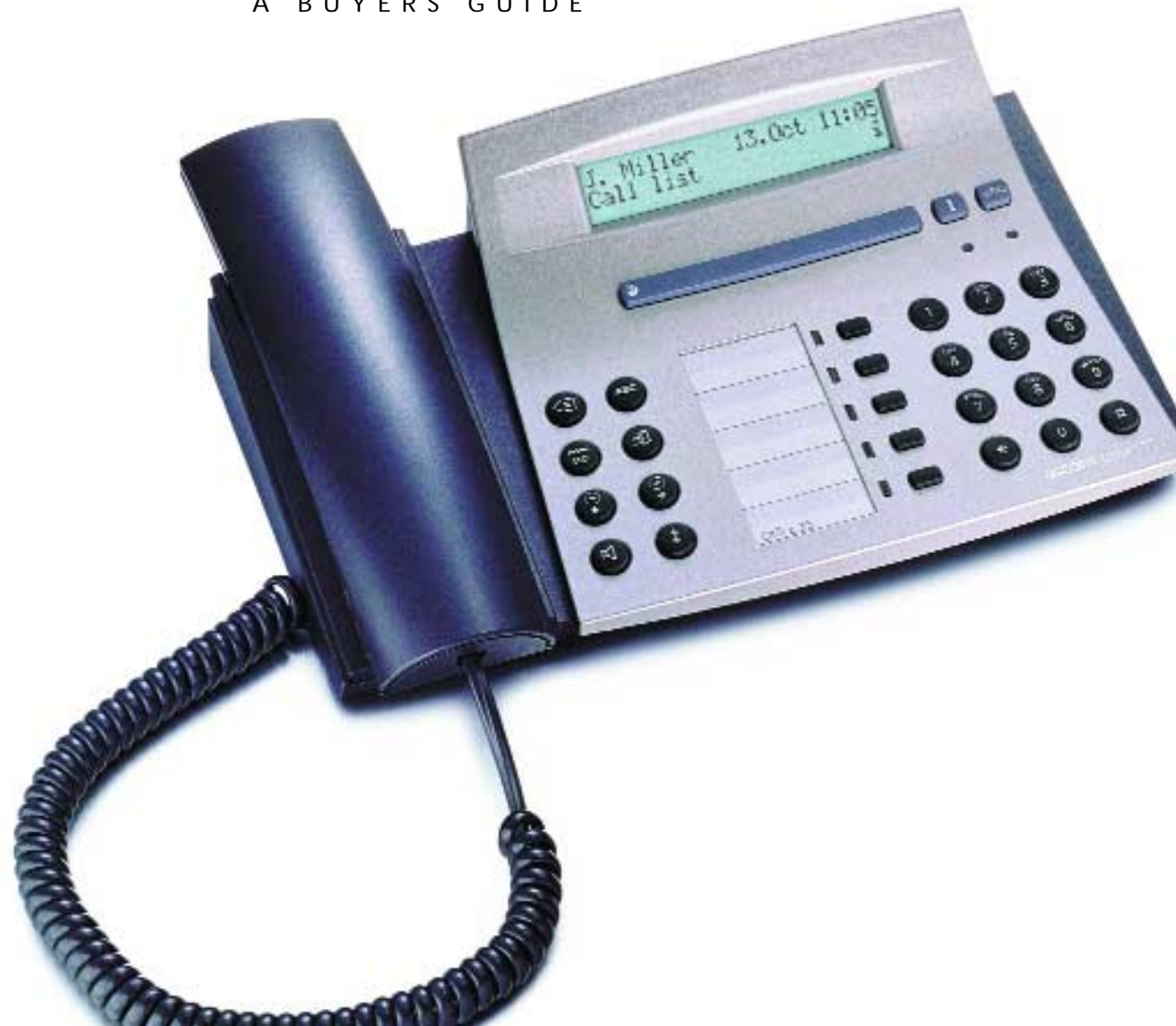


BUSINESS TELEPHONE SYSTEMS

A BUYERS GUIDE



Telephone +44 (0)1268 243900
Email info@actimax.co.uk
Website www.actimax.co.uk

Foreword

Recent years have seen major changes in telecommunications, with the transition from analogue to digital telephone systems, the introduction of wireless communications, computer telephony integration and convergence of voice and data on IP networks. Ascom is at the forefront of recent developments and the opportunities they bring, but we also understand how confusing they can be for non-specialists in small and medium-sized businesses faced by their own set of challenges.

As the functionality of telephone systems has increased, the buying process has inevitably become more involved. It is no longer enough simply to select a telephone system on the basis of how many people you expect to be employing in five years' time. You must also consider how closely you want to integrate the IT and phone systems, how sophisticated a call centre you will require, whether people will work from home or the office and a thousand other questions.

By providing an introduction to the features of modern phone systems and their business benefits, this guide will make the buying process a little easier. It explains current terminology like CTI, Unified Messaging, VoIP and LAN telephony, and examines how technology can be used to improve customer service and the efficiency of internal communications.

