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Connecting you via Hosted IP



Midus Communications Ltd
User Guide to Hosted Ip
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Foreword

Massive changes in individual work styles and expectations are creating new service imperatives for organisations. They in turn need to meet changing demands without incurring huge costs and inconvenience.

It's a changing society: a world where we all, customers and providers alike, want and expect to be able to contact the people we need to contact immediately: no fuss, no delay, day or night. Simultaneously, where we work is no longer a fixed location or desk: we need to have the ability to operate, function and communicate effectively from wherever we are, be it the office, home or remotely.

This service demand comes at a time when telecommunications have changed beyond all recognition. Alexander Graham Bell's early ideas took years to come to fruition, but for the best part of a century, change was slow and steady. In the past few decades, by contrast, this change has accelerated, and the phone as we knew it may, today, be anything from a cordless headset to a highly featured IP telephone or menu driven screen based console.

Along with this change has come an exciting new way of delivering phone calls – IP telephony. Most companies and organisations looking to install, upgrade or change telephone systems will have become increasingly aware of IP telephony, and perhaps some of its potential benefits. It is, without question, the fastest growing technology that is helping provide highly flexible and cost effective communications and is the future direction for most organisations. In terms of reduced costs and potential productivity improvements, it is one of the most exciting developments in the history of business telecommunications.



Yet there are many ways of delivering IP telephony, and as much misinformation as there is information. Managers today are faced with a

bewildering array of commercial choices which makes their purchasing decision a difficult one. As with most things, not all service providers are born equal, but sorting the 'wheat from the chaff' can be challenging – the key is choosing the right supplier that will provide the right service and ongoing support.

This guide helps demystify the options available, the potential benefits to your organisation and looks at one of the easiest ways of delivering IP telephony to an organisation - hosted IP telephony is now a very serious and viable consideration. This guide includes, information on the services that can be offered and equally, the importance of a high quality robust network as the key to success. In addition we offer advice as to how to avoid the costly pitfalls that can create real frustration for users. It aims to explain the business benefits and, in layman's terms, the underlying technology where it matters.

Michael Georgiou-Holden
Wholesale Director

Introduction to IP Telephony

Old fashioned lines and telephones dominated our voice communications until around 1990, when a decade of rapid change began, at ever increasing speeds. Today consumers convey voice calls across all kinds of devices, and 'speaking' to someone no longer even necessarily requires voice – we can chat happily over instant messaging (IM) applications and email, for example. From around 1990, a new digital service,

initially from BT, was introduced. Called ISDN (Integrated Services Digital Network), this new generation of lines heralded a major change for the user. New 'structural' features were introduced. For example, DDI (direct dialling inwards) meant that organisations could, for the first time, cost effectively have incoming calls directed to individuals within their organisation without passing through a switchboard.

Furthermore, a feature called CLI (Calling Line Identification) meant that, with a compatible phone, the number of the person calling was visible before answering.

ISDN also provided 'high speed' data transmission capabilities when compared to the slow, expensive modems of the day. It was the first real attempt at 'convergence' – the joining together of voice and data applications on one network.

The next sea of change in innovation came around 1995, when IP telephony emerged. It's fair to say that in its earliest forms it would have been described as anything but 'business-class'.

However, it developed and refined rapidly and today is a robust, well tested mainstream technology which offers considerable cost savings and adds all kinds of possibilities for organisations.

This technology can now either be integrated within an existing conventional PBX by way of upgrade or be provided as a 'hosted service' effectively replacing the conventional phone system alternative. unaware that our everyday calls often journey

VoIP

– Voice over Internet Protocol (IP) - means, as the name suggests, that voice travels over the Internet. When it was first developed, it would only work over the Internet, but today the term has outgrown itself: the majority of networks are able to carry IP. The 'P' in the acronym refers to the protocol – the technical set of rules used by the network to send and receive signals. These signals are electronic pulses that convert into what we hear as 'voice'. It is also commonly referred to as IP Telephony.

PBX

– Private Branch Exchange - the 'telephone system' that switches calls between various internal extensions within an organisation, while allowing all users to share a certain number of external phone lines. In larger companies a switchboard is often used but now of course calls can be easily directed straight to individual departments, users and call centres.

Such is its success that most of us are blissfully technology. Indeed, BT has announced that from 2008 their network will use only IP for carrying calls.

