

## Openreach Summary of Market and Customer Insight on the ISDN2 and ISDN30 Services

### Executive Summary

This paper seeks to provide an update on the current market position for both ISDN2 and ISDN30. Since the previous Fixed Access Market Review commenced in 2012 and Final statement on the markets was published in 2014, the rate of decline has continued and we have seen an overall reduction in channels for both products. We forecast that the rate of decline will accelerate as the alternative products reduce in price and available Application services increase.

At the same time as the decline in ISDN connections and therefore market size, there has been a considerable rise in ISDN substitutional IP telephony products. SIP Trunking and Hosted VoIP are both offered by up to 100 companies, so competition is well established in the UK and the recent announcement by BT that PSTN is to be withdrawn by 2025 will further generate migration from traditional ISDN2/30 towards these new substitute products.

We consider this rise in substitutional products within section 2 *Substitution of ISDN2 and ISDN30 by alternative products*, to be a key factor in the market changes we are seeing. Within this review process, we have pinpointed the main drivers of change for both ISDN2 and ISDN30 together with views from our CP customers and Market Analysts. The main Industry drivers include, cost reduction, improvements in reliability and quality of service, improved business continuity, and new overlay services, and we consider each in turn for ISDN2 and ISDN30 within this section.

In section 3 *Market definition impact from substitutional products*, we look at the gathered evidence and how we believe this has altered the market definition of both ISDN30 and ISDN2. Supported by the views from Industry and latest forecasts, we conclude that there is significant overlap between SIP Trunking and ISDN30 product sets and with ISDN2 overlap exists with Hosted IP/IPCentrix, plus the significant impact of Broadband on volumes.

We believe that over the next few years including the period covered by the next Narrowband Market Review that both products will be subject to greater levels of substitution. We have included voice of the customer input from CP customers and Analysts gathered via market insight within the relevant sections and collected them within Annex A and B.

In summary, we consider that the recent moves in the market have been significant enough to thoroughly examine the market definition of each product and that the criteria for Significant Market Power (SMP) be re-evaluated to take account of these changes.

## 1. Market Assessment, Fixed Access Market Review 2014

Ofcom had previously published its ISDN market assessment within the 2009 Wholesale and Retail Narrowband Statements<sup>1</sup> and its position was found still to be appropriate at the time of the FAMR Consultation which commenced in 2013. The FAMR Statement<sup>2</sup> was published in June 2014 and in this document Ofcom concluded that the appropriate market definitions should apply to ISDN2 and ISDN30.

### Market Definition and Significant Market Power (SMP)

**ISDN2** – A market definition based only on ISDN2 exchange lines at the retail and wholesale levels should remain. IP-based services are growing and becoming increasingly important but Ofcom believed that these did not at that time pose a sufficient constraint on the supply of ISDN2 to warrant inclusion in the relevant product market.

**ISDN30** – In both the market review statement 2009 and the subsequent 2013 Consultation document it was concluded that no material change had occurred and the following remained applicable. A market definition based only on ISDN30 exchange lines at both the retail and wholesale levels is appropriate. IP-based services such as SIP Trunking are growing and becoming increasingly important but Ofcom believed these do not yet pose a sufficient constraint on the supply of ISDN30 to warrant inclusion in the relevant product market.

Furthermore, In terms of SMP, Ofcom concluded that;

**ISDN2** - BT holds SMP in the provision of wholesale ISDN2 exchange line services in the UK, and for the Hull Area, Ofcom found that KCOM had SMP. Ofcom confirmed that no communications provider holds SMP in the provision of retail ISDN2 exchange line services in the UK.

**ISDN30** - BT holds SMP in the provision of wholesale ISDN30 exchange line services in the UK. No CP had SMP in the retail ISDN30 market in the UK excluding the Hull Area. However, for the Hull Area, Ofcom found that KCOM had SMP.

Ofcom reached the conclusion that SMP was applicable as the criteria set out in the Relevant Markets Recommendation was met, namely:

- High and non-transitory barriers to entry: Ofcom consider that significant barriers to entry remained
- Market without effective competition: BT still has a very high market share/currently pricing at the cap imposed by the charge control
- The insufficiency of competition law alone to adequately address the market failure: Ofcom, does not believe this market will tend towards competition within the relevant time horizon and therefore ex ante regulation is necessary to promote effective competition

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<sup>1</sup> Ofcom 2009 Ofcom, Fixed Narrowband Retail / Wholesale Services Markets, 15 September 2009; [http://stakeholders.ofcom.org.uk/binaries/consultations/retail\\_markets/statement/statement.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/retail_markets/statement/statement.pdf)

<sup>2</sup> Fixed access market review, wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30

In addition to the market definition and SMP, Ofcom compared the trends in wholesale ISDN2 and ISDN30 volumes against the trends in SIP/IP Trunk volumes and Hosted VoIP volumes. The following conclusions were documented;

- In considering ISDN services as a whole, the growth in IP-based services in absolute terms is still greater than total ISDN decline.
- Over the period from June 2010 to December 2013, SIP/IP Trunk volumes grew by approx. 920,000 trunks and Hosted VoIP volumes grew by approximately 810,000 (units are equivalent to 1 ISDN channel) – roughly 1.7 million in total.
- In comparison ISDN30 volumes declined by about 420,000 and ISDN2 volumes declined by about 140,000 – only around 560,000 channels in total.
- This may be as a result of transitional dual running of services and growth in other uses of IP-based services. The disparity in rates of growth and decline of the respective services suggests that there is not a one-to-one relationship, and therefore we cannot assume that the growth of IP volumes results purely from the switching behaviour of ISDN customers.