With more than 100 years' experience in the telecommunications industry, Ascom is no stranger to change. Originally established as a manufacturer and repairer of Morse telegraph machines in Berne, Switzerland, Ascom now employs more than 10,000 people worldwide. Best known for its Ascotel digital telephone systems, the company also builds and operates complex infrastructures in the telecoms and IT sectors and has recently started to provide access to broadband communications via the electricity supply grid.

Ascom's heritage, and the culture of innovation that has kept it at the forefront of recent developments such as IP telephony, gives it a unique insight into the changing world of telecommunications. *Business Telephone Systems: A Buyers Guide* reflects this with its balanced assessment of LAN telephony, Voice over IP and other new technologies.

Buying a phone system is one of the most important decisions a company has to make. This guide will help you choose wisely to optimise your business communications. ■



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Market overview

EXECUTIVE SUMMARY

- ▶ Voice and data communications are converging.
- ▶ VoIP is the emerging technology for converged networks across multiple sites.
- ▶ The use of IP raises suitability and service issues.
- ▶ Conventional phone systems offer proven reliability, a full feature set, range of options and proven benefits.

Pick up the phone, press 13 digits on the keypad and within seconds you can speak to someone in California. The sound quality will be excellent with no echoing, no delay, no reverb, no garbled speech, and no speech drop out - you could be in the next room. Yet your voice has travelled over landlines, satellite links and undersea cables, across an ocean and a continent.

It has taken 125 years to achieve this degree of sophistication, since Alexander Graham Bell invented the telephone in 1876. But the whole nature of telephony communications is about to change. The relentless progress of computers and data processing technology means that the days of telephony as a distinct, separate network from data communications is coming to an end.

The national and international backbone networks used to transmit your call to California are already digital which is why the call is of such high quality. What remains to be converted is the equipment used by businesses and the link between your premises and the local exchange (the so called 'local loop').

Internet Protocol

The technology that has emerged to do this is called IP (Internet Protocol) signalling. This is not only the type of digital transmission used across the Internet, but also the type of digital signalling used on most data



LANs (Local Area Networks). The general, widespread use of IP signalling has made it the technology of choice for the converged voice and data networks of the future.

Manufacturers of conventional phone systems are already adapting existing telephone systems to offer access to the IP network via gateways, enabling voice traffic to be sent over data networks, as well as offering full IP-based systems. This means that customers today can get the best of both worlds: reliability and a full feature set, and a clear migration path via a stable platform.

Convergence has also, for the first time, enticed manufacturers of data communication equipment into the telephony market, and a number

of them are now marketing IP-based telephone systems.

These developments give customers more choice than they have ever had. However, it is not simply a case of choosing either an IP phone system or a circuit-switched digital PBX. The two technologies are at different stages of their evolution, and Soft PBXs and LAN-based solutions are not yet able to offer as full a feature set as digital PBXs.

IP-based systems may also require new investment in infrastructure. If you are planning to route voice traffic over your data network, either as part of a LAN telephony solution or via a VoIP gateway, it is important to make sure that your network has the capacity to handle the extra traf-

fic. It is vital, too, to ensure that your supplier has the expertise to support LAN-based solutions. This could be a new area for them too!

This guide outlines the points to consider when making a purchase, what features to look for and how the latest and current technologies, such as ISDN, can benefit your business. It covers the options available on the very latest phone systems, including voice processing, unified messaging, CTI and cordless (e.g. DECT), and provides an introduction to the emerging technologies of VoIP and LAN telephony.

Our aim is to provide you with the basis to make an informed decision when acquiring a phone system for your business. ■

Choosing a phone system

EXECUTIVE SUMMARY

- ▶ A company's phone system is often the first link with new customers.
- ▶ Phone systems last for an average of 5-7 years so should be chosen with the greatest care.
- ▶ Draft a specification document detailing current and future requirements.
- ▶ Choose a system that can be easily upgraded, and a supplier that offers consultancy, installation, project management and support.

The best way for managers to get a true picture of their company or department is simply to phone their own switchboard a number of times and ask to be transferred to key departments and personnel. How the call is handled will reveal more about an organisation than any number of consultants' reports.

The telephone system, or PBX (Private Branch Exchange) as it is often called, is a company's main link with the outside world and can have a major impact on potential customers' first impressions of a business. If callers are met with an engaged signal, if they are put on hold and then forgotten, if they are passed from department to department, if they are sent to voicemail without warning, they may take their business elsewhere.

The choice of phone system is one of the most important decisions a company can make. Get it right and your customers can look forward to improved levels of service. Get it wrong and you run the risk of alienating potential and current customers.

Future-proof

Phone systems have an average working life of five to seven years, so it is important to assess medium and long-term future needs. A number of questions will need to be answered including: -

- ▶ Is your company likely to grow in the next five years?
- ▶ Have you any branch or regional offices with which you communicate regularly?
- ▶ Does your company have a centralised call centre such as a service desk, order processing, sales etc.?
- ▶ Will certain staff require cordless handsets so that they can be contacted at all times?
- ▶ How are messages distributed internally - could voicemail improve the way calls are handled?