The universal, naturally open, nature of IP has turned telecommunications into an exciting business application, rather than simply a tool to talk, making traditional PSTN (Public Switched Telephone Network) seem tame and boring.

A new protocol, SIP (Session Initiation Protocol) has become central to this evolution by providing a mechanism which enables a range of 'cross platform' services – blurring the distinction between data (computers) and voice applications.

Moreover it has allowed 'intelligence' and innovative applications and services to be added at the user end of calls

based on the status and availability of the call recipient.

Most application developers are using SIP as standard, so although users will be unaware of the protocol used, purchasers would be well advised to ensure that their systems are SIP-compliant as a way of protecting their investment for future developments.

On the face of it, the way that a call is carried is as relevant to the end user as the way that physical packages are carried – it should arrive in good condition, on time, and cost as little as possible, but not something we usually want to pay attention to daily. Yet businesses are accustomed to what is known in the industry as ‘five nines reliability’ (99.999%), anything less is not acceptable. Whilst we can wait for a ‘data’ package (such as an email) to arrive, and even accept that it may take a while to ‘load’, disjointed voice calls are unacceptable. Therefore the way in which voice is carried is of paramount consideration for businesses, especially at the point of selecting a supplier, IP telephony is now able to provide these high levels of service, resilience and reliability expected however we strongly recommend reading the chapter on the importance of the network to ensure this can be achieved.

The Business Benefits of IP Telephony

The business benefits of IP telephony, however delivered, make a compelling case. In a nutshell these are cost reduction, ease of management and productivity gains.

Reduction in Direct Costs

With an IP telephony system, the number of traditional (PSTN) lines can usually be reduced to a level to manage incoming calls: fewer lines means lower line rental charges.

Additionally, savings are made in the way that calls are routed, making some calls free (usually those on the same network – between offices, for example) and reducing the cost of others as outgoing calls are routed over the IP network.

Management

Moves, adds and changes (sometimes known as MACs) need managing, but with an IP telephony system this should be very simple and can be managed by an administrator rather than requiring specialist technology expertise, often remotely. Moreover, moves, even between buildings, should not require changes in 'extension' numbers. Wherever they are on the network, it should be able to identify the user enabling them to log on wherever they want to within the organisation.

Productivity

It has been noted by many analysts that productivity benefits are often not 'costed in' as part of the justification for moving to IP telephony, often because they are harder to quantify than straightforward call cost benefits. Yet the use of the SIP protocol allows productivity tools to be incorporated within the telephony. It allows easy integration of telecoms applications

with other desk top applications because it's based on 'open' standards. Without digging deeply into the technology, this simply means that it's a lot easier for things to work together. Some of the common productivity tools available enabled by IP telephony are discussed later in this guide, but the most basic productivity savings are made through the intelligent routing

Action checklist:

Consider IP telephony if:

- Your organisation plans to grow
- You have remote workers
- You operate from more than one site
- You have mobile workers such as sales forces 'on the road'
- You have home workers
- Your PBX is coming to the end of its life

Things to do:

- Check how the supplier delivers (network – for help and guidance see our chapter on the importance of the network)
- Check that any system you are offered is SIP compliant
- Look out for a genuine idea of call costs when selecting a system
- Ensure that the supplier has a range of good quality (preferably 'tier one supplier' 'interconnect' agreements to ensure least cost routing.
- Consider hardware recommendations being made

of calls, meaning that callers are more likely to get straight through to the person they want, wherever they might be (on-site or even offsite), or to a suitable alternative, first time.

Reduced Cost of Ownership

Conventional phone systems have historically been a capital purchase or maybe bought on lease however Hosted Telephony Services have now significantly reduced costs of ownership as you effectively pay for the

services and applications that you need on an ongoing basis. The only potential outlay may be the cost of purchasing your own IP telephones per extension user.

Many providers will additionally be able to offer some form of 'least cost routing', meaning that the network will intelligently pass calls along the 'route' that's going to cost the least

And Finally....

There are a couple of myths regarding IP telephony that need clarifying:

Expensive hardware

It is a fallacy that expensive handsets are a requirement for IP telephony. Most IP telephony systems can work with ordinary telephones (protecting your existing investment), IP phones or headsets. IP phones look and function in pretty much the same way as 'normal' business telephones. They make using the sophisticated functions offered by IP telephony simple – using interactive and intuitive scroll down menus rather than sequences of numbers. There's a myth that they are expensive – some executive models can be (in the same way as 'ordinary' phones), but highly functional entry level phones can be bought for £40-£80.



