its standard wholesale connection and rental fees. These charges are subject to regulated charge controls and can be material in aggregate. This report assesses whether two key categories of ancillary charges – **Hard Ceases** (for the removal of left-in jumpers and tie cables associated with copper-based services) and **VLAN moves** (for rerouting Ethernet traffic between Cablelinks) – are cost reflective, efficient, and consistent with Ofcom's principles for cost recovery. We find that:

- **Hard Cease charges do not reflect efficiently incurred costs:** the original justification for removing left-in jumpers – to manage exchange Main Distribution Frame (MDF) capacity during the expansion of copper broadband – is now obsolete. With the rapid decline of MPF, WLR, and SMPF volumes, and the upcoming Openreach PSTN switch off, there are no longer capacity constraints at exchanges. An efficient operator would therefore not incur any significant incremental costs for Hard Ceases, as the recovery of jumpers to free up capacity is no longer necessary.

- **BT's cost allocation for Hard Ceases appears inaccurate and discriminatory:** BT's Regulatory Financial Statements (RFS), which Ofcom uses as a basis for setting Hard Cease charges, do not distinguish between singleton and bulk Hard Ceases, appear to misattribute engineering and labour costs (by including activities related to the delivery of FTTP services), and fail to reflect the current operational environment, in which routine jumper removal to free up capacity is no longer necessary. The methodology disproportionately affects non-BT Communications Providers (CPs), such as Sky, which rely largely on MPF, with no allocation of Hard Cease costs to WLR.

- **VLAN moves charges are excessive and unsupported by evidence:** VLAN moves are automated software processes with effectively zero incremental cost, but Openreach charges for this service. Conversely, VLAN moves can in fact *reduce* costs to Openreach, by facilitating more efficient use of the capacity available at the exchange. There is little clarity in what costs, if any, BT could legitimately recover from these services with BT's RFS appearing to allocate unrelated service centre and physical infrastructure costs to VLAN moves.

- **Assessing Openreach's charges for Hard Ceases and VLAN moves against Ofcom's 'six principles for cost recovery' shows that these charges are unjustified:** Openreach's charges for these services go against the principles of cost causation, cost minimisation, distribution of benefits and effective competition.

Therefore, we recommend that Ofcom implements the following changes in its 2026 Telecoms Access Review (the TAR):

- **Hard Ceases should be only performed – and charged for – where Openreach can demonstrate an operational need**, rather than as a default requirement when CPs withdraw copper services.
- **Charges for Hard Ceases should be aligned with the actual incremental cost**, which is expected to be close to zero for jumper removal activity undertaken when exchanges are decommissioned.
- **VLAN moves charges should be set to zero**, given that these processes are fully automated, do not drive incremental cost, and their current pricing distorts efficient network management and downstream competition.

1 Introduction

1.1 Openreach levies several ancillary charges in addition to per line connection and rental fees for wholesale local access (WLA) services. These charges can be material in aggregate due to increased service migration volumes – in particular, as a result of FTTP rollout and in preparation for copper switch off and exchange decommissioning. This report focusses on charges for two types of ancillary services:

(a) Hard Ceases: when services on unbundled copper lines in local exchanges are stopped; and

(b) VLAN moves charges associated with the migration of GEA (Generic Ethernet Access) traffic from one Cablelink circuit to another.[1]

1.2 This report assesses the extent to which the regulated charges for these services are cost reflective and, more broadly, consistent with Ofcom's six principles for cost recovery:

(a) Effective competition – the mechanism for cost recovery should not undermine or weaken the pressures for effective competition.

(b) Cost causation – costs should be recovered from those whose actions cause the costs to be incurred at the margin.

(c) Cost minimisation – the mechanism for cost recovery should ensure that there are strong incentives to minimise costs.

(d) Distribution of benefits – costs should be recovered from the beneficiaries, especially where there are externalities.

(e) Practicability – the mechanism for cost recovery needs to be practicable and relatively easy to implement.

(f) Reciprocity – where services are provided reciprocally, charges should also be reciprocal.

1.3 We find that Openreach's charges for these services diverge from the above principles in multiple respects with negative consequences for consumers.

[1] A Cablelink circuit is the handover connection between Openreach's access network and a Communications Provider's (CP's) own network.

1.4 We present our analysis of the current approach to charges for Hard Ceases and VLAN moves in Section 2 and Section 3, respectively. Each Section is structured as follows:

(a) first, we set out relevant background relating to the charges;

(b) second. we assess the extent to which charges are cost reflective based on the available evidence, in particular BT's Regulatory Financial Statements (RFS); and

(c) third, we consider the extent to which the approach to these charges is consistent with Ofcom's 'six principles for cost recovery', and the negative consequences of diverging from these principles.

1.5 Section 4 sets out proposed changes that Ofcom should implement in its 2026 Telecoms Access Review (the TAR), to address the issues we have identified.

2 Assessment of Hard Cease Charges

2.1 Background

2.1 Connections (both new connections and migrations) of any copper exchange-delivered services, e.g. WLR, SMPF and MPF, require an Openreach engineer to physically connect jumpers (short copper cables) across the main distribution frame (MDF) to connect a customer's line to a provider's active equipment in the exchange (and for MPF lines, also to Openreach line testing equipment). The cost of the engineer's time to carry out this work – specifically, the removal of jumpers connected to the losing Communications Provider's (CP's) equipment and / or installation of new jumpers to the gaining CP's equipment – is recovered through the relevant connection charge. In the case of migrations, this is charged to the gaining provider, i.e. the provider losing the customer does not pay for the jumpering work entailed in activating the customer's service with the gaining provider.