Make sure that you involve a number of different departments in the selection process. Any department heavily involved in telephone use, such as a telesales operation or service desk, should be consulted. So, too, should the IT department, particularly in organisations where there is likely to be communication between two or more branches.

To ensure that you get the telephone system you need and to provide back-up in case of dispute, it is important to compile a specification list detailing what you require the system to deliver now and in the future.



Analogue or digital?

Ninety-five per cent of new telephone systems are now fully digital and able to support both analogue and digital ISDN lines (see page 9). As ISDN is the enabling technology for many of the functions described in this guide, digital systems are much more flexible and functional than analogue PBXs.

Even businesses with very basic telephony requirements should buy a digital rather than analogue

phone system, as it gives them the flexibility to upgrade to ISDN should their requirements change. Digital phone systems are now priced extremely competitively.

When choosing a digital system, look for one that has a clear migration path to the technologies covered in this guide, such as Computer Telephony Integration (CTI), Digital networking, DECT, Voice over IP, Unified Messaging and LAN telephony. Some do, many don't. ▶▶



►► It is also important to look for a telephone system that offers total flexibility, growth potential and security of investment so that it can be upgraded to meet changing business needs and accommodate new technologies. It should support 'open standards' and have common components and handsets that can be upgraded on an ad hoc basis as new features and system enhancements become available.

Size matters

The size of a phone system is given in the number of 'ports' that can be supported: buyers can specify a combination of external lines and internal extensions to the maximum port size. In most commercial organisations it is best to work on a ratio of one exchange line for every three extensions required.

As ISDN enables callers to dial extensions directly (using DDI) without going through an operator, you do not necessarily need separate lines for voice calls, fax, data and internet access, allowing you to optimise line usage and reduce overall line rentals. This offers the potential of significant cost savings.

Don't plan just for current capacity. If you expect your business to double in size in the next two years, consider what effect this will have on your phone system requirements. It is better to wire for additional extensions at the installation stage, even if the extra capacity is not needed for some time.

If future needs are hard to determine and maximum flexibility is required, digital cordless phones such as DECT (Digitally Enhanced Cordless Telephony) handsets should be considered for part or all of the system.

The right supplier

Virtually all phone system manufacturers sell their equipment through specialised telecoms dealerships and resellers. Dealers may sell systems manufactured by several different suppliers, but usually major on one or two companies' equipment.

Look for dealerships and resellers that are: -

- Fully trained and accredited by the system manufacturer and able to offer a complete service, including consultancy, installation, system maintenance and project management;
- Able to liaise on your behalf with the network provider (e.g. BT) to ensure a smooth transition to the new system.

Other points to consider are:

- Does the dealer's technical competence cover data networking, as well as voice-based systems?
- Can the dealer maintain the system after installation?
- Is staff training available on your premises, and how comprehensive is it?
- What leasing arrangements or finance terms are available?
- Is the dealer a member of a trade association?
- What system service and maintenance options are available?
- Can your system be supported remotely by the maintainer?
- Has the dealership qualified for any approved standards, such as BSI, ISO 2001/2?

As always look for references from companies with similar requirements to your own. ■



The benefits of ISDN

EXECUTIVE SUMMARY

- ISDN is a 'dial up' digital public network that unifies voice and data communications.
- It is available in two forms: Basic Rate ISDN and Primary Rate ISDN.
- ISDN offers additional telephony services, such as DDI, CLI, Virtual private networking, external call conferencing and call transfer.
- It provides ability to optimise your exchange line usage by bring all your lines through one system.

BT and other network providers offer a choice of analogue or ISDN (Integrated Services Digital Network) phone lines for voice and data traffic. Both are available on a 'dial up' basis, with charges based on line rental and usage.

As prices have fallen and its benefits have become more widely understood, ISDN has become the de facto standard for business users.

It has two clear advantages over analogue lines: it offers additional telephony services, such as Calling Line Identity (CLI) and Direct Dial Inwards (DDI); and it can transmit text, data, images and video much more quickly than analogue lines.

Improved customer service and call handling

The main reason for installing ISDN is for the additional telephony services that it offers. The two main ones are Calling Line Identity (CLI) and Direct Dialling Inwards (DDI).

With CLI, the telephone number of the caller is shown on the answering phone's LCD as the call comes in. Some PBXs and telephones support alpha tagging, where the name of the caller is also displayed.

CLI has two main benefits. On the most basic level, it enables you to greet a caller by name when picking up the phone. It is also the enabling technology for a variety ►►

BENEFITS**ISDN telephony services**

- ▶ **Calling Line Identity (CLI)** displays the callers number (and name) on the telephone's screen.
- ▶ **Direct Dial Inwards (DDI)** enables customers to dial individuals or departments directly.
- ▶ **Transfer to outside line** enables customers to be transferred to another branch office or to a mobile phone.
- ▶ **Call Conferencing** lets multiple parties hold a conference call across the network.
- ▶ **Call Divert** diverts calls from your extension to your mobile or another office.