Free calls

It is a common misconception that all IP telephony calls will be free. All providers should be able to offer some calls without charge, depending on how the network delivers calls (a good reason to examine the provider's network), and the provider's business model. Some providers, like Skype, a consumer based application delivered entirely over the Internet, use the free call aspect to generate revenues for some more sophisticated 'add on' applications. All providers should be able to offer 'on net' calls free – meaning that, at very least, 'internal calls' between offices, branches and even remote workers will be free.

Hosted IP Telephony Close Up

The advantages of IP telephony, as we have seen, are the potential productivity gains, easier local management (moves, adds, changes) and reduction in direct costs. Hosted IP telephony adds three additional bonuses: enhanced flexibility, outsourced management of the technology and significantly reduced implementation costs.

Hosted telephony services and functions are typically provided and run by a 'managed service provider' over some form of broadband connection. Where voice quality and security matter, a secure Virtual Private Network (VPN) may be used which avoids carrying calls over the internet. In both cases, the service is hosted securely from a large central equipment location that the service provider controls for its customers.

Translated into operational terms, the 'host' provides full functionality of a conventional phone system over a reliable and secure network and tends to the underlying technology, allowing organisations to take care of the business 'end' of operations, 'renting' the technology that they need, when and where they need it.

Costs

Using a hosted IP telephony service obviates the need to invest in expensive premises based telephone systems or IP installations that require significant capital expenditure, management and technical skills. Though some companies may look to migrate to IP Telephony by enhancing their existing hardware based phone system, in many cases this may be the most viable way to enjoy the enhanced benefits available. As with most IP telephony systems, significant savings on call costs and line rentals can be expected as a benefit of 'free calls' between all remote offices including home-working employees. Using good quality hosted telephony services, an additional saving should be made on line rentals, as users only pay for services used.

Moreover, hosting can deliver tighter cost control through predictable, fixed monthly billing. Seasonal businesses benefit in particular from the flexibility this affords: they need not invest in hardware which sits idle for much of the year.

Hosting means that organisations can scale in size: upwards and downwards, in line with performance or seasonal trends. When compared with a PBX purchase, this scalability offers some significant cost advantages – PBX sales require an organisation to 'overprovision' for future growth, and pay for equipment up front.

Users of hosted IP telephony solutions usually take delivery of the number of IP handsets and specified telephony options they require - and pay for only these (although some will keep existing phones or use headsets).

IP phones

There are a range of IP phones available and the costs will depend on the level of functionality required. There are a number of handsets which conform to the latest IP standards and provide many intuitive functions, often similar in operation to mobile phones in feature access and ease of use. They obviate the need for sequences of numbers and keys being dialled in order to access services. They are connected directly to the organisation's network.

Managing the technology

Using IP telephony makes moves, adds and changes easy at the user end, but many organisations lack the technical resources to undertake a complex IP telephony implementation. Hosting removes the immediate strain of managing a network in house, which can prove expensive - and the skills/appropriate experience, are in short supply.

Hosted IP telephony suppliers handle the underlying network management on a day-to-day basis and places the onus on the supplier to stay abreast of the latest technology innovations and standards.

As well as checking supplier's success on behalf of other customers, users are advised to check that their chosen supplier's network is both secure and resilient. For example, where suppliers use a 'next generation network', based on the very latest technology, the network offers a degree of 'future proofing' and choice as new applications and innovations emerge.

We recommend reading our chapter on the importance of the network.

Flexibility

Most hosted telephony services are both flexible and highly scalable with an extensive range of telephony applications, allowing organisations to easily expand and adapt as their business evolves and grows – or shrinks.

IP telephony allows for more flexible ways of working, such as mobile working or home working (looked at more closely in our chapter on productivity).

A hosted service will often make this easier by allowing workers to be anywhere on the network, yet still remain part of the organisation's telephony system.