### Openreach View

In setting out our position, we consider the conditions for both ISDN2 and ISDN30 in terms of Market Definition and SMP have changed markedly since the 2014 statement. We have seen overall Industry connections for both products decrease. Given the gathering evidence from CP customers and industry analysts, we believe this is due to the substitutional impact of IP Telephony products on ISDN30 and to a lesser but growing extent on ISDN2. With regards to ISDN2 specifically, ADSL broadband is now heavily substituting the use of ISDN2 lines for ‘non-voice’ purposes.

Competition is already well established for substitutional products such as SIP trunking and Hosted VoIP which particularly impacts new demand for multi-line voice and the existing ISDN30 base. We explore the impact of IP Telephony growth on the ISDN2 and ISDN30 markets drawing upon insight from analysts and the Industry. Taking the available evidence into consideration we have concluded that the influence of IP Telephony, and ADSL broadband for ISDN2 ‘non-voice’ use, in accelerating the decline of ISDN2 and ISDN30 should now be reflected within their respective market definitions.

## 2. Substitution of ISDN2 and ISDN30 by alternative products

In the 2014 Statement Ofcom looked at both demand and supply-side factors to consider whether the wholesale and retail price of ISDN2 and ISDN30 was constrained by potential substitutes. It concluded that a market definition based only on ISDN30 and ISDN2 exchange lines at retail and wholesale levels remained appropriate. It acknowledged IP-based services such as SIP Trunking were growing and becoming increasingly important, but considered in 2013 that these did not yet pose a sufficiently strong constraint on the supply of ISDN30/ISDN2 to warrant inclusion in the market. They summarised that demand and supply-side substitution was limited to IP Telephony products and that as SIP Trunking uses a PBX based at the customer site, it is a closer functional substitute for ISDN30 than ISDN2.

We have summarised the options for substitution below, with only Hosted VoIP/IP Centrex and

SIP Trunking being realistic alternatives to ISDN30. Broadband and IP Based Telephony are the main substitutional options for ISDN2.

## ISDN30/ISDN2

Leased Lines

ISDN2/ISDN30

Analogue Exchange Lines



For all 3 Ofcom determined that the risk of substitution with ISDN30/ISDN2 was negligible

**Broadband** – To substitute ISDN2 In areas where broadband access is poor

### IP-Based Telephony –

- Hosted VoIP/IP Centrex (services provided to small sites that are accessed via an ordinary broadband internet connection)
- SIP Trunking
- Hosted VoIP would only be a substitute for businesses prepared to use a managed network based service for PBX functionality as an alternative to an onsite PBX
- SIP Trunking is generally multi-line, providing exchange line services to modern IP PBXs supporting this type of interface and is an alternative to ISDN30
- SIP Trunking uses PBX at the customer site, it is a closer functional substitute for ISDN30 than Hosted VoIP services

## Openreach View

### ISDN2

We believe there is growing evidence that IP-Based Telephony substitution of ISDN2 lines for voice usage and broadband substitution for data usage has increased markedly since the market data supplied to Ofcom for year ending 2012/13 and published in the FAMR statement of 2014<sup>3</sup>. The insight we have gathered on the dynamics influencing substitution of ISDN2 by either broadband (data usage) or IP Based telephony (voice usage) has been driven by a number of factors:

- **Lower pricing and improved TCO** - The reason the use of ISDN2 as a low cost data service is in decline is in part due to the competitive cost of alternatives and now ubiquitous coverage of Broadband services.
- Although cost is certainly part of the decision making process for a business, it is less of a consideration than reliability, security and quality of service for ISDN2 customers when compared with ISDN30. However it remains that lower pricing which drives lower cost per Mbit/s is a key driver of customer decision making regarding reliable low bandwidth connections. BTGS recently stated that price remains a key consideration when a customer considers migrating from ISDN2<sup>4</sup>.

<sup>3</sup> Fixed access market review, wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30