2.2 When services on a customer's line are ceased (rather than migrated to another provider), jumpers may be 'left in', with a soft disconnection at the active equipment, e.g. a 'soft dial tone' on WLR so voice services can be reactivated in the future without any need for physical intervention.

2.3 The introduction of local loop unbundling (LLU), and in particular MPF which is based on 'double jumpering', resulted in a significant increase in the number of jumpers used in exchanges. In some cases, given the difficulty of expanding MDF capacity, there were capacity constraints at an exchange. In order to mitigate these constraints, Openreach could disconnect these left-in jumpers (LiJs) to provide capacity for new connections to copper services delivered from exchanges – referred to as a 'Hard Cease'. CPs may also request Hard Ceases if they have capacity constraints on their active equipment and so require lines to be physically disconnected.

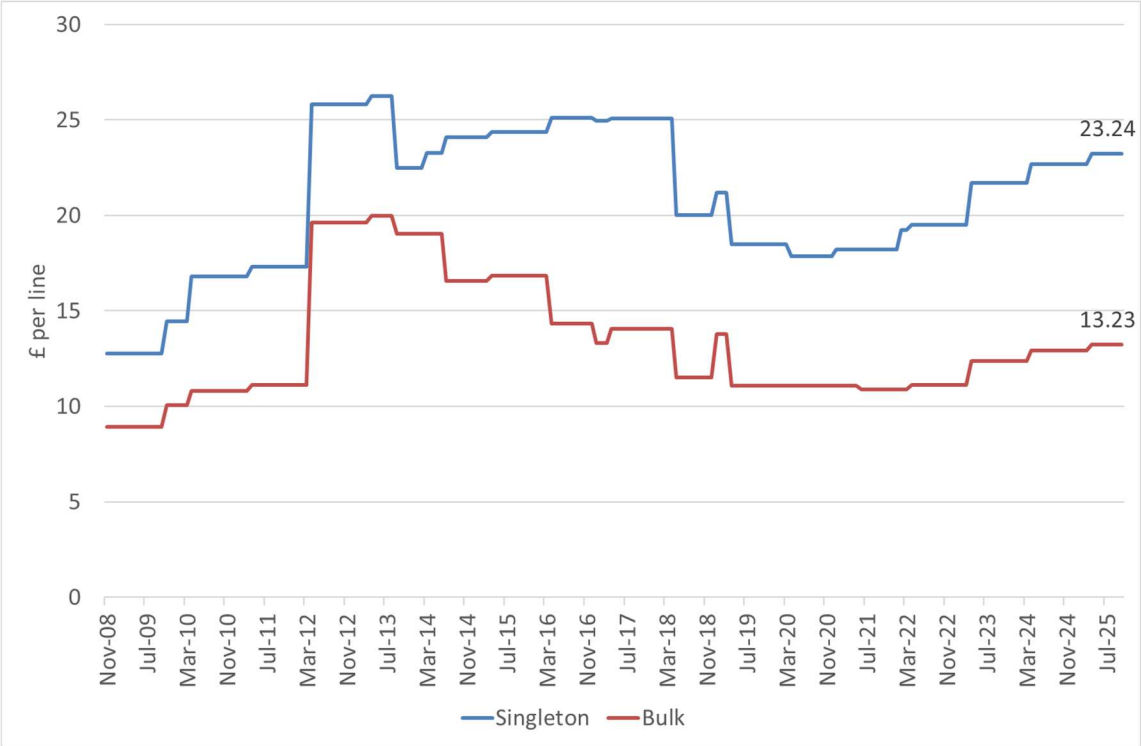
2.4 Given engineer time was required for the removal of left-in jumpers, but there was no corresponding connection charge, Openreach was allowed to charge for these Hard Ceases of MPF and SMPF lines through specific charges to the CPs that had previously used the line. They are intended to recover the cost of engineering work carried out at the exchange when copper services on a particular line are stopped (rather than migrated).

2.5 The rationale for the service, and its associated charges, was that removing LiJs allows operators to maintain port capacity on their LLU equipment and for Openreach to maintain copper network capacity to process new orders for exchange-based copper services (such as WLR and LLU). There is a separate, lower, charge for bulk Hard Ceases. The reduction should reflect the lower unit

costs of an engineer carrying out a larger number of jobs in an exchange at the same time: for example, the cost of travelling to the exchange can be spread over a larger number of jobs.

2.6 Ofcom applies a charge control to Hard Ceases, based on a 'top-down' modelling approach. The top-down model uses base year cost data from BT's RFS as a starting point, which it assesses and adjusts where appropriate, and forecasts how the nominal costs of relevant services will change over the period of the charge control. The evolution of the charges for MPF Hard Ceases is shown in Figure 1 below.

Figure 1 MPF Hard Cease charges



Source: Frontier Economics analysis of the Openreach price list

2.7 We understand that, typically, [✂]. This downward trend has been driven by ongoing migration to FTTP services and to Single Order GEA (SOGEA) FTTC services, which now bypass the MDF. Copper 'stop sell', at exchanges where fibre is available to more than 75% of premises, together with Openreach's FTTP order

mix targets have further supressed demand for copper-based wholesale access.[2,3]

2.8 We also understand that, under current contractual arrangements, Sky will face bulk Hard Cease charges at exchanges where it retires its active equipment used for copper-based services. Sky will also be required to pay cease charges on tie cables from Sky's equipment to the distribution frame. Sky estimates that this could apply to [✂] jumpers, [✂]. Under the current charging regime, Sky therefore could face Hard Cease charges [✂], as and when it retires its copper equipment.