IP Centrex

Centrex, a contraction of **CENTR**alised **EX**change, is a telephony service first introduced around twenty years ago finding more popularity in the US and some parts of Europe than the UK. Early Centrex offerings were a forerunner to today's hosted services. They were allocated a section of a public telephone switch to dedicated use by a single organisation. Centrex provided the basic functions of a private telephone switch without the need for in-house telecoms equipment or expertise, but was limited by a poor set of features.

Modern day IP Centrex systems, by contrast, are based upon the high availability and reliability of IP networks. They offer users a viable, cost effective alternative to expensive on site PBX without compromise on features – indeed many IP Centrex solutions have sophisticated feature options over and above the traditional telephone systems, and often form the basis of hosted IP telephony systems.)

Summary:

Consider hosted IP telephony if you want to harness the benefits of IP telephony and....

- The organisation may grow or contract
- Fixed predictable costs are more appealing than a large, up front investment
- There are not the technical skills available 'in house' to implement and manage an IP telephony system
- Future proofing your telephony system (and protecting your investment) is important

Things to do:

- Check how the supplier delivers services (A next generation network is preferable: for help and guidance see our chapter on the importance of the network)
- Ensure the supplier allows scaling down as well as scaling up
- Check for comprehensive telephony functions including those you don't necessarily need today – many organisations find that users start to request new productivity functions when they realise the possibilities
- Ensure that there is a degree of localised user control in the system offered, including self installation of new extensions quickly and easily
- Make certain that the supplier supports remote and mobile working – even if not needed immediately
- It is reasonable to expect a single, business-wide bill for voice services and call costs: check with supplier how this will arrive.

Hosted IP Telephony Services and Applications

Apart from the standard telephony features delivered with a traditional telephone system, a hosted IP telephony solution usually offers additional optional user and organisationwide functions and applications.

Apart from productivity arising simply from being able to manage the system more easily, other benefits are accrued in two main ways: through telephony features that allow more efficient call handling; and through more flexible working arrangements.

Voice mail

Voice mail is normally provided by hosted IP telephony suppliers as standard. It offers the user a range of useful options to ensure important calls are not missed when busy on another call, in meetings or out of the office. Messages can be easily retrieved either from a desktop phone, or remotely (via a mobile phone for example). Better suppliers offer the option of sending messages to your Outlook inbox as a 'WAV' file, to be accessed, replayed, stored and/or forwarded easily to colleagues at the click of the mouse. To help ensure important calls are not missed when out of the office, some systems can send text alerts to a mobile phone with caller details for any messages left on voice mail.

Operator Console

Whilst calls can be easily taken, held and transferred to anybody on a phone network by any user, PC-based attendant operator consoles or switchboards are also available for use where centralised call answering is preferred. These enable organisations to transfer calls easily throughout their network and can be located on-site or off-site.

Things to do:

- **Consider what productivity applications may be appropriate within the organisation, and whether home working is appropriate, and check that the supplier offers them. Some may be offered free, some have a 'per seat' charge.**
- **Decide how calls will be handled – centrally or by number dialled**
- **Decide if productivity applications such as unified messaging will be easily accepted by individuals within the organisation**
- **If using IVR, plan carefully and test prior to 'going live'**

PC-based 'Softphones'

'Softphones' emulate traditional phones through a PC or a laptop, enabling voice telephony and facilitating integration with a range of software applications such as Microsoft Outlook, from wherever a network connection is available.

Softphones enable integration with a range of software applications such as Microsoft Outlook, from wherever there is a secure connection to the VPN, for real workforce mobility.

Unified Messaging

Unified Messaging, sometimes called unified communications, means that mail, voice mail and other message types are managed and accessed via one single inbox. All message types can be viewed, replied to, saved or deleted in the same Inbox using a familiar system such as Microsoft Outlook or Lotus Notes, enabling simple message management, ease of access and enhancing staff productivity.

Interactive Voice Response (IVR)

IVR automatically manages incoming calls and enables the caller to route themselves through to key departments or access important information that they may require such as opening times or announcements. IVR allows callers to link,

using voice and/or touchtone (phone keypad) prompts with a computer database. In this way, the system can accept a question, access the company's database and provide a caller with the information they are seeking – perhaps an account balance, timetables or guidance. It can also take information from the caller; convert it to data and input that data to a database (for example, meter readings).