<sup>4</sup> GS Market Insight Team: Feedback received from GS Sales

- IP-based products are generally marketed as a cheaper alternative to ISDN and with the initial set up costs reducing, this has made switching to this technology more attractive to customers who haven't yet considered this move. This is especially true for smaller SMEs who are typically most cost conscious than larger enterprises and are seeking to control capital investment and reduce ongoing operational expenditure.
- Genius Networks were quoted in a Business Comms article<sup>5</sup> that compared to ISDN, SIP is cheaper on a per channel basis, more flexible in terms of what telephone numbers you can have and where you can have them, is quicker to install and can offer a very robust business continuity service that ensures your business never loses calls.
- **Improvements in reliability, quality and security** - Together with cost reduction, the improvements in key service characteristics such as quality of service and reliability are removing the main barriers of switching and narrowing the functionality differences.
- Customers have used ISDN2 primarily due to its low bandwidth reliability. Concerns over security and quality have also slowed the decline of the ISDN2 base and maintained a steady stream of new connections. However, advancements in the stability, security and quality of service of broadband and IP Based Telephony has started to change the market perception and made them a realistic alternative to ISDN.
- ISDN2 is often used for a number of critical operations. These include line resiliency, offering back up service in the event of a failure of the primary service. ATMs that require very low bandwidth, but 24 hour service reliability and Public locations such as traffic lights train stations and bus stops that display live information. These services are increasingly transferring to copper broadband given near ubiquitous coverage, lower cost per Mbits and high levels of reliability.
- We have witnessed the following trends from CP customer feedback that confirms that there are fewer occasions where ISDN2 does not have a viable substitute for data usage. We believe that these alternatives now offer the same functionality at a lower price;
  - For most applications including street applications, ATMs and EPOS ISDN2 lines are being substituted by copper broadband (ADSL)
  - There are a number of major deals where large corporate retail banks have replaced ISDN2 for ATMs with copper broadband
  - [REDACTED]
  - Transport for London is replacing ISDN2 circuits that underpinned traffic lights with an alternative solution from another supplier

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<sup>5</sup> Business Comms article published Sept 2015 <http://commsbusiness.co.uk/features/isdn-vs-sip-no-contest/>

- **Higher take-up of IP complementary data products** - All these factors, including the further rollout of more reliable and powerful broadband will give customers more viable alternatives when considering their data and voice future needs.
- BT Business have advised that as the availability of fibre broadband increases, customers seriously look at Hosted IP /IP Centrix, both cost and flexibility of the service driving the decision. BT Business record the fact <sup>6</sup>that the market is certainly talking about SIP and Hosted VoIP and most customers have these products on the roadmap of 1-2 years from now.
- **Shift in retail focus from ISDN to IP-based products by Openreach CPs** – Competition has intensified and confidence in IP-based products and broadband has allowed service providers to position these products as a real alternative as they compete with each other to get ISDN customers to migrate.
  - A number of Openreach’s CP customers have voiced their views on what they are now seeing in the market. Node 4 believes they are seeing more and more uptake in SIP from customers that were traditionally ISDN customers. Gamma concurs, saying that in their view, SIP trunking was identified as the single most important new technology with approximately 50% in a readiness state to deploy.
  - Growing awareness of IP-based products has created a shift in demand and of service providers and wholesalers adapting to address the business need. Although IP based products are already driving large scale substitution, the market is still seen as immature. Cavell Group believe that providers are positioning SIP as ISDN replacement only, though there will be a drive towards further overlay services that will add value to new customers or those considering switching.
- **PSTN end-of-life announcement** - Cavell Group believes that the PSTN End-of-Life, announced by BT to be 2025<sup>7</sup>, will have a major impact on the SIP Trunking market in the next few years and further accelerate the ISDN2 rate of decline.
  - Migration activity will gather urgency within the next five years as vendors plan to discontinue PSTN-related product lines and support. Several service providers have plans to complete the majority of PSTN migration by 2020, after which Ovum expect vendor support for traditional single line and multi-line fixed voice to fall off significantly.

The views from CPs as we have seen are enthusiastic, although we do note that some customers are yet to be convinced by substitution of their traditional voice service. These customers believe that the risk in migrating from a service that has a strong record of reliability is still high. Although concerns around security and quality of service exist with broadband it is now viewed to be able to fulfil all the services at least as well as ISDN2. Indeed its extra flexibility and reducing set up costs have seen services previously only ever considered suitable for ISDN such as ATMs and EPOS migrate to substitute products. [REDACTED]

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<sup>6</sup> [REDACTED]

<sup>7</sup> Comm Business : <http://commsbusiness.co.uk/news/bt-set-firm-date-to-switch-off-isdn-network/>

[REDACTED]

Reliability still remains the primary concern and moving to SIP Trunks means that voice and data are carried over the same physical connection. Therefore the reliability of that underlying connectivity product is even more critical given the impact it has on both data and voice. BTGS cited that customer concerns over security do persist as an issue that is preventing some customers from moving to IP-based voice. BTB have voiced their view <sup>8</sup>that end customers are overcoming initial doubts around reliability and security and are choosing to migrate. It is also expected that as the availability of fibre broadband increases, customers seriously look at Hosted IP /IP Centrix, both cost and flexibility of the service driving the decision.

The growth of substitutional products such as SIP Trunks and Hosted VoIP has been exponential and is expected to continue. Indeed Cavell Group’s SIP & IP Trunking Market Report & Forecast 2015-2020 published in September certainly supports the view that ISDN is in terminal decline. It predicts growth only starting to slow from 2019/20 as market penetration of existing ISDN channels reaches 80%. This together with the improved reach and stability of broadband will combine to hasten the decline in the ISDN2 base over the next few years.

### ISDN30

We believe there is growing evidence that IP-Based Telephony substitution has increased markedly since Ofcom published the FAMR statement in 2014. SIP Trunking in particular is viewed across industry as the most common alternative to ISDN30 due to the fact that it replicates PBX functionality. Since 2012/13, the volume of SIP Trunks has increased by an average of 25% each year and the SIP Trunk market is expected to exceed total ISDN30 channels midway through 2016. This demonstrates that SIP Trunks is a fast growing market capitalising on both new demand for multi-line voice but also substituting existing ISDN30 lines.