▶▶ of Computer Telephony Integration (CTI) applications, such as screen popping. When a call comes in, the system reads the CLI data and automatically pops up the relevant customer data on your PC screen.

DDI, the ability to assign individual phone numbers to extensions and departments, also has far reaching consequences. By enabling callers to dial extensions directly, DDI reduces reliance on an operator and ensures that people get through to the right person first time.

Other lines can also be routed through the telephone system via DDI, such as those required for fax, email or file transfer, thereby saving the cost of separate dedicated lines (see below).

DDI lines are one of the great drivers behind the adoption of voice mail, as there needs to be some

answering system on your extension if calls are coming to it directly. However, calls do not have to go to voice mail if you are away from your desk, as ISDN enables them to be re-routed automatically to a mobile phone or home office, for example.

Another useful feature of ISDN is the ability to link phone systems across the public ISDN network in a Virtual Private Network using a linked numbering plan. This allows you to make and transfer calls (and conference calls) to a colleague in another site simply by entering a short extension code helping to provide a much higher level of customer service.

Optimise your line usage with ISDN

ISDN also enables you to rationalise the number of exchange lines needed by channelling all your requirements through one system.

Many companies pay for separate analogue lines for fax, modem connections for EPOS or credit card verification, internet access, email, videoconferencing and of course the telephone system. This is a waste of resources, as many of these lines are used infrequently.

By channelling everything through your telephone system, ISDN enables you to optimise your line usage, eliminating the need for

separate, dedicated lines. For example, a DDI number gives direct access to the fax, while S-Bus connections enable ISDN to be delivered directly to the desk for data applications, such as videoconferencing, internet access and file transfer. This enables bandwidth on demand for voice and data calls and offers significant savings on existing line rentals.

Scalable ISDN

ISDN is available in two forms: Basic Rate ISDN (BRI), which is targeted mainly at the home worker or small business, and Primary Rate ISDN (PRI), which is suitable for any business using a phone system with

eight or more exchange lines.

ISDN lines include one 'D' channel, which carries the administrative information needed to set up a call or communicate with the telephone network, and a number of 'B' channels, which carry the voice and data traffic.

A Basic Rate (ISDN2e) line includes two 'B' channels, each of which is equivalent to a normal telephone line. These can be used for two voice calls; two data calls; one voice call and one data call; or one data call using two channels. As each channel can transmit data at speeds of 64Kbps, this represents a data transfer rate of 128Kbps. The 'D' channel can additionally be used for low rate data requirements

such as credit card verification.

Primary Rate ISDN (ISDN30e) provides up to 30 'B' channels, giving users 30 lines that can be used for any combination of voice, data and video. Adding additional ISDN channels on Primary Rate ISDN is very easy and will not require a site visit by either the network provider or the telephone system supplier. ■

**CASE STUDY****ISDN**

A successful music and production company uses an ISDN telephone system in both its London offices. Since installing the system it has been able to improve customer service levels by transferring calls between its two offices, and by re-routing calls seamlessly to someone's mobile phone should they be out of the office. The use of ISDN has also speeded up general office processes, such as file transfer, web access and e-mail, and enabled the company to integrate the phone system with its production facilities. Broadcast quality digital data can now be sent to radio stations via ISDN, eliminating the need for couriers.



Computer Telephony Integration

EXECUTIVE SUMMARY

- ▶ CTI technology links the telephone and computer systems.
- ▶ CTI delivers productivity benefits and improved customer service.

CASE STUDY CTI

A prestige car dealership has adopted CTI technology to improve the service it offers to customers. The database containing customer service records is now linked to the telephone system so that when a call comes in the customer's name and a full service history of his/her vehicle pops up on the service receptionist's screen. This enables the receptionist to greet the caller by name and display a detailed knowledge of the car's service history. It also allows calls to be dealt with much more quickly and eliminates the need for return calls.

The two most important desktop tools in any business are the telephone and the computer. CTI (Computer Telephony Integration) is the term used to describe the linking of the two, enabling organisations to make calls directly from databases or popular contact management packages (e.g. Goldmine and ACT!) and automatically pull up customer records relating to an incoming call. The productivity and customer service benefits are considerable. Most manufacturers offer CTI interfaces for their digital telephone systems that are compliant with Microsoft's TAPI (Telephone Application Programme Interface) and TAPI-2 standard protocols. The use of open standards gives users access to a wide range of commercially available CTI packages and bespoke applications written specifically for a business.

The classic CTI application is 'screen popping', which uses CLI (Calling Line Identity) – potentially – to identify callers and display their records on-screen before a call is answered, thereby improving the speed with which each call is handled.

In addition to the customer service benefits of greeting a caller by

name, screen popping data from a customer database, say, gives help desk staff the information needed to deal with an enquiry in one call. Should the caller need to speak to someone else, their details and the updated customer record can be transferred with the call, eliminating the need for callers to answer the same questions all over again.

The productivity of outbound dialling is also improved, as calls can be made directly from a contact management package, such as ACT!, by highlighting a customer's telephone number and clicking the call button. This is ideal for departments where there is a high level of outbound and follow up calls, such as telesales.

First or third party CTI?