'Reach Me' – Any time, Any place

Single number 'reach me' is an 'anytime, anyplace, anywhere' application that ensures important calls can always reach the appropriate person, wherever they are – even when out of the office. Better systems offer the option of calls to a desk phone simultaneously ringing on a designated mobile or home phone - or even a specified phone at another destination. Some systems also feature a screen-based user portal which provides the flexibility to create 'drag and drop' call routing requirements, allowing various calls to be handled and managed in different ways.

Home-working (or teleworking)

According to the UK National Statistics Agency, by 2005, 3.1 million people in the UK were officially working from home. Modern communications make that option a realistic, affordable reality.

One of the key 'must haves' for most people that work regularly from home is feeling that they are still 'part of the office', with access to all the information they would have if they were still in the office: work files, user applications, databases and email etc. Increasingly they also demand efficient, cost effective telephony at home.

In this way, home office staff can form part of call groups or call centres, increasing staffing flexibility and efficiency. A broadband or VPN connection can provide the home worker with a fixed cost method of having all those 'must haves' including a telephone on their home desk top that is part of the office phone system.

By having IP telephony at home, as an extension to the office system, a number of benefits are derived. All calls between the home office and other company premises on the network are free (like making an internal call). Home workers enjoy the same telephony feature set as their office-based colleagues: extension status, voicemail, call forward options etc.

Customer calls can be held and transferred easily to the correct individual – whether in office or out - improving customer service and reducing the need for costly 'call backs'. Calls may also be easily set to forward to, for example, voicemail, a secretary, colleague or mobile phone dependent upon personal availability. Calls made from home are still billed to the company, taking advantage of better call rates and reducing administrative costs.

The Vital Key: The Network

The network over which IP telephony will travel is a data network. It can be likened to a road or rail network: congestion has to be controlled or collisions are inevitable. The network must be able to prioritise IP telephony during periods of high demand so that it can arrive predictably at its destination, sounding the way it should.

To ensure this, there are two things that a network must address: QoS (Quality of Service) and security. Not all networks are born equal, and anyone considering IP telephony should demand assurances from their supplier or service provider that they have these capabilities.

Converged networks

Traditionally, larger companies used converged networks to link remote offices. Typically they used a dedicated leased line between offices with a set amount of 'bandwidth' (capacity) in the pipe reserved exclusively for voice, leaving the remainder for data.

A converged network uses a single infrastructure to deliver both 'data' (information, applications, documents or the Internet for example) and voice (calls). The underlying technology in a converged network divides voice calls into small samples, encapsulated in 'IP data packets'. These are marked as priority and transported across the network together with other data packets which may not be as time sensitive.

Converged networks offer some management efficiencies because only one network is required to carry both voice and data.

However, most multi-site companies are now using, or considering, computer systems that link using what is known as an IP-based Wide Area Network (WAN). This type of network can be used to carry voice calls, but not all WANs

Security

Security is an important aspect of anything which uses IP. This is especially true of services which use the Internet for some, or all, of their network infrastructure. Hosted solutions using secure VPNs offer protected access to voice services, using sophisticated systems to prevent hacking, virus propagation and other forms of intrusion.

Quality of Service

QoS (Quality of Service) defines the way that calls are handled when transported across an IP based network - size of packets and speed - and what gets priority on the network. There are many factors that determine the QoS provided, and the company installing or providing the system should ensure that things are set up adequately. Without QoS, voice calls can never truly be "business-class" where they share a network with other data applications.

are able to prioritise voice flow. Converged networks with VoIP enable organisations to build company-wide telephone systems with one simple extension number dial plan providing centralised functionality such as unified messaging, voicemail and reception services.

In a converged network, there must be sufficient capacity to support the required number of simultaneous voice conversations and data applications, and provide priority for 'real time' (instantly delivered) traffic such as voice. It needs to be able to cope under heavy load, and should be able to safely 'drop' or 'park' non-critical data traffic as capacity becomes exhausted. Only a 'next generation' network will be truly able to prioritise voice flow.

The network is only as good as its weakest link, and therefore needs to be constantly monitored and managed. This normally requires specialist networking skills, either in-house or using external support. Most companies outsource this service to managed service providers.

If an organisation 'outsources' to a managed service provider, their network will usually be remotely monitored in accordance with a service level agreement (SLA), which they should ensure they are comfortable with. This differs from a hosted solution in that the equipment on premises remains proprietary, and liability for renewal and repair often lies with the customer, and highlights the importance of selecting the right supplier.