The insight we have gathered on the dynamics influencing substitution between SIP Trunks and ISDN30 point to a number of different factors:

- **Lower pricing and improved TCO** – The key benefit of IP-based products including SIP Trunks which has been sold to customers is lower cost vs. ISDN30. These cost benefits apply to both rental and calls.
  - Research by [REDACTED] in January 2014<sup>9</sup> identified that “reducing total cost of ownership” was the top reason for moving from ISDN30 to alternative product (Hosted Voice or SIP Trunks). [REDACTED]

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<sup>8</sup> [REDACTED]  
<sup>9</sup> [REDACTED]

- BTGS confirmed that price is the primary consideration when a customer considers migrating from ISDN30 to an alternative product. Depending on the readiness of the business to consumer IP-based voice there can be considerable costs (e.g. investment in Ethernet) and at this level it works mostly for deployments across estates that are medium to large in scale.
- Zen cited in a Comms Business article<sup>10</sup> that the wholesale cost of ISDN30 is £11.75 per channel and with Business Talk SIP as low as £3 per channel customers can make significant savings.
- In another article Genius Networks<sup>11</sup> concur with this view; compared to ISDN, SIP is cheaper on a per channel basis, more flexible in terms of what telephone numbers customers can have and where they can have them. They also highlight the benefits of quicker installation and robust business continuity.
- Node 4 highlight the savings SIP Trunks can offer for “on-net” calls between different company sites; “in particular, we find that the majority of multi-site businesses can see significant savings from SIP trunking – especially through internal call cost savings”.
- Colt also point to organisations’ business needs to reduce OPEX costs and improve mobility of their workforce to enhance productivity. They position that SIP Trunks can deliver these ongoing operational costs and when completing a standard TCO analysis, the cost benefit shows that transitioning to SIP trunking is a justified investment.
- **Improvements in reliability, quality and security** – A key early barrier to adoption of IP-based voice has been lack of confidence from customers in reliability, quality and security of the service. The view from industry indicates that on all three factors customers’ perceptions are shifting with their confidence in IP-based products to deliver in increasing.
  - The research by BT Business conducted in January 2014 quoted a number of business customers that had switched from ISDN30 to SIP Trunks because of the improvements they had seen in reliability.
  - These theme was also reflected by those service providers and wholesalers featured in the Comms Business article<sup>12</sup>. Siphon explained that concerns relating to security and reliability that were raised in the early years of SIP trunking have been addressed. Going on to say that SIP trunking delivers more flexibility, reliability and value for money than ISDN.
  - Gamma, itself a key provider of SIP Trunks, go further in saying that “SIP security is a hot topic and there is a perception that other technologies are more secure

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<sup>10</sup> Comms Business - The Death of ISDN? Published 5 May 2014; <http://commsbusiness.co.uk/features/the-death-of-isdn-3/>

<sup>11</sup> Comms Business - article Published Sept 2015 <http://commsbusiness.co.uk/features/isdn-vs-sip-no-contest/>

<sup>12</sup> Comms Business - article Published Sept 2015 <http://commsbusiness.co.uk/features/isdn-vs-sip-no-contest/>



- primarily because it is an internet based protocol. This is a myth, and SIP channels can provide a secure solution which, like business continuity, has a positive message surrounding it”.
- In the same article Genius Networks explain that most carriers are now offering fraud alert services where they can limit the end user’s exposure should their service be breached, never allowing calls to go past a certain cost.
  - **Improvements in Business continuity and innovative overlay services** – SIP Trunks offer greater flexibility in enabling business continuity and this is seen as a key benefit by many customers. Beyond this innovation in overlay services offered through SIP Trunks is enabling the product to not just replicate ISDN30 but surpass the functionality that it offers.
    - A number of service providers and wholesalers highlighted the importance of business continuity benefit offered by SIP Trunks in the Comms Business article. Tipical commented that “Business continuity is one of the main reasons many end users choose SIP. If it is automated the customer should experience very little or no downtime”. This view is also shared by Venus; “One of the most important business continuity features that SIP delivers is complete independence with regard to location. Numbers are virtual, so once you have ported your number in to a SIP carrier it stays with you wherever you move”.
    - In the same article TalkTalk Business highlight the “fantastic range of overlay services that are allowing many contact centres to switch to SIP and utilise overlay features that surpass those available on ISDN”. These services include; extension dialling across sites by default and the ability to intelligently link any mix of traditional PABX, Hosted UC sites, home and mobile workers across the customers estate. In addition another innovation is the introduction of burstable SIP Trunks; this means that a multi-site customer can oversubscribe trunks at a site level to allow them to “borrow” spare capacity from other sites if their local traffic demands it.
    - Openreach’s own Service Management centres have migrated all their service centres that previously used ISDN30 to an Harrier IP based service to enable business continuity if the primary link were to go down. We believe this trend concerning call centres/service centres in particular will continue. The recent shift by a number of corporates to move call centre capability back “on shore” could provide the catalyst to move to an IP-based solution for their entire UK based call centre estate
    - BTGS have confirmed that ISDN30 is still prevalent in call centres though they are also seeing more interest from customers in SIP deployments across their call centre estates.
  - **Higher take-up of IP complementary data products** – Significant investment, particularly in higher bandwidth more reliable data connectivity products such as Ethernet, were a prominent barrier to migration to IP-based voice including SIP Trunks. Over the past 2 years growth in these products has been considerable as both bandwidth and reliability needs have increased, together with the improvement in the relative pricing position that is

enabling more businesses to invest and switch from legacy data products. This means that many more businesses have already incurred the cost of moving to Ethernet and their business is ready to migrate to SIP Trunks.