There are two types of CTI: first party and third party. First party CTI, ideal for a small number of users, is a single desktop solution that requires each individual PC to be connected to a telephone. Third party CTI, which is more likely to be used when ten or more staff need automatic access to database records, is a multiple terminal solution requiring a single link between the telephone system and the Microsoft NT server.



Basic CTI applications, such as screen popping and screen-based dialling are available for both variants, though, as you would expect, third party CTI offers more sophisticated applications, including automatic dialling from a central database, sometimes known as 'predictive dialling'.

Essentially a call centre application, 'predictive dialling' removes all dialling responsibilities from an agent. Once a call has been completed the software automatically dials the next number on an agent's call list, eliminating the risk of misdials and dead time between calls. ■



Voice processing

EXECUTIVE SUMMARY

- ▶ Over 60% of all new telephone systems are provided with some form of voice processing.
- ▶ Voice processing can significantly improve call handling efficiency.
- ▶ Voice mail is more than a message answering service.
- ▶ Voice mail packages vary in size and sophistication.
- ▶ Auto-attendant can direct calls automatically to key staff and departments.
- ▶ Interactive Voice Response automates routine information transactions.

Modern telephone systems can be specified with a variety of voice processing functions, including voice mail, auto attendant and interactive voice response (IVR).

When used correctly, such systems can greatly improve call handling to the benefit of callers and businesses alike. In particular, they reduce a company's reliance on telephone operators to transfer calls and eliminate much of the message-taking staff are required to do.

If not used properly they can alienate callers and lose potential customers, so it is vital to train individuals in all aspects of a system.

Voice processing breaks down into three main areas, voice mail, auto-attendant and IVR (Interactive Voice Response). We'll look at each in turn.

Voice mail

The most widely used application is voice mail. The use of voice mail has grown dramatically in the last few years, driven in part by the take-up of DDI (see page 10). Because DDI enables callers to dial chosen extensions or departments

directly without going through a switchboard, it is important to have some form of answering system in place so that the call can be taken even if the person called is away from his/her desk.

The ability to leave messages in personal mailboxes - even outside office hours - reduces demands on telephone system operators and minimises interruptions to co-workers.

It improves customer service by giving callers the assurance that their message will be heard and by eliminating unanswered, lost or misdirected customer phone calls.

Voice mail, though, is much more than a glorified answering machine. It can also take a message when you are on the phone, alert you when you receive an urgent message, send a single message to a group of people and forward a message to a colleague. It is also possible to record different greetings for internal and external calls and by time of day.

Most systems allow you to pick up all your messages remotely wherever you may be, though it is

important for this facility to be password protected.

Voice mail packages vary in both capacity (the number of voice mailboxes the system can support) and sophistication. Phone system manufacturers normally offer fully integrated voice mail options for their own phone systems that are designed to be very easy to use, with extended functionality and sophistication. A number of specialist companies also offer voice mail packages that are compatible with phone systems from the major manufacturers.

Voice mail is often installed as the prelude to going over to a fully integrated messaging system, such as a Unified Messaging platform where all messages (voice, fax and e-mail) can be received into one desktop mailbox (see page 16).

Auto-attendant

Auto-attendant systems are designed to direct calls to the correct individual or department without the need for a human operator, increasing productivity. Callers benefit from quick answering with

their calls directed correctly, using recorded prompts such as 'for sales please press one; for accounts, please press two' and so on.

It should be remembered that some callers are uncomfortable using auto-attendant services, so the option to speak to a human operator should always be made available by any customer-facing organisation.

Interactive Voice Response

Interactive Voice Response (IVR) is used for automation of routine information transactions. For example, IVR can be used for brochure and literature requests or for order taking, where the caller is prompted to leave their contact details and account information. IVR can also be used to give out routine information such as theatre performance start times and seat availability. IVR systems usually offer callers a choice of voice recognition or phone keypad operation.

IVR systems are also available with fax integration so, for example, a price list can be faxed back automatically in response to a customer request. ■

CASE STUDY

Voice processing

Using auto-attendant allows an insurance brokers to maintain a four rings before answer policy. The auto-attendant asks the caller to select from motor, home, travel and other insurance options so the call is put through to the correct department, without the need for a dedicated operator.

HOW TO

Get the best out of your voicemail

- 1 Always reply to your messages - do not hide behind it.
- 2 Refresh your voicemail message regularly, daily if possible.
- 3 Always offer an alternative to leaving a message in a voicemail box, such as dial '0' for the operator.



Unified Messaging

EXECUTIVE SUMMARY

- ▶ Unified Messaging (UM) collects messages of all formats in one electronic mailbox.
- ▶ The electronic mailbox can be accessed wherever you are, at any time.
- ▶ UM improves employees' ability to handle and respond to important messages.
- ▶ Field-based staff can pick up and manage messages anywhere, anytime.
- ▶ Benefits include better internal and external communications, greater productivity and cost savings.

BENEFITS

Why Unified Messaging?