Using the Internet to deliver calls

The Internet offers a single big advantage: potentially free calls. The trade off, however, is that quality is not guaranteed, and at times it is consequently poor. In addition, the Internet is inherently insecure which may not be acceptable for sensitive business calls.

Many will already be familiar with consumer VoIP services such as Skype. Because basic calls are free, consumers accept some degradation in quality. However, most organisations would consider the quality unacceptable in a business context.

Some hosted IP telephony suppliers do offer services delivered in this manner. Organisations should therefore find out which transport mechanism will be used, and consider carefully whether security and quality matter to them when weighing up the pros and cons of such services.

Using a next generation network to deliver Calls

Next generation networks are based on advanced high speed technologies which enable multiple services such as voice, video and data to be integrated and carried efficiently over the same infrastructure. These networks offer highly sophisticated network 'architectures' that enable operators to easily provide new capacity and services, cost-effectively.

As described above, the underlying technology in a converged network divides voice calls into small samples, encapsulated in 'IP data packets'. In a next generation network, the packets are far smaller. The small size enables better control over quality and delivery: ultimately, the call will sound better. (A miniscule particle lost will be less detrimental than a big one. Purely as an analogy, imagine a sentence with part of a letter missing, compared to one with a word missing.)

Next generation networks offer high levels of flexibility and very fast switching technology. They can support a number of different communications protocols, allowing for future developments and innovation.

The inherent traffic engineering features of next generation networks mean lower cost capacity and better quality for 'real time' applications such as telephone calls.

Virtual Private Networks (VPNs)

A VPN is a secure private network, national or global, which connects users' offices, branches and remote sites. It is usually supplied, managed and maintained and by a managed services provider.

IP-VPNs take VPNs to the next level: they are built to take advantage of IP, the standard protocol that delivers the Internet's benefits. Instead of using an expensive dedicated physical connection, such as leased line, an IP-VPN uses "virtual" connections to share these components between a number of users, reducing costs.

Hosted IP telephony services using a private IPVPN tend to be higher quality and more secure than those delivered over the Internet.

Gateway to VoIP

If an organisation already has a lot of telephony equipment, a hosted IP telephony supplier may recommend an IP 'Gateway' or 'trunk'. The majority of telephone systems currently in place cannot make calls using Voice over IP, and cannot be upgraded by the equipment manufacturer without a complete and expensive change to the entire system. Naturally some organisations will be reluctant to 'rip and replace'. An IP gateway may provide the solution. IP Gateways provide interoperability between the wide and varied range of proprietary telephone systems and the new IP networks. A hosted telephony service provider should be able to facilitate this.

An IP Gateway deployed on an existing, traditional telephone system converts normal telephony traffic into IP for transmission. This makes older PBX (switchboard-type) systems 'IP-enabled'. An IP gateway allows them to link to IP handsets or other telephone systems. Based on open standards, IP Gateways enable proprietary telephone systems to seamlessly interoperate with new IP networks, offering some of the advantages of 'going IP'. Gateways are available to cater for different sized companies according to the number of simultaneous conversations that would typically take place.

'SIP trunks' can be used to connect this gateway directly to supplier networks, such as a VPN, to improve quality of service and reduce call costs. They can also connect to an existing private data network between sites, eliminating the need for additional network capacity. This reduces call costs between sites and homeworkers as site to site phone calls become free of charge.

Things to do:

Decide whether carrying calls over the Internet will offer enough security and quality, and source appropriate supplier. Since the managed service provider is one of the single most important factors in determining the success of an IP implementation, check the following:

- **levels of QoS and security on the network**
- **success in previous implementations**
- **financial stability**
- **adequate service support levels to meet your organisations needs**
- **interconnect arrangements**
- **quality and resilience of the network over which calls will be carried**
- **back end processes like accurate billing are in place**

Interconnect Agreements

Hosted IP telephony suppliers manage their own network on behalf of customers. Such suppliers normally have multiple interconnection agreements with a number of telecommunication operators. These agreements will ensure that the quality of calls is high, and allow a degree of least cost routing.



Glossary of Terms

ATM: Asynchronous Transfer Mode - the predecessor protocol used prior to the adoption of the MPLS standard used extensively in telecommunication networks

DSL: Digital Subscriber Line.