- Comms Business highlighted this back in 2013<sup>13</sup> where they pointed to the wider availability of “far more reliable and powerful broadband, EFM and GEA” to underpin SIP Trunks.
- Siphon quoted in the recent Comms Business article said that “as a result of continued improvements in access connectivity over the past few years, SIP trunking is now well established as the preferred solution for SMEs and large enterprise”.
- **Shift in retail focus from ISDN to IP-based products by Openreach CPs** – The industry has witnessed a shift in multi-line voice portfolio of service providers and wholesalers addressing the business market. Growing awareness and confidence in IP-based products is enabling service providers to position these products at the head of their voice portfolio. The net impact is increased potential for substitution of ISDN30 by IP-based products given the relative sales positioning of the two products to customers.
  - One of Openreach’s CP customers, TalkTalk Business, has shifted its focus on multi-line voice services over the past 3 years with IP-based services now spearheading their multi-line voice portfolio whereas ISDN30 did previously.
  - In their most recent step TalkTalk Business launched ‘Complete Voice and Internet package’ which offers “eight to 60 ISDN-quality voice lines and up to 20Mbps of internet, delivered over the same connection”<sup>14</sup>. TalkTalk Business highlight that this packages is “ideal for organisations that have outgrown traditional solutions, such as using separate lines for ISDN and internet, organisations with variable demands of voice capacity, and companies wanting to make the first move into IP Voice (SIP) without changing their ISDN phone system”.
  - TalkTalk and other service providers have firmly placed IB-based voice including SIP Trunks as the multi-line products to complement growth business connectivity products of EFM, GEA-FTTC and Ethernet. Most service providers offer ISDN30 products but they are placed less prominently in their portfolio given her higher pricing and lower margin for the service provider/wholesaler.
- **PSTN end-of-life announcement** – Cavell Group<sup>15</sup> view that the 2025 PSTN End-of-Life announcement made by BT will have a major effect on the SIP Trunking market in the next few years. This view is supported by Ovum<sup>16</sup> who comment that PSTN migration will be necessary and gaining in urgency within the next five years as vendors plan to discontinue PSTN-related product lines and support. Several service providers have plans to complete

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<sup>13</sup> Comms Business - The Death of ISDN? Published 5<sup>th</sup> April 2013; <http://commsbusiness.co.uk/features/the-death-of-isdn-3/>

<sup>14</sup> TalkTalk Complete Voice and Internet; <http://www.talktalkgroup.com/press/press-releases/2015/completevoiceandinternetpackage.aspx>

<sup>15</sup> Cavell Group SIP & IP Trunking Market Report & Forecast 2015-2020

<sup>16</sup> Ovum – Service Provider PSTN Migration: Not there yet Published November 2014;

the majority of PSTN migration by 2020, after which Ovum expect vendor support for traditional single line and multi-line fixed voice to fall off significantly.

All of the CP customers we have spoken with have noted a shift in the perspective of business customers towards SIP Trunk and its ability to address their multi-line voice needs. A recent article in Comms Business cited several perspectives from service providers and wholesalers on the shift in outlook and buying behaviours towards SIP Trunks vs. ISDN30. Node 4 and BT Wholesale note that they are seeing more adoption of SIP from customers that traditionally purchased ISDN30. Channel Telecom believe that business customers see the technology as more mature and reliable which has boosted their trust in the SIP Trunks.

For those that have yet to switch many are still well aware of the potential for SIP Trunks and other IP based products such as Hosted Voice to replace ISDN30 and meet their needs. BT Business's research identified that many have it on their roadmap for the next few years but will only make that decision when they choose to make a change on their wider voice and data estate given ISDN costs are usually a relatively small proportion of their overall comms spend.

Feedback particularly from CP customers clarified that the above perspectives are not held by all customers. Some concerns do remain particularly for those with the most sizeable ISDN estates and therefore greatest risk in migrating across to a new technology. Reliability remains *the* key concern and moving to SIP Trunks means that voice and data are carried over the same physical connection. Therefore the reliability of that underlying connectivity product that carries IP voice is even more critical given the impact it has on both data and voice. Those customers that have adopted resilient Ethernet over Fibre circuits have less concerns but where other shared infrastructure products such as GEA-FTTC are used customer concerns are greater given lower rate of reliability. In addition BTGS cited that customer concerns over security do persist as an issue that is preventing some customers from moving to IP-based voice.

### 3. Market definition impact from substitutional products

#### ISDN30

Given the available evidence gathered to date regarding the market perspective on substitution of ISDN30 by IP-based voice products, we conclude that there is significant overlap between the two product sets. We believe that over the next few years including the period covered by the next Narrowband Market Review that ISDN30 still be subject to greater levels of substitution by SIP Trunks specifically.