2.9 As part of its 'Exchange Exit Contract', Openreach has offered to waive Hard Cease charges at Openreach-led exchange closures and, in particular, the first tranche of 108 exchanges that it plans to close by the end of 2030. Openreach has also offered to defer and ultimately waive Hard Cease charges outside of these 108 closing exchanges, on the condition that Sky has fully exited all 108 closing exchanges by 1 December 2030 – i.e. if Sky is delayed in exiting just one exchange (even by one day), it will be liable for the full deferred charges across all exchanges it is planning to exit (plus interest).

2.2 Analysis of the cost reflectivity of Hard Cease charges

2.10 In this Section, we consider the extent to which Openreach's charges for Hard Ceases reflect Openreach's efficiently incurred costs. We find:

(a) **Hard Cease charges are not efficient**: The original rationale for removing left-in jumpers (LiJs) – to manage exchange capacity for copper broadband – no longer applies because copper-based services (MPF, WLR, ADSL) are in steep decline due to FTTP rollout, stop-sells, the upcoming Openreach PSTN switch off and LLU operators withdrawing their MPF services.

(b) **Hard Cease charges are not cost reflective**: Reported costs combine singleton and bulk Hard Ceases; include engineering activities that are likely unrelated to Hard Ceases; and apply outdated cost allocation weights that overstate the costs of bulk Hard Ceases while omitting comparable WLR work. This disproportionately impacts non-BT CPs such as Sky.

2 SOGEA was created to provide broadband without needing a separate analogue voice line, with voice calls instead being delivered using VoIP, therefore bypassing the need for a connection to the MDF.

3 Under Openreach's 'Equinox 2' commercial offer, CPs need to ensure that at least 80% of all new orders in FTTP-available areas are placed on FTTP, not on copper, in order to receive a discounted price on FTTP rentals (and over 90% in order to receive the largest discount).

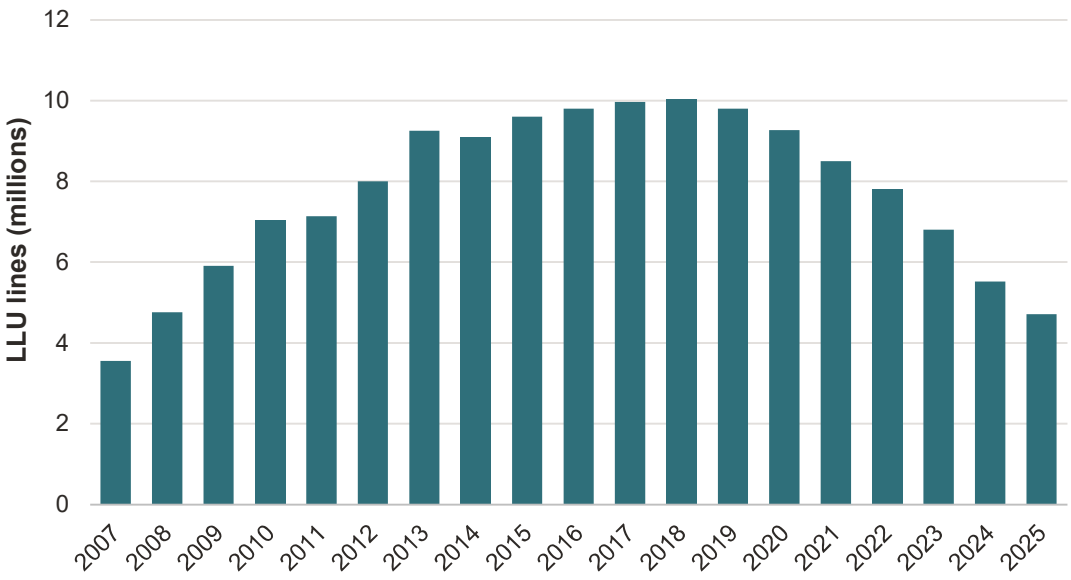
Openreach incurring costs for bulk removal of left-in jumpers is unlikely to be efficient

2.11 As explained above, the rationale behind the removal of left-in jumpers and the associated Hard Cease charges was that they freed up capacity on MDFs and active equipment, allowing Openreach and LLU Providers to process new orders for exchange-delivered copper services. This was especially important in the period after exchanges were unbundled and take-up of copper-based broadband services was growing, to ensure that there was sufficient capacity available at exchanges to support new connections.

2.12 The rollout and adoption of SOGEA and FTTP services, alongside the introduction of copper stop-sell (in FTTP Priority Exchanges) and Equinox 2 order mix targets, mean order volumes for LLU services, i.e. MPF and SMPF, WLR and other copper services are increasingly *de minimis*. For instance, in the first 9 months of 2025, [✂] of Sky's orders to Openreach were for MPF-based services. In addition, Openreach's commercial offers, including Equinox, have further incentivised migration away from exchange-based copper services.

2.13 The steep decline in demand for unbundled copper services in recent years can clearly be seen from Figure 2 below, which shows how the number of active unbundled copper lines used by external (non-BT) CPs has evolved over the period 2010 – 2025. As the chart shows, the number of external LLU lines has fallen by more than half since 2018, from around 10 million to less than 5 million today.

Figure 2 Non-BT LLU volumes (MPF + SMPF) 2010 – 2025



Source: Frontier analysis of OTA data

2.14 Openreach's upcoming PSTN switch off also means that voice services have migrated away from exchange-delivered WLR services to voice over IP services delivered over broadband lines, e.g. SOGEA or GEA FTTP. The OTA reports that in September 2025 there were 1.22 million non-BT WLR lines, down from 4.2 million non-BT WLR lines in 2015/16 (and 16 million WLR lines in total) with the number of WLR lines due to fall to zero with Openreach's PSTN switch off in January 2027. [4,5]

2.15 This drop in demand for copper services delivered from exchanges means that there are no capacity constraints on MDFs in exchanges, with the expectation that demand for copper-delivered services will drop to near zero in the medium term and the MDFs can be decommissioned.[6]

2.16 Although there is a commercial incentive for LLU providers to migrate existing MPF customers to alternative services such as SOGEA and FTTP and close their LLU installations, there appears to be no technical or operational requirement for Openreach to remove resultant LiJs or LLU tie cables.

