

## Planning and Managing Voice over IP (VoIP)

### 1. INTRODUCTION TO VOIP

Voice over IP, or VoIP, is a technology increasingly popular in business for its ability to run voice communication over computer networks – including the Internet – and reduce costs.

This helpsheet explains what VoIP is and how it can help your business.

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#### 1.1 WHY BUSINESSES ARE SWITCHING TO VOIP

The major reason is to cut costs, often dramatically. It's not uncommon for rental costs to be halved moving from ISDN lines to VoIP.

The integration of business phone systems with PC applications – as users increasingly work with devices other than the traditional desk phone – is another key driver.

#### 1.2 THE BENEFITS OF VOIP

VoIP eliminates some of the limitations of traditional telephony by replacing high cost, specialised and proprietary hardware with low cost services and commodity hardware. VoIP is far more scalable both in terms of users and locations.

Traditional telephone lines are inefficient since a pair of physical copper wires is needed for each concurrent call, and these lines are utilised only when a call is made. Since VoIP calls run on existing computer networks, investment in broadband or leased line connections is maximised by eliminating ISDN rental charges. VoIP also brings new features including:

- video calls and video conferencing
- high definition voice calls
- integrated collaboration tools like instant messaging and presence.

#### What about Skype?

Skype is a form of VoIP that operates on PCs, tablets and mobiles over the Internet. It's a peer-to-peer system that uses participating PCs to process and carry calls.

Being Internet based, Skype has no network infrastructure of its own and so the cost base is cut – but this also means that the quality of calls can't be controlled.

Skype is generally seen as a service aimed at the consumer market, in particular for international video calls. As such it doesn't yet provide the range of services that businesses usually expect, for example extensions, call hold and forward and voicemail.

## 2. POTENTIAL COSTS AND SAVINGS

Cost	One-off or Recurring	Typical Amount
<b>VoIP telephones</b>	One-off	Typically £50-£200 per unit
<b>Installation costs</b>	One-off	Dependant on local network survey
<b>End User Licences</b>	Variable	Variable by system choice
<b>Feature charges</b>	Variable	Variable by package
<b>Call costs</b>	Recurring	Mostly per-second
<b>Connectivity; ADSL (includes line rental of landline) or leased lines.</b>	Recurring	Variable by provider. Can often leverage existing connectivity arrangements.
<b>SIP Trunks</b>	Recurring	Variable by package
<b>PBX Services</b>	Recurring	Variable by package

Saving	One-off or Recurring	Typical Savings
<b>ISDN circuits</b>	Recurring	Line rental can typically be halved
<b>Inter-branch call costs</b>	Recurring	Usually un-metered (i.e. free)
<b>Call costs</b>	Recurring	Variable by service providers, but VoIP is almost always the same or better value than PSTN
<b>Home working</b>	Recurring	Contingent on the value of phones operating at home as in the office
<b>Business Continuity &amp; Disaster Recovery</b>	Recurring	Contingent on the value of being able to set up phones anywhere with an internet connection
<b>Flexibility</b>	Recurring	Contingent on the value of adding and removing extensions and services at will
<b>PBX Maintenance Costs</b>	Recurring	Hosted systems require no maintenance
<b>PBX Capital Cost (avoided)</b>	One-off	Physical PBX typically £5,000+

## 3. PLANNING FOR IMPLEMENTATION

### 3.1 TELEPHONE NUMBERS

Whilst we're familiar with geographic telephone numbers, with VoIP both geographic and non-geographic numbers can be delivered anywhere, by *porting* existing numbers to a SIP provider (SIP is a standard for voice and multimedia calls using the Internet and other computer networks in place of the traditional telephone network (PSTN). In addition to the cost savings and functionality enhancements, this also provides a way for businesses to retain telephone numbers if moving offices to another area.

### 3.2 HOSTED SERVICES

A private branch exchange (PBX) telephone system is a switching system to direct calls to the extensions within an office. It typically serves a single physical location.