HTTP: Hypertext Transfer Protocol - an important networking 'protocol' for distributed, collaborative, hypermedia information systems.

IP: Internet Protocol – the standard, open protocol that allows networks to communicate.

ISDN: Integrated Services Digital Network – the traditional way of carrying calls.

PBX: Private Branch eXchange - the telephone system that switches calls between enterprise users, while allowing all users to share a certain number of external phone lines - most commonly a switchboard.

LAN: Local Area Network

POTS: Plain Old Telephony Services – the old fashioned, 'circuit switched' way of delivering phone calls.

Packet Switching: the underlying technology in IP telephony turns voice into 'packets' for transmission.

Router: A device that handles the routing of packets between two or more packet switched networks. Routers spend all their time looking at the source and destination addresses of the 'packets' passing through them and deciding which route to send them on.

SIP: Session Initiation Protocol

SLA: Service Level Agreement

SMTP: Simple Mail Transfer Protocol. The mail server protocol that helps send email.

QoS: Quality of Service. This defines how the network enables priority traffic to reach its destination when the network is loaded.

VPN: Virtual Private Network

WAN: Wide Area Network

Case Studies

Case Study 1: Publishing firm

An expanding publishing company had three main offices dispersed across the south of England: editorial, advertising and web site design. Additionally, several members of staff work regularly from home. Their original set up included three telephone systems sourced from three different suppliers, connected to two different network operators for calls. This resulted in high telephony costs, particularly between offices, inefficiencies in contacting people, and equipment that could not expand any further.

Using a hosted IP telephony service at each location and for home-workers, the company centralised their communications. This notably enhanced employees by improving access to information and streamlining communication processes. When journalists needed to work from different locations, they still had all the features of the office phone.

The hosted service provided IP telephony “on demand” which meant that, with per-user based pricing, the company could cost-effectively scale as needed to meet seasonal needs and growth requirements.

This also reduced administration costs as the IP telephones could be moved or added by simply plugging them in, with security built into the solution infrastructure for peace of mind. Finally, receiving just one bill instead of multiple, often unintelligible, bills from a range of service providers, the hosted system also simplified management and administration.

Case Study 2: Manufacturing company

A small manufacturing firm in Guildford with 35 extensions needed to reduce its telecommunications overheads. In consultation

with their supplier, they decided to replace their existing ISDN30 service from BT by using an IP gateway to connect to a next generation network supplied by a well known hosted IP telephony supplier.

This reduced their annual line rental by 25% and allowed them to bring remote homeworkers onto their office telephone system without a wholesale change to their

existing phone system - and without significant upfront investment.

Case Study 3: A Construction Company

A large construction company was heavily involved in a high profile regeneration project. Their existing phone system did not provide them with the flexibility and mobility they required.

They were a several site business providing an important, communications role that grew, contracted and moved around as building works developed, site personnel needed to be easily contactable in order to get decisions on important issues and speed resolution of any problems or queries. This was particularly important with regard to suppliers and Head Office needing to arrange deliveries or advise of problems or delays.

Hosted IP telephony offered the flexibility to move staff around with minimal fuss, whilst retaining the same numbers, and the site management team, in particular felt that they knew what was happening all the time, rather than being reliant on messages left.

Head Office noted improved accessibility and reduced call costs, as managers were no longer constantly returning suppliers' calls

Case Study 4: Serviced Offices

A company offering serviced offices across the south of England was moving into a new site, and looking at upgrading the phone systems on their existing sites.

The move to IP was a logical one, as their clients regularly need changes to their telephone set up, and calls between the different sites are frequent. However, the costs associated with offering serviced offices are all 'up-front': the space, the technology, the furniture all have to be purchased up-front and then charged back – the company relies on filling the space to get a return on its investment.

Using hosted IP technology allowed them to limit their up-front investment, and calls and lines could easily be charged back to clients.

In the words of one of their senior directors:

"I'm sure that implementing our own system would, perhaps, have made us a few pence more margin on some calls. But when you factor in that our own IT manager didn't have experience with IP, the massive up-front investment that would have been required and the cost of borrowing money, the hosted option has, I'm convinced, been cheaper. It has certainly reduced the amount of time that our operations director and her staff have to spend on the system. We've also been able to offer additional services to our clients: and in a low margin business like this, anything we can sell on helps our bottom line."

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