2.17 Where an operator has migrated all MPF subscribers in an exchange and wishes to retire its LLU equipment and hand back the exchange space to Openreach, there is no disadvantage to Openreach if these inactive LiJ connections and LLU tie cables remain in place until the copper network infrastructure in the relevant exchange is removed entirely. To the contrary, it would likely be more efficient for Openreach to remove all its equipment (MDF, jumpers, etc.) together in one go when it decommissions the exchange.

2.18 Thus, an efficient operator would not incur costs for jumper removal for bulk Hard Ceases as equipment is retired. Openreach, in offering to defer, and then waive these Hard Cease charges implicitly acknowledges that it does not intend to remove remaining LiJs when decommissioning exchanges. Moreover, because the waiver is conditional on CPs exiting exchanges within the specified timeframe, the deferred charges act, in effect, as a punitive mechanism rather than a means of Openreach recovering efficiently incurred costs

4 https://www.offta.org.uk/latest-news/september-2025-update

5 BT Regulatory Financial Statements 2016/17

6 While there will likely continue to be some residual demand for copper-based services such as SOTAP, we would expect this to be immaterial relative to the available capacity, given that MDF capacity has been scaled to serve the entire market and hence should be able to be accommodated within the existing jumper capacity. Moreover, the steep decline in MPF volumes since 2018, shown in Figure 2, implies that at least 5 million TAM ports should be available for SOTAP services.

The current approach to cost attribution in the RFS does not appear to reflect exchange decommissioning

Table 1 Hard Cease costs and revenues from the RFS

	FY24	FY25
Revenues	4.5	5.0
Operating cost	3.1	4.5
EBIT	1.4	0.5
EBIT margin	31%	10%

Source: BT RFS 2025

Note: Mean capital employed for Hard Ceases is negligible, so ROCE is not meaningful

2.19 As noted at paragraph 2.6 above, Ofcom uses BT's RFS as the basis for setting Hard Cease charges. While in recent years the reported revenues are broadly in line with reported costs in the RFS (see Table 1 above), these reported costs do not appear to be an accurate measure of the actual costs of delivering the Hard Cease services:

(a) The costing approach is not transparent and the relationship between revenue and cost fluctuates, suggesting inconsistent allocation.

(b) The RFS appears to include unrelated engineering activities within the copper jumpering cost base:

(i) The main source of costs attributed to jumpering activities are labour costs. BT engineering labour costs are allocated based on time spent on different activities, classified by the Class of Work (CoW).[7]

(ii) Costs are booked to jumpering CoWs from a range of profit centres (divisions of Openreach). These include those related to service delivery of copper services, e.g. 'SD CS London' but also those associated with service delivery of FTTP services, e.g. 'SD FTTP London'. This suggests that the costs include the cost of connecting fibre cables as well as jumpering for copper cables.

(c) While Hard Ceases were historically carried out for capacity management, with jumpers of disconnected lines being removed to maintain port capacity at the MDF, today we would not expect that a large volume of bulk Hard Ceases

[7] There are two classes of work related to jumpering: J – 'Jumpering' and JLU – 'Jumpering for LLU'

is needed as services are withdrawn from exchanges. The underlying costing approach does not appear to have changed to reflect this shift. In particular:

(i) The RFS show revenues and costs for 'MPF Hard Ceases' as they are regulated products and generate significant revenues. This category combines both singleton Hard Ceases, e.g. where individual lines are ceased and the corresponding jumpers removed, and bulk Hard Ceases where several lines are ceased, for example when active equipment is retired.

(ii) The Hard Cease costing appears to be based purely on the incremental cost for singleton Hard Ceases, being based on an attribution of jumpering costs and with the attribution between different products being based on the time taken for jumpering individual lines for different products.[8]

(iii) The underlying costs of singleton and bulk Hard Ceases now differ significantly. As noted above, it is unlikely to be efficient to remove left-in jumpers for bulk Hard Ceases.

The unit cost of bulk removal of jumpers will be significantly lower than the unit cost of singleton Hard Ceases

2.20 As noted above, given declining volumes and hence reduced demand for capacity for copper services, we would expect that, going forward, LiJs can stay in place at a given exchange until it is eventually decommissioned.

2.21 The presence / absence of jumpers seems unlikely to alter materially the cost of copper exchange decommissioning. Therefore, to the extent that there are costs associated with removing LiJs and tie cables when an exchange is being decommissioned, we would expect these costs to be significantly lower than historical costs for bulk Hard Ceases at active exchanges and are likely to be indistinguishable from other decommissioning costs, e.g. that of the MDF within which the jumpers are situated.

2.22 Therefore, setting 'deferred charges' for LiJs and tie cables that will remain in place until the decommissioning of an exchange based on current Hard Cease charges will not reflect the actual work done at decommissioning.

[8] In the RFS, the costs associated with jumpering CoWs are allocated in total to Plant Group 'PG142A', an intermediate step in the cost allocation. This plant group is in turn allocated to component 'CL161'. CL161 is then allocated across a range of various services which require copper jumpering activity in the exchange based on weighted volumes. These weights appear to reflect the different complexity of the jumpering activity required based on singleton transactions, where engineers need to conduct jumpering activity for a single line rather the bulk Hard Ceases required when a CP removes access equipment from an exchange.