- ▶ Mobile workers can experience a 70% time saving gain by using UM*
- ▶ Office-based staff experienced 50% time saving gain using UM*
- ▶ Using a UM platform enables you to save 80% of your time*

*time saving and productivity gains by UM compared to using traditional methods of checking messages and sending and receiving faxes from a standalone fax (source: Captaris and Comgroup)

Imagine this: you are expecting an important call from a customer about a new contract, but you have to go away on business for a couple of days. The customer has told you that he will let you know as soon as a decision has been made but does not expect to be contacted in the meantime. The customer has your e-mail address, fax number and direct line phone number and might contact you using any of these tools. What do you do?

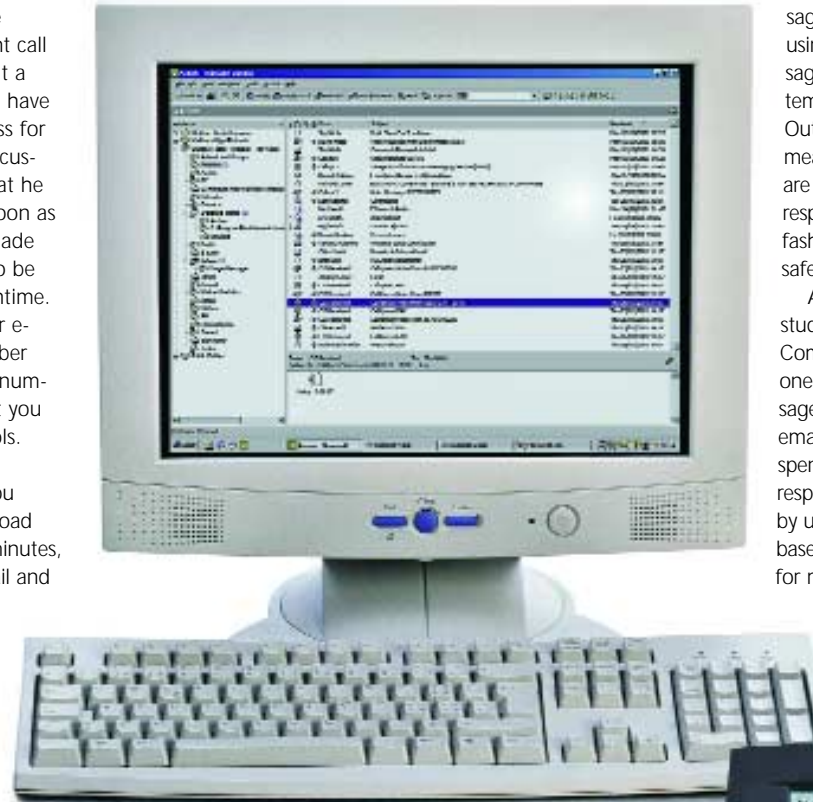
Like most people you would probably download your e-mail every 30 minutes, dial into your voice-mail and continually phone up colleagues asking about any faxes that might have arrived. At some point you would begin to worry that the all-important message had gone astray.

The inefficiencies highlighted by such a scenario are one reason why more and more companies are adopting Unified Messaging (UM) systems that provide one centralised mailbox for all e-mail, voice and fax messages.

Business people today receive messages in a variety of formats, via different tools at a number of locations. Managing these messages can be

confusing and time consuming, whilst increasing the likelihood that some will be lost or simply not replied to.

By providing one mailbox for all message types, Unified Messaging gives users complete control of their business communications. The ability to manage all voice, fax and e-mail mes-



sages from one Inbox using a familiar message management system such as Microsoft Outlook or Lotus Notes means that messages are more likely to be responded to in a timely fashion and filed away safely when dealt with.

According to a recent study by Captaris and Comgroup, having just one Inbox for all messages (voicemail, fax and email) can cut the time spent accessing and responding to messages by up to 50% for office-based workers and 70% for mobile workers. This makes it easy to cost justify a UM system: in some cases, the

Return on Investment can be achieved within the first year (dependent upon usage), with the promise of further cost savings well into the future.

Unified Messaging systems are available from a number of suppliers. By integrating the telephone system with Unified Messaging, it becomes possible to access all messages on the same screen, showing the date, message type, status and sender.

Because the format of messages can be changed from text to voice and vice versa, all messages can be picked up from a PC, desktop or mobile phone, whether you are in the office or out on the road.

Advanced message management features include the ability to reply to, forward, save or delete messages. And with all messages stored in one place, it becomes easier to keep a record of all e-mail, fax and voice messages. ■



CASE STUDY

Unified Messaging

In an attempt to improve internal and external communications, an international engineering company with 60 staff integrated its telephone system with the existing e-mail system to provide staff with one centralised mailbox for all messages. Using Microsoft Outlook, staff can retrieve and manage voice, fax and e-mail messages wherever and whenever it suits them.

Unified Messaging is used by everyone, including office-based staff, field engineers and the international sales manager who, with a notebook computer and modem, can access his/her Inbox from anywhere in the world via an Internet link for the cost of a local call. Voice mail, e-mail and fax messages can be replied to, forwarded, saved or deleted, all via this one application. UM significantly reduces the time spent accessing messages when away from the office as well as improving message management.