Analysis of actuals and forecast volumes demonstrates a significant transition in share between ISDN30 and SIP Trunks. Industry forecasts and perspectives for each product set are clear, ISDN30 is a declining product and SIP Trunks / Hosted Voice are growing considerably and this is set to continue for the next few years. Cavell Group (including Illume) track and forecast the size of the SIP and IP Trunking market. They published their latest forecast of SIP & IP Trunking Market in

September 2015<sup>17</sup>. Cavell's report confirms that

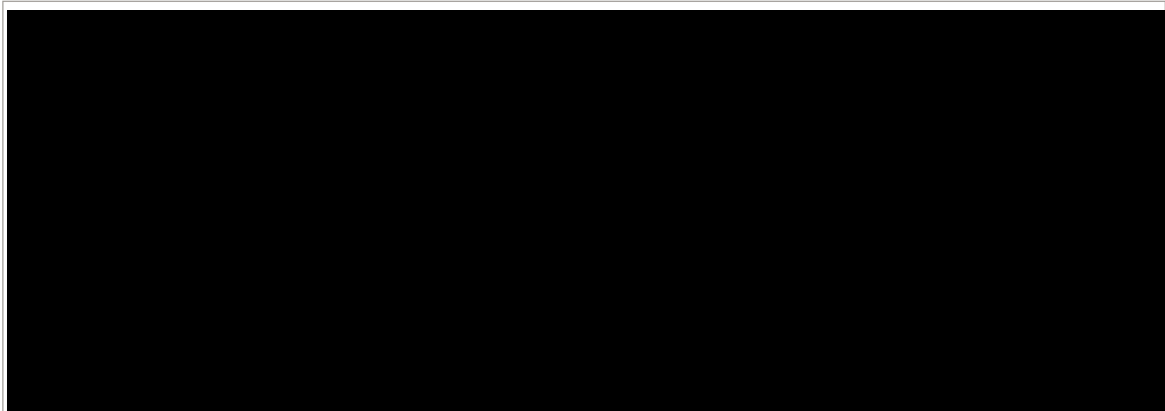
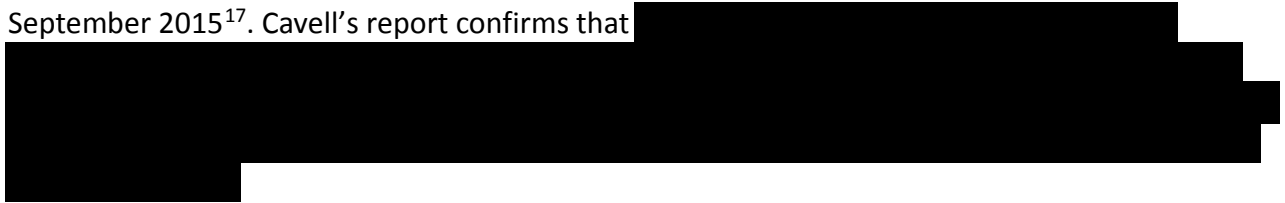


Figure 1. UK SIP & IP Trunking Market Report & Forecast 2015-2020, Cavell Group, September 2015

Cavell estimate that SIP Trunk penetration is [REDACTED]. The available market is determined to be multiline voice requiring PBX functionality. The majority of the remainder of this available market [REDACTED] is currently addressed by ISDN30. Over the next 5 years into 2020 Cavell forecast that the growth in the SIP Trunks market will see penetration [REDACTED] leaving only [REDACTED] of available market with other products, chiefly ISDN30 (see Figure 2).

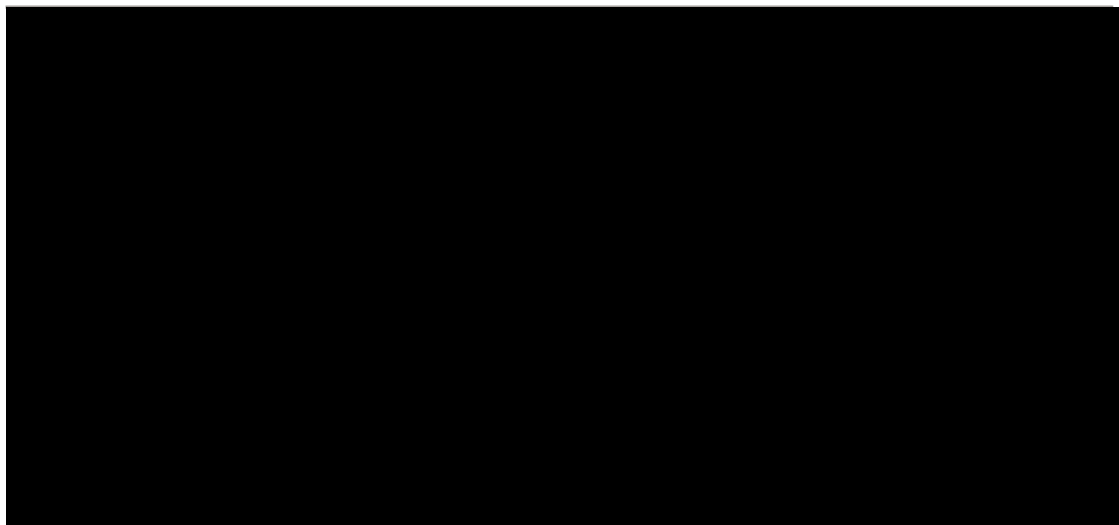


Figure 2. UK SIP & IP Trunking Market Report & Forecast 2015-2020, Cavell Group, September 2015

This forecast implies [REDACTED]. If the two products are combined to form one market [REDACTED]

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<sup>17</sup> Cavell Group UK SIP & IP Trunking Market Report & Forecast 2015-2020, September 2015

(see Figure 3).