BT's approach to the allocation of jumpering costs between wholesale products is inconsistent and disproportionately impacts non-BT CPs

2.23 BT's RFS appear to only allocate jumpering costs for the removal of left-in jumpers to lines using MPF and not to lines using WLR. There is no charge in BT's price list for Hard Ceases of WLR lines.

2.24 However, we understand that the underlying operational processes involved in implementing a Hard Cease for an MPF line and WLR are very similar and would therefore expect them to be allocated similar costs, taking into account the fact that WLR solus uses a single jumper and two jumpers when it is paired with SMPF or FTTC (compared to the two jumpers used for MPF).

2.25 Given that BT Retail has mainly used WLR for its copper-based services, while non-BT CPs have relied primarily on MPF, this apparent inconsistency in cost allocation and / or Hard Cease charging also disproportionately impacts non-BT CPs.

2.3 Assessment of Hard Cease charges against Ofcom's six principles

2.26 Our analysis in Section 2.2 above indicates that Openreach's charges for Hard Ceases bear little relation to the underlying costs.

2.27 In this Section, we assess these charges more broadly against Ofcom's 'six principles of cost recovery' (as outlined at Section 1). We find that the current approach diverges from these principles in several respects:

(a) **Hard Cease charges are not consistent with Ofcom's cost causation and cost minimisation principles**. As set out in Section 2.2, declining copper volumes mean that MDF capacity constraints are no longer binding, and jumper removal is no longer necessary for operational purposes. The efficient incremental cost of a Hard Cease is therefore close to zero, yet Openreach continues to levy material charges. Allowing charges for an activity that is no longer required undermines incentives to minimise costs and risks encouraging unnecessary work.

(b) **By placing an unjustified cost burden on CPs, the charges also conflict with the principles of effective competition and distribution of benefits**. Hard Cease liabilities fall disproportionately on MPF operators, whereas WLR-based services – used primarily by BT Retail – do not appear to attract equivalent cost allocation and / or charges. Moreover, the long-term beneficiary of copper switch off and exchange exit is Openreach, which will benefit from substantial ongoing cost savings. Under Ofcom's framework, the party benefiting from an activity should bear its cost; yet CPs face significant Hard Cease charges despite receiving no corresponding benefit.

Charges for Hard Ceases are inconsistent with the cost causation principle

2.28 As set out at Section 2.2 above, the efficient incremental costs associated with Hard Ceases should be close to zero (in that bulk jumper removal work is an inefficient activity). Falling copper volumes mean that capacity constraints for copper services at BT exchanges are no longer an issue, making the removal of jumpers largely unnecessary. Any costs associated with unnecessary jumper removal would be inefficient and hence should not be reflected in Openreach charges. To the extent that jumper removal is required on exchange decommissioning, we would expect the unit cost of this to be low and included as part of the overall decommissioning costs.

2.29 Therefore, according to Ofcom's cost causation principle, the efficient level for Hard Ceases should be very close to zero. However, the current charges represent a material cost to CPs. To illustrate, the number of external (non-BT) LLU lines peaked at 10 million in 2018, and CPs can expect to have incurred (or be liable to incur) Hard Cease charges in the region £13 to £23 per line (depending on whether they are singleton or bulk Hard Ceases). This equates to upwards of £130 million in total.

Hard Ceases charges go against the cost minimisation principle

2.30 Ofcom's cost minimisation principle sets out that charges should ensure there are strong incentives to minimise costs. As noted above, declining copper volumes means that the removal of jumpers when copper lines are disconnected should no longer be necessary. By allowing Openreach to charge for this service, it is provided with an incentive to carry out this work even though it is not required. Conversely, setting the charge to zero would incentivise Openreach to avoid unnecessary jumper removal and hence minimise the associated cost.

Deferred Hard Ceases charges impose a significant cost liability on access seekers despite Openreach being the long-term beneficiary of exchange exit

2.31 As set out at paragraph 2.8, we understand that Sky and other access seekers could face Hard Cease charges for all copper lines with LiJs when they exit exchanges in future, and that this represents a substantial liability. In addition to not being cost reflective, charges for the bulk removal of LiJs on exchange exit and / or decommissioning are contrary to Ofcom's distribution of benefits principle – BT is the main beneficiary of exchange exit, as it will significantly reduce its operational costs going forward, and therefore should be responsible for the associated costs. Further, as noted at paragraph 2.23 above, no jumpering costs in the RFS appear to have been allocated to WLR – a service used primarily by BT's retail businesses.

2.32 While Openreach has offered to waive deferred charges for Hard Ceases if access seekers exit the 108 exchanges it plans to decommission by 1 December 2030, this is subject to the 'cliff edge' requirement that CPs fully exit all 108 of these exchanges ahead of the target decommissioning date. This appears unduly punitive and creates a substantial risk that CPs will be exposed to the full, and unjustified Hard Cease charges across all exchanges, if they miss exiting just one of the initial 108 exchanges (even by one day).

Excessive charges for Hard Ceases should be removed

2.33 Ofcom is proposing to find that BT has significant market power (SMP) in WLA markets, equivalent to dominance. Openreach's approach to setting charges for Hard Ceases appears consistent with an excessive pricing abuse, based on the established 'United Brands' test:[9]

(a) **Prices are excessive:** as explained above, Openreach's charges for these services appear to bear no reasonable relation to the cost of efficient supply:

(i) routine jumper removal work to free up capacity at exchanges is now an unnecessary, inefficient activity and hence should not be reflected in Openreach charges;

(ii) to the extent that jumpers are required to be removed on exchange exit and / or decommissioning, we would expect the unit cost of this to be immaterial and borne by Openreach as part of its overall decommissioning costs;

(iii) as noted at paragraph 2.18, the fact that Openreach is offering to waive Hard Cease charges strongly implies that these costs are not material; and

(iv) the fact that Sky will be liable for deferred Hard Cease charges if it is delayed in exiting the initial 108 exchanges due to be decommissioned by 1 December 2030, means that the charges act as a punitive mechanism, rather than a means of recovering efficiently incurred costs

(b) **Prices are unfair:** the prices appear to bear no relation to their economic value – again, routine Hard Ceases to free up capacity are not necessary, while the removal of jumpers in exchanges that Sky is exiting and / or Openreach is decommissioning will be of no economic value.