Today's *hosted* PBX services do away with the hardware required on-site. Instead, they offload the functionality to a service provider (increasingly referred to as a *cloud* solution).

As a result, personnel can easily work across locations, since the hosted PBX doesn't care where a telephone is physically located, in the same way that email can be picked up anywhere.

An interesting and useful side effect of hosted VoIP services being location-independent is that it considers all calls between its extensions as internal, regardless of physical location. For smaller companies, this can create the perception of a larger organisation and also means that calls between extensions are un-metered, even if they are separated by thousands of miles.

### 3.3 HANDSET OPTIONS AND PROVISIONING

A wide range of telephones are available, from £50 to £500 or more, with features and functionality designed for every use case from individual consumers to large international businesses. *Soft phones* – an app that runs on a PC, smartphone or tablet – are also generally available.

It is usually recommended to acquire phones from the VoIP solution provider, since some configuration is required and different handsets often have different system licensing implications.

### 3.4 NETWORK REQUIREMENTS

Broadband typically has more download capacity than upload, and since telephone calls need equal capacity in both directions, the lower (upstream) capacity is the limiting factor, determining how many simultaneous calls are possible. Generally, a couple of phones and PCs can be used on a standard business broadband connection, and a dedicated broadband connection should be able to support ten or more phones.

#### 3.4.1 CODECS

The actual bandwidth each concurrent call needs depends on the *codec* used (the method of converting voice to digital data), alternatives providing a trade-off between audio quality, bandwidth and compatibility. Calls of the same quality as a PSTN line need about 100kbps each, but that can be halved at the expense of some audio quality by using a compressed codec.

#### 3.4.2 SEPARATING VOICE AND DATA

Because speech data is real-time, normal computer-network transient conditions (such as packet loss, latency, and jitter) do impact VoIP call quality. It's therefore important for the provider to understand the nature of the network and offer robust solutions such as *class-of-service* prioritisation and *VLANs* to separate traffic types.

The final design depends on the network infrastructure already in place, security requirements, and of course budget. For larger systems, a detailed network assessment will be needed.

### 3.5 SIP TRUNKS

SIP trunks use the SIP standard to connect VoIP systems to the outside world, enabling calls to be made to and received from any other telephone.

SIP trunks can carry many simultaneous calls, making it possible to reduce costs by replacing many ISDN lines with a single Internet connection.

SIP trunks are marketed in various ways by VoIP providers, from a free service associated with their telephone numbers or PBX, to a chargeable service based on the number of simultaneous calls or channels supplied.

#### VoIP for the Sole Practitioner and Small Firm

Some forms of VoIP are targeted specifically at the smaller business.

Hosted VoIP services for this sector are capable of providing a range of telephony services with low rental costs. In addition, numbers, extensions, services and features can be added or removed as required, usually without penalty or the need for long term contracts – and sometimes, with no contract at all.

Companies that specialise in services to small firms can be found in the Small Enterprise category on the ITSPA Awards website [www.itspaawards.org.uk](http://www.itspaawards.org.uk).

## **4. SUPPORT, MANAGEMENT AND RECOVERY**

### **4.1 SERVICE PROVIDER SUPPORT**

A key benefit of hosted VoIP solutions is that service providers can offer more effective remote support, reducing costly site visits, since the major components of the system are located within their data centres. This also enables maintenance tasks such as software patches and upgrades to be undertaken more regularly and without downtime.

The service providers also generally have real-time monitoring systems to alert them to faults proactively, in contrast to traditional telephony providers who generally rely on fault reports lodged by customers.

### **4.2 ONLINE MANAGEMENT**

Many service providers have taken advantage of Internet technologies to provide sophisticated online management tools or web control panels with their VoIP services. These go further than traditional PBX management tools by providing a range of real time information such as:

- itemised call records
- usage statistics
- autodials from your address books
- integration with online services such as Salesforce.com and Google Apps

Other features offer organisations better control of their telephony – such as setting up call forwarding from a web interface. A business with multiple offices, home offices and mobile workers can generally control the complete service from a centralised online management interface.