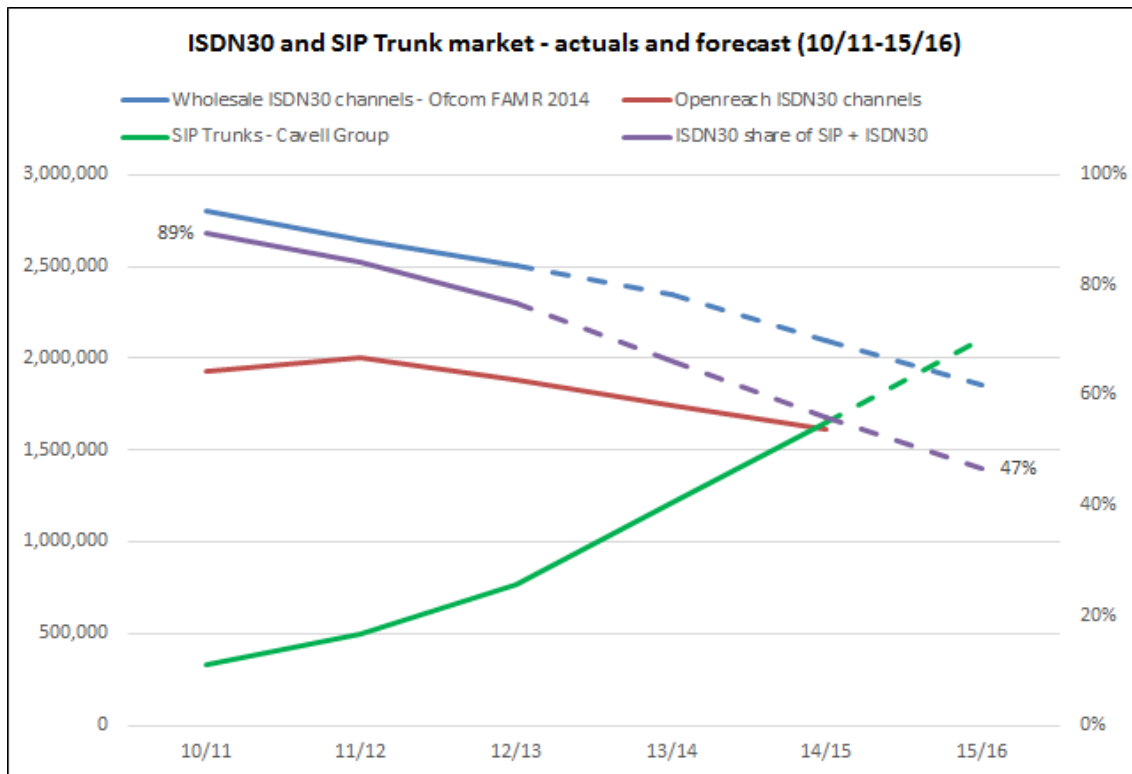


Figure 3. ISDN30 and SIP Trunk Market actuals and forecast, 10/11 – 15/16

Over the period of the char

. With a consensus view across industry that the ISDN30 base will continue to decline over the coming years and SIP Trunks will remain on a high growth trajectory, ISDN30 will account for a diminishing share in the marketplace.

### ISDN2

Recently there has been a firmer trend away from ISDN2 towards IP-based services. We have seen in the data from Cavell Group that since 2013, Hosted VoIP volumes grew by approximately

. This confirms that both ISDN2 has declined more gradually than ISDN30 and that although not all decline is due to substitution, a growing proportion is directly due to substitution, either from IP based products or broadband.

ISDN2 decline is forecasted to accelerate over the next five years with an average 15% decline per year as substitution increases and PSTN switch off gets nearer. Analysis of actuals and forecast volumes demonstrate the position had changed since 2013 with a growing transition in share between ISDN2 and Hosted VoIP/IP Centrex. The separate impact broadband is having on ISDN2 data market makes direct comparisons with IP Based Products less clear.

In summary, we are witnessing the trend away from ISDN2 and confirm that there are fewer occasions where ISDN2 does not have a substitute. Until now this has been reflected in a gradual market decline, that we forecasted to rapidly increase now that the alternatives offer the same functionality at a lower price.

## Annex A

### CP Insight

**Comms Business**<sup>18</sup> - ISDN vs. SIP – No Contest? Published 18 May 2015 & The Death of ISDN? Published 5 May 2013

The report by Comms Business brings together Industry views on four key questions relating to the growth of SIP and decline in the traditional ISDN service. We believe it is important to include the voice of the customer as it adds weight to the view SIP Trunking and IP Telephony are already displacing ISDN and that it is already a very competitive market. The questions seek to answer;

- Do the business continuity features of SIP stack up?
- Is SIP trunk security adequately addressed?
- Are there real cost savings to be made?
- What about Application Services?