2.34 Openreach's approach to Hard Cease charges also appears to have no objective justification.

[9] ECJ in United Brands v Commission (Case 27/76)

3 Assessment of VLAN moves charges

3.1 Background

3.1 VLAN moves implement changes in the routing of traffic to the Sky network, generated by Sky's GEA-based subscribers on the Openreach local access network, i.e. moving the routing of traffic for an individual GEA subscriber from one Cablelink circuit to another. Configuring VLAN moves is a completely automated process, with no manual intervention, relying on electronic data interchange between CPs and Openreach. [10]

3.2 CPs may use VLAN moves for operational reasons (e.g. equalising utilisation of Cablelinks terminating on the same L2S) or for network modernisation / security purposes. To illustrate the latter use case, Sky has [✂] GEA Cablelinks in use, the majority of which attach to [✂]. [✂], at current VLAN moves prices, the [✂] GEA services currently supported by these [✂] Cablelinks would cost [✂] to move to [✂] Cablelinks.

3.3 VLAN moves are separately charged by Openreach. The price was first charge controlled in the 2018 Wholesale Local Access Decision. Ofcom included VLAN moves as one of several automated, software change ancillary services within Openreach's GEA / VULA portfolio. At the time, BT was unable to provide robust service-specific cost data for any of this group of services. In the absence of cost information, Ofcom based the allowed charge on a proxy: the fully allocated cost (FAC) of the CP-to-CP migration service (and corresponding LRIC), which it judged to be a similar automated system change. These ancillary items then sat within the WLA / VULA price control framework (and later WFTMR SMP conditions for specific ancillary charges, e.g. bandwidth change charges).

3.4 In its 2018 WLA charge control clarifications, Ofcom states explicitly that its '*estimated LRIC and FAC for… services that require software changes such as … VLAN modifications are based on the FAC of the GEA CP-to-CP migration service*,' noting BT '*was unable to provide detailed cost information for the majority of software change services.*'[11]

3.5 Since then, VLAN moves have been subject to pricing continuity.[12] In addition to the standard charge for single VLAN moves, there is a slightly higher charge for bulk migrations. There is no clarity as to why bulk charge per move should be

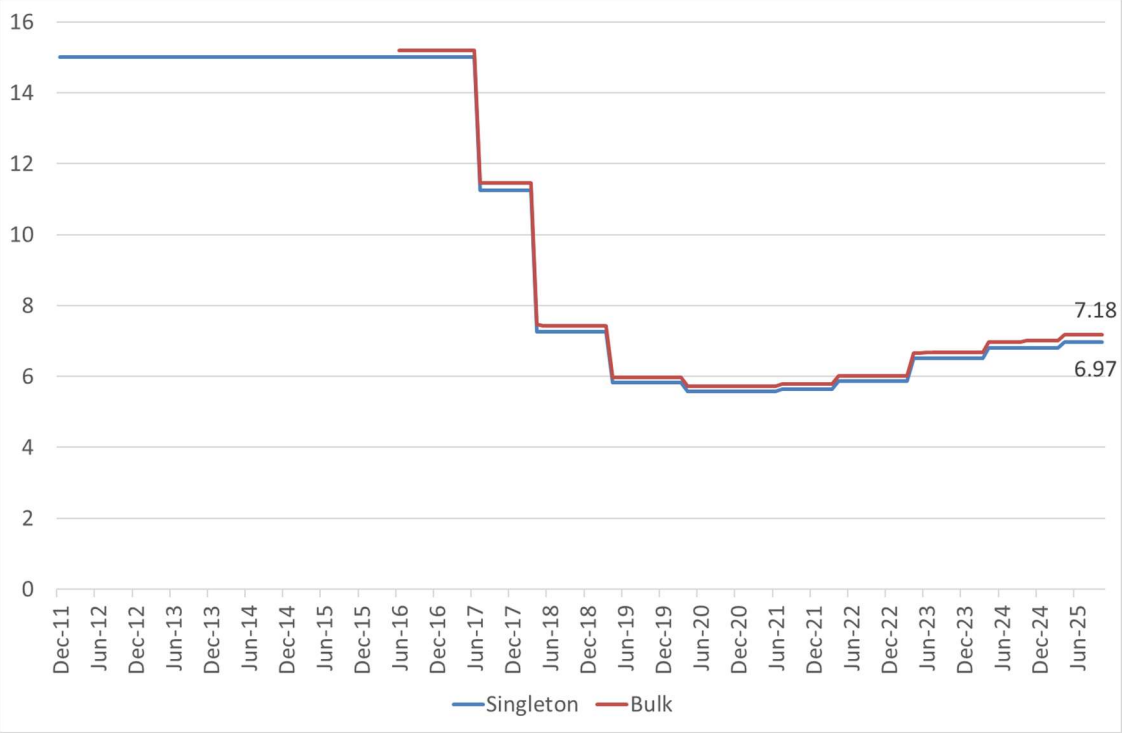
10 A Cablelink circuit carries customer traffic between Openreach's network and the CP's network at the exchange.