### **4.3 DISASTER RECOVERY AND BUSINESS CONTINUITY**

VoIP can address the telephony side of Disaster Recovery and Business Continuity almost by default.

Whilst companies using both SIP and ISDN channels have the option of using one technology if the other fails, many companies moving to VoIP will completely eliminate ISDN lines and achieve redundancy with combinations of broadband connections and leased lines from different providers. Failover between such networks can then be achieved automatically.

Multiple failover is also achieved by VoIP's ability to be easily redirected. In the event of something preventing an office from working, the calls can be taken by another office.

It's usually possible for phones to be taken home and used there. Even if the worst happens and an office burns down, pre-configured phones could be shipped the same day, plugged in anywhere and work exactly as they did in the office.

## **5. SECURITY AND COMPLIANCE**

### **5.1 SECURITY**

Traditional PSTN calls can be intercepted by tapping the wires anywhere along their route, but intercepting VoIP calls usually requires access to either the customers' or service providers' premises. Because on-premises call interception can be avoided through network design and use of encryption, VoIP is considered to be more secure than PSTN.

However, VoIP systems, like anything else connected to the Internet, are potentially vulnerable to malicious use, so it's essential to use an ITSP with robust network security such as dynamic fraud detection. For more detail on the types of fraud and security plans, see the ITSPA White Paper 'IP-PBX deployment for end users' ([http://www.itspa.org.uk/downloads/ITSPA\\_BCP\\_IP-PBX.pdf](http://www.itspa.org.uk/downloads/ITSPA_BCP_IP-PBX.pdf)).

Using reputable VoIP suppliers is also essential because these companies all provide emergency services. However, it is important to note that power outages (without a UPS) and interruption of Internet connectivity will prevent emergency (999) calls being made with VoIP telephones – as it will with most normal PBXs.

Where an advanced IP solution is deployed that allows users to roam and 'log in' in other buildings, it is worth consulting your supplier regarding what 999 address information is automatically presented by your network operator in an emergency call.

## 5.2 REGULATORY COMPLIANCE

Companies that need to be FSA compliant often find that the cost of initially achieving compliance and the on-going cost of maintaining compliance is a major part of their telephony expenditure – a large component being call recording.

For businesses with multiple locations, the costs of recording calls using traditional telephony is generally far higher than with a VoIP solution, since a single, centralised recording platform solution can be implemented with VoIP.

Additionally, whilst traditional recording solutions require on-site recorders and storage, VoIP providers increasingly offer on-tap pence-per-minute call recording services, making call recording accessible to even the smallest businesses.

## 6. Do's AND DON'TS

### DO

- Review your local network and broadband access before jumping in.
- Your homework – Service Providers aren't all the same.
- Test your Service Provider before committing – call their support line.
- Use a VoIP provider that is a member of ITSPA and preferably one that has earned a Quality Mark certification.

### DON'T

- Use VoIP if your access to the Internet is poor.
- Try to cut costs on hardware and Internet access – your firm's reputation will be damaged by poor call quality.
- Choose separate providers for your phones, SIP trunks and broadband. (Unless you like playing pass the parcel)
- Commit to long contracts.

## 7. USEFUL INFORMATION RESOURCES

- <http://www.itspa.org.uk/> - the Internet Telephony Services Providers' Association (ITSPA) website. ITSPA has served as the trade association representing UK-based network operators, service providers and other businesses involved with the supply of VoIP services since 2004. Choosing an ITSPA member with a quality mark ensures that the provider meets or exceeds all the requirements of ITSPA's codes of best practice.
- <http://www.voip-info.org/> - a VoIP wiki that provides a range of information on all aspects of VoIP, from getting started to the latest industry news.
- <http://www.voip-news.com/> - an information resource from Ziff Davis that offers a mix of industry research, articles and news from the VoIP marketplace.