#### Continuity Features

**Tipicall** - Business continuity is one of the main reasons many end users choose SIP. It really works and if it is automated the customer should experience very little or no downtime.

**Venus** - One of the most important business continuity features that SIP delivers is complete independence with regard to location. “Numbers are virtual, so once you have ported your number in to a SIP carrier it stays with you wherever you move.

**Gamma** - With all technologies there are areas of concern, but the right solution can be built with SIP to achieve whatever business continuity requirement your business has.

#### Security

**Siphon** - As a result of continued improvements in access connectivity over the past few years, SIP trunking is now well established as the preferred solution for SMEs and large enterprise. Concerns relating to security and reliability that were raised in the early years of SIP trunking have been addressed. SIP trunking delivers more flexibility, reliability and value for money than ISDN.

**Gamma** - SIP security is a hot topic and there is a perception that other technologies are more secure primarily because it is an internet based protocol. This is a myth, and SIP channels can provide a secure solution which, like business continuity, has a positive message surrounding it.

**Genius Networks** - Most carriers are now offering fraud alert services where you can limit the end user’s exposure should their service be breached as it will never allow the calls to go past a certain cost that you can set as a monthly total.

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<http://commsbusiness.co.uk/features/the-death-of-isdn-3/> <http://commsbusiness.co.uk/features/isdn-vs-sip-no-contest/>

**TalkTalk Business** - “Simply put, All SIP trunks are not the same. While they may broadly rely on similar protocols between providers, there is still much room to differentiate their offerings, for example security and ease of deployment.

### Price

**ZEN** - The wholesale cost of ISDN30 is £11.75 per channel and with Business Talk SIP as low as £3 per channel, the savings on rentals are clear.

**Talk Talk** - SIP-based services offer not just next generation networking, but next generation pricing and service too. The TalkTalk ISDN30/SIP service provides an IP-based ISDN service at a much cheaper price than a TDM-based product, without the end user needing to make any investment or change to PBX systems.

**Genius Networks** - Compared to ISDN, SIP is cheaper on a per channel basis, more flexible in terms of what telephone numbers you can have and where you can have them, is quicker to install and can offer a very robust business continuity service that ensures your business never loses calls.

**Node4** - Savings can indeed be made in many cases. “In particular, we find that the majority of multi-site businesses can see significant savings from SIP trunking – especially through internal call cost savings (i.e. calls between branches being on-net).

### Overlay Services

**TalkTalk** - The good news is that the fantastic range of overlay services are allowing many contact centres to switch to SIP and utilise overlay features that surpass those available on ISDN.

### General Market View

**Node 4** - We are seeing more and more uptake in SIP from customers that were traditionally ISDN customers

**Gamma** - SIP trunking was identified as the single most important new technology with approximately 50% in a readiness state to deploy

**BT Wholesale** - SMEs, major enterprises and government organisations are embracing SIP trunks and actively moving from ISDN based services

**Chess** - We are starting to consider removing ISDN30, but only on the back of significant investment in resilient leased lines

**Channel Telecom** - SIP trunks are now a mature technology that business users can and do trust and depend on for business communications





2013 saw the UK IP/SIP Trunking market continue to grow and it passed the one million trunk mark for the first time. The key factors for migrating to IP/SIP are outlined by Colt;

- SIP trunking is listed in Gartner's Critical Capabilities for Pan-European Network Services report
- At the same time, as traditional voice line services are replaced by more mature IP telephony, many users are migrating from TDM telephony to SIP-based communications to benefit from new services such as unified communications
- Previous barriers to adoption have been primarily been cost of access (i.e. providing bandwidth to the customer site where the PBX is located)
- Maturity and trust are additional factors. ISDN TDM services have been used for over 30 years now, whereas SIP trunking has gained major market traction as recently as 2005.
- Therefore customers who have used these older, more traditional services may have wanted to keep them in order to sweat the asset investment they have made in TDM.
- This issue is now being eroded by organisations' business needs to reduce OPEX costs and improve mobility to their workforce to enhance productivity.
- When completing a standard TCO analysis, the cost benefit shows that transitioning to SIP trunking is a justified investment.

## Industry Analyst Views

OVUM - Service Provider PSTN Migration: Not there yet: November 2014

From a slightly different angle, Ovum insist that PSTN migration will be necessary and gaining in urgency within the next five years because vendors are planning to discontinue PSTN-related product lines and support. Also, the aging workforce with knowledge of PSTN infrastructure will add to the urgency. Several service providers have plans for substantially completing PSTN migration by 2020, after which Ovum expect vendor support to fall off significantly.

Ovum quotes one study that concludes that, 77% of TDM switches have been in place for over 20 years, and virtually all of them are more than 10 years old. What has exacerbated the situation is the vendor consolidation over the past decade, leading to rationalization of product portfolios and discontinued lines of equipment. With the loss of PSTN-skilled and experienced workers retiring, It is not just the infrastructure that is aging, but also technicians and engineers with the requisite knowledge of maintenance of such infrastructure. Required skillsets and experience are diminishing as these workers retire or leave the workforce, making maintenance more difficult and costly.