11 https://www.ofcom.org.uk/siteassets/resources/documents/consultations/category-2-6-weeks/106398--wla-further-consultation-on-charge-control/clarifications-wla-charge-controls-further-consultation.pdf?v=322786

12 See Ofcom, 2021, WFTMR Statement, Volume 4 Pricing Remedies, paragraph 5.19; Ofcom 2025, TAR Statement, Volume 4: Pricing Remedies. In the 2021 WFTMR, Ofcom justified pricing continuity on the basis that it expected changes in costs over the market review period were likely to track inflation relatively closely.

higher than singleton charge. The evolution of these charges is shown below, with a steep decline in prices leading up to the charge control being implemented followed by a series of relatively small changes under the charge controls.

Figure 3 VLAN Moves Charges



Source: Frontier Economics analysis of the Openreach price list

3.2 Analysis of the cost reflectivity of VLAN moves charges

3.6 In this Section, we consider the extent to which Openreach's charges for VLAN moves reflect its efficiently incurred costs. We find that:

(a) **VLAN moves charges are excessive:** VLAN moves are automated software processes with near-zero incremental cost. The original basis for these charges was not grounded in direct evidence – Ofcom instead relied on a proxy service (CP-to-CP migration) due to the absence of actual service-specific cost data from BT.

(b) **BT's RFS do not attribute costs to VLAN moves in a way that reflects the true costs of the service.** Almost all the reported costs stem from the 'OR service Centre – Provision GEA' component, which includes a wide range of unrelated physical network activities that appear to have no relevance to VLAN moves services. This disconnect is exacerbated by allocating service centre costs across services uniformly, in proportion to volumes, without regard to the extent to which specific services are likely to drive costs.

The incremental cost for VLAN moves is effectively zero and the costs attributed to these products bear little relation to the underlying activities

3.7 Since VLAN moves are software-based processes, generally requiring no manual intervention, the incremental cost is effectively zero.

3.8 As set out at Section 3.1 above, in the absence of service-specific evidence from BT, Ofcom based the allowed charge for VLAN moves on the FAC associated with CP-to-CP migration, as a proxy. In the 2016 RFS, the costs recovered from this proxy consisted of three main components:

(a) Routing & Records

(b) FTTC Development

(c) Service centre – Provision NGA

3.9 To the extent that the fixed costs recovered were the costs of systems development to support these processes, we would expect these costs to fall over time:

(a) The cost of developing new systems to support GEA (e.g. FTTC) will have largely been recovered by now and the integration of these processes in any new systems is likely to require lower expenditure than the initial implementation.

(b) The overall volume of transactions is likely to increase over time compared to the 2016 benchmark, when GEA volumes were much smaller.[13]

3.10 By 2021, where the cost of VLAN moves was separately identified in the RFS, the cost of VLAN moves was almost entirely due to the cost component 'OR Service Centre – Provision GEA' with no attribution of 'Routing and records' or 'FTTC Development' costs.

3.11 The 'OR Service Centre- Provision GEA' component includes attributions of a range of costs which are clearly not relevant for VLAN moves, for example:

(a) 'Lift & Shift of Wholesale Network Equipment'

(b) 'MTC Main distribution Frames Specific to LLU'

(c) 'Maintenance Network Power Plant Specific to LLU'

[13] The use of economic depreciation can account for anticipated growth in volumes over time. However, we understand that bottom-up model used to set charges for VLAN moves (and other GEA-related services) in the 2018 WLA, used CCA depreciation (see Ofcom 2018 WLA Statement, Annex 14, paragraphs A14.62 – A14.63) and that the charges have been subsequently rolled forward (based on CPI-0), under Ofcom's pricing continuity approach.

(d) 'Provision of new poles'

(e) 'Maintenance; Underground Main Network'

(f) 'Maintenance, Local Line Underground Copper Wiring Residential'

The allocation of costs across services using unweighted volumes exacerbates the disconnect between the charges and the underlying activities

3.12 The cost of 'OR Service Centre – Provision GEA' component is allocated across a range of products in proportion to unweighted volumes. For example, a new connection to FTTP services has the same allocation as a VLAN move. This does not appear to reflect causality as there is far more likely to be a need for manual intervention by the Openreach service centre in delivering a new FTTP connection, due to the need to make a physical fibre connection at the customers premises, than the simple software-driven change in the Openreach network to carry out a VLAN move.

There is no evidence that VLAN moves charges are cost reflective

3.13 In summary, there appears to be no evidence that VLAN moves charges are cost reflective. The initial setting of the charge was, by Ofcom's own admission, not based on robust service costing. The costing approach in the regulatory financial statements is clearly inappropriate:

(a) Several costs are attributed to VLAN changes which are related to physical network infrastructure, which is causally related to other services; and

(b) To the extent that some of the costs included in the 'OR Service Centre – Provision GEA' may be relevant to VLAN changes, the attribution of these costs equally across all products is unlikely to reflect cost causality.

(c) System development costs associated with GEA should have declined over time as initial investments were recovered and transaction volumes increased, yet there has been no corresponding reduction in charges in the period since price regulation was introduced in 2018 (to the contrary, prices have been rising steadily, as Figure 3 above shows).

3.3 Assessment of VLAN moves charges against Ofcom's cost recovery principles

3.14 Our analysis in Section 3.2 above indicates that Openreach's charges for VLAN moves are not cost reflective.

3.15 In this Section, we assess these charges more broadly against Ofcom's 'six principles of cost recovery' (as outlined at Section 1). We find that the current approach diverges from these principles in several respects, with negative consequences to consumers:

(a) **VLAN moves charges clearly diverge from Ofcom's cost causation principle**. VLAN moves are fully automated, software-based processes that require no engineering time, physical intervention, or network resources. Their efficient incremental cost is therefore effectively zero.