Call centres and ACD

EXECUTIVE SUMMARY

- ▶ A call centre is defined by the nature of the work, not the size of operation.
- ▶ DDI and alpha-tagging can streamline incoming calls.
- ▶ CTI can boost the productivity of call centre agents.
- ▶ ISDN can be used to set up virtual call centres.
- ▶ ACD systems manage call traffic to improve call centre efficiency.
- ▶ ACD systems provide real time information for call centre supervisors.

The popular image of a call centre is of thousands of workers with headsets sitting in a vast hangar devoid of any windows. In fact, a call centre can consist of a handful of people and they don't have to share the same office or even be in the same building.

What defines a call centre is not the scale of the operation, but the nature of the work. Any group of people answering or making a large number of similar calls, such as a telesales team, an accounts department or technical support helpdesk, can be classified as a 'call centre'.

Digital telephone systems used in conjunction with ISDN offer a number of features to improve call handling in formal and informal call centres. Simply assigning a DDI number to direct calls to a specific call centre can help streamline the flow of calls into a business.

This can be refined further through the use of DDI alpha-tagging, a useful feature that enables agents to identify the nature of an enquiry from the number dialled. For example, a sales promotion business running promotions for different companies could use alpha-tagging to identify the specific promotion a caller was responding to. This information could be shown on an agent's PC or phone display, enabling him or her to respond in the appropriate manner. This is often referred to as scripting.



CLI (Calling Line Identity), another ISDN feature, can improve call handling by showing the caller's phone number on agents' screens. If linked to a company directory or database, the caller's name and company can also be shown. Computer Telephony Integration (CTI) is another useful tool, which uses CLI to help productivity in a call centre. In call centres with a high volume of inbound calls, 'screen popping' provides agents with the information needed to answer calls, whilst 'predictive dialling' can improve productivity in a telesales department where the majority of calls are outbound (see page 9).

ISDN can also be used to set up virtual call centres using home workers. Calls to a call centre are seamlessly routed to the call centre agents based at home without the caller being aware of it.

Call management

The larger (or busier) a call centre is, the more likely it is to require some form of Automatic Call Distribution (ACD) system to answer and route incoming calls, ensuring that callers are not left with a ringing tone or engaged signal.

Most phone systems have in-built automatic call distribution functionality or ACD options. For

example, if no agent is free to take a call, the system can place the caller on hold and play music or pre-recorded information. As soon as an agent becomes free, the call that has been on hold the longest is put through automatically.

More sophisticated ACD packages provide call management analysis and real time reporting, allowing a call centre supervisor to monitor and manage the level of incoming calls and increase or decrease the number of agents accordingly. To motivate agents, real-time statistics showing the number of calls waiting or the longest call queued can be displayed on electronic wallboards. ■

CASE STUDY

ACD

A small electronics company runs a technical support helpdesk for users of its products. The helpdesk has its own DDI number, so callers go straight through to one of six trained engineers who man the helpdesk. Each time a new product is launched, the volume of calls to the helpdesk goes up. Following complaints that customers could not get through, the company installed a small ACD system. If no agents are free, callers are told that they are being held in a queue and that their call will be answered shortly. While on hold, callers listen to a recording listing common technical problems and how they can be solved. Although no one likes being held in a queue, customers say it is preferable to hearing an engaged signal.



DECT Cordless Systems

EXECUTIVE SUMMARY

- ▶ DECT is a cordless alternative to fixed phones.
- ▶ It allows users to make, take and transfer calls securely as they move around an office.
- ▶ Benefits include improved productivity and better customer service.
- ▶ DECT is an enabling technology for 'new ways of working' such as hot desking.

Are you familiar with any of the following scenarios? Your computer system has crashed, and you cannot contact your IT manager; you've missed important calls while away from your desk; you need to check how much of a certain product is in stock but cannot track down the warehouse manager.

For many office workers, particularly those in management or key support roles, simply being in the office is no guarantee that they can be contacted. The disadvantage of a having just a desk phone is that

as soon as you move away from your desk you are out of reach.

Office staff nowadays require mobility, which is why more and more companies are investing in DECT (Digital Enhanced Cordless Telephony) systems that provide total cordless coverage in an office or industrial site via a series of strategically placed base stations.

DECT cordless handsets enable staff to take, make and transfer calls as they roam around an office, ensuring that they can be reached at all times.

Because DECT phone systems can be fully integrated with an existing ISDN phone system, using a DECT cordless handset is no different than using a standard desktop phone. All internal calls are free and there is full access to telephone system features, such as speed dials, call hold & transfer, DDI and CLI.

DECT cordless handsets can be 'twinned' with a desk phone, with calls automatically transferred to the cordless handset as soon as it is removed from its docking unit.

The use of DECT phones is trans-

parent to the caller, thanks to seamless hand over of calls from base station to base station, allowing you to wander around the premises whilst talking on the phone. The latest systems even allow users to switch from a desktop telephone to a cordless DECT phone without interruption during a call.