(b) **Charging for VLAN moves will lead to inefficient outcomes**: VLAN moves charges distort CPs' operational choices – discouraging efficient network upgrades, traffic management, and timely migration to fibre-based services – which could result in poorer performance, slower adoption of new technologies, and less innovation in the retail market.

(c) **The charges also undermine effective competition and harm consumers**. VLAN moves are an ongoing operational activity that scales with the size of a CP's GEA-based customer base and therefore directly affects retail pricing and margins. BT Consumer faces no equivalent uplift, as payments to Openreach are internal transfers within BT Group, creating a structural asymmetry that disadvantages rival CPs.

Levying a fee for what is essentially a costless service clearly violates Ofcom's cost causation principle

3.16 As explained in Section 3.2, VLAN moves entail (essentially) zero cost, as they are software-based and automated. Despite this, Openreach's RFS allocate a range of costs that appear to have no causal link to the execution of a VLAN change.

3.17 Because VLAN moves neither consume resources nor trigger new expenditure, charging anything above a nominal value is inconsistent with Ofcom's cost causation principle.

VLAN moves charges act as a barrier to modernisation and efficient traffic management

3.18 CPs can face VLAN moves charges when upgrading equipment at exchanges (in particular, to add more capacity or remove legacy equipment) and rerouting customer traffic to that equipment. The excessive charges for VLAN moves act as a barrier to modernisation and efficient traffic management.

3.19 For example, where a CP is facing capacity constraints at exchanges due to growth in customer traffic, it may need to install new higher capacity Ethernet switches. Routing the traffic of existing customers as well as new customers to a higher capacity switch reduces the risk of customers facing capacity constraints at peak

times, which can result in slower end user speeds. Rerouting traffic also allows the retirement of old Ethernet equipment. However, VLAN moves charges currently act as a disincentive / barrier to traffic rerouting, which can result in prolonged use of obsolete equipment which may negatively impact consumer experience and result in the inefficient use of resources (in particular, energy and limited space at the exchange as well as capacity).

Excessive charges for VLAN moves distort downstream competition and increase costs to consumers

3.20 When access seekers face inflated costs for ancillary services, it can increase their effective unit cost per customer and put downwards pressure on their retail margins for broadband services. Current VLAN moves charges are an ongoing cost to CPs that scale in line with the number of customers on the network (i.e. variable costs), and hence need to be factored into CPs' forward looking commercial decisions (e.g. retail pricing).

3.21 As the retail divisions of BT are part of BT Group, they face no equivalent mark-up on their costs, since fees paid to Openreach are effectively an internal transfer. Therefore, imposing excessive charges on VLAN moves places access seekers at a disadvantage relative to BT, undermining their ability to compete. This is contrary to the principle at 1.2 (a) above that charges '*should not undermine or weaken the pressures for effective competition.*'

3.22 The costs of excessive VLAN charges will to some extent be borne by consumers – as noted above, these charges represent a variable cost to access seekers, which we would therefore expect to be passed onto consumers, at least partially, in the form of higher retail charges.

There does not appear to be any dynamic efficiency benefit to setting charges for these services above cost

3.23 Setting charges above cost can be justified if there is a compelling case that this will incentivise innovation and investment that will benefit consumers in the longer run. However, Ofcom already allows pricing flexibility on wholesale rental charges for high speed, FTTP services, to support investment in fibre; and we would therefore expect no further dynamic efficiency benefit from allowing Openreach to set excessive charges for VLAN moves.

4 Proposed changes

4.1 In light of our analysis, we propose the following changes to Ofcom's approach.

Hard Ceases should be performed, and chargeable, only where operationally justified

4.2 As explained in Section 2, the historic rationale for removing left-in jumpers (LiJs) – to alleviate capacity constraints on the Main Distribution Frame – no longer applies.

4.3 Therefore, the routine removal of LiJs is not operationally required, and an efficient operator would seek to avoid the incremental costs associated with this work where possible. To ensure that charges are cost reflective and efficient, we propose that:

(a) **LiJ or tie cable removal should take place only where Openreach can demonstrate an operational requirement**, such as a documented capacity, safety or equipment-access constraint; and

(b) **in all other circumstances, there should be no Hard Ceases or charges**.

4.4 Ofcom should make this an explicit condition of Openreach's SMP obligations, supported by transparent reporting of the circumstances in which LiJ removal is claimed to be necessary.

Where Hard Ceases are genuinely required, charges should reflect the actual cost of the activity

4.5 When considering Hard Cease charges, Ofcom should distinguish between:

(a) **instances where Openreach might need to recover jumpers in bulk to meet ongoing copper demand in live exchanges** – in this case, charges should be based on evidenced costs associated with anticipated LiJ removal activity; and

(b) **instances where Openreach is decommissioning an exchange and there are remaining jumpers in place** – in this case, any incremental costs associated with left-in jumpers would likely be immaterial and, along with its other exchange decommissioning costs, should be borne by Openreach.

Charges for VLAN moves should be set to zero, reflecting their incremental cost

4.6 As discussed in Section 3, charges that CPs currently face for VLAN moves have no empirical cost basis and result from an outdated proxy first introduced in 2018. The RFS allocations include significant costs unrelated to VLAN moves, including physical plant, copper network maintenance and FTTP field activity.

4.7 To restore cost reflectivity and support efficient traffic management, we recommend that:

(a) **Ofcom sets the regulated price for VLAN moves to zero**; and

(b) **any fixed or common costs relating to GEA systems be recovered through other services** with material incremental costs, not via VLAN moves.