The benefits

By enabling callers to get through to the person they want first time, DECT systems improve customer service, help internal communications, maximise productivity and reduce caller frustration. They can also cut company phone bills as fewer return calls will need to be made.

Another benefit of DECT systems is their flexibility. Anyone who needs to spend a few days on-site, such as management consultants, auditors or temporary workers can be given their own DECT phone, giving them the use of a telephone without the requirement for any additional cabling. Additional capacity can be added by increasing the number of base stations.

DECT is also an enabling technology for flexible working practices, such as hot desking. Instead of giving all staff their own desk (and corded phone), many companies now require sales staff, service engineers and others who spend most of their time out of the office to share workstations. When staff arrive at the office they pick up a DECT phone with their own assigned extension number and work at any free workstation, helping to reduce the amount of office space required. ■

BENEFITS

DECT Cordless Systems

- ▶ DECT cordless phones can significantly improve internal and customer communication.
- ▶ Key office staff can remain in contact wherever they are in the office.
- ▶ No more 'missed calls'.
- ▶ Significant savings as number of return calls are reduced.

CASE STUDY

IT Office Support

A small manufacturing company with 20 office-based staff and the same number of factory workers has a mix of computer equipment in the offices and on the factory floor. Computer crashes are a regular occurrence which means that the IT manager is always moving between the factory and offices – he is very rarely at his desk. This was a source of great irritation for staff wanting to contact him to report a fault. The company solved the problem by integrating a DECT phone system with its existing PBX. Now, key staff, including the IT manager and security staff, carry cordless DECT phones with them at all times so that they can always be contacted.

Convergence: VoIP, LAN telephony and Soft PBXs

EXECUTIVE SUMMARY

- ▶ Voice and data networks are converging.
- ▶ IP signalling allows voice to be sent over a data network.
- ▶ Soft PBXs allow tighter integration of telephony and IT functions.
- ▶ LAN telephony eliminates need to maintain separate voice and data networks.
- ▶ New IP phone systems are required.
- ▶ VoIP provides least cost routing between two sites.

The impact of computer networks and the internet has been felt in all industries. The telecoms industry is no exception, where the ability to send voice traffic over data networks using Internet Protocol (IP) signalling, so called Voice over IP, is driving the introduction of LAN telephony and software-based PBXs (Soft PBX).

Traditionally voice traffic has been sent over the Public Switched Telephone Network (PSTN) as a continuous stream between two callers, known as circuit-switching. Although fast and reliable, circuit-switching does not make the best use of network resources as a 'line' is monopolised for the duration of a call, whether its capacity is fully used or not. As a result, businesses have had to install separate networks for voice and data traffic.

Most data networks, be they

local area networks (LANs), wide area networks (WANs) or the internet, transmit data using the IP (Internet Protocol) signalling standard, which uses packet-switching techniques to send data across a network in small chunks (packets).

Improvements in networking technology mean that it is now possible to transmit voice traffic using this method, by breaking voice messages down into 'packets' and reassembling them at the other end

without any noticeable delay or degradation of quality by the use of Quality of Service (QoS).

The significance of this breakthrough is that it allows voice and data to be sent across the same IP network simultaneously. In other words, there is no longer a need for businesses to install, manage and maintain separate voice and data networks. It can also enable tighter integration of telephony and IT functions.

The convergence of voice and data networks will have far-reaching consequences for the end user. However, these are only just beginning to be felt and the majority of businesses will not benefit from implementing IP telephony today. Nonetheless, when choosing a new phone system it is important to give some consideration to whether you may require Voice over IP at some point in the future.

Soft PBXs

Soft PBX is the term used to describe a software application that provides server-based telephony. Performing similar functions to a hardware PBX, Soft PBXs offer a range of PBX functions, voice mail and integration with other server-based applications such as Unified Messaging and contact management systems.

Vendors of Soft PBXs argue that because they are based on open standards and reside on the server, telephony applications can be more easily integrated into an existing IT infrastructure than traditional phone systems developed using proprietary software. While this is true up to a point, it should be pointed out that most modern phone systems also adhere to open standards and can be upgraded with future enhancements, such ▶▶





» as full IP functionality.

Soft PBXs are available for use with conventional telephone handsets over a circuit-switched telephone network or as part of a packet-switched LAN telephony solution with IP phones (see below).

LAN Telephony

Most businesses have two separate networks, one for data and one for voice. LAN Telephony eliminates the need for two networks by delivering telephone calls over the data network. It does this using IP signalling, the standard method for sending information across the internet and Local Area Networks (LANs).

The benefits of having just one network to manage, coupled with

tighter integration of voice and data, mean that LAN telephony represents a real alternative to conventional circuit-switched telephone systems.

Gartner Group estimates that by 2006/7, 40% of businesses will have adopted a server-based PBX providing LAN telephony, though to date the take-up has been rather slow. Those companies that are using LAN telephony tend to be start-ups or large companies that have moved to a greenfield site and chosen to install just one converged voice and data network.

Businesses that already have separate networks have found it less easy to justify the cost of upgrading to a LAN telephony solution, which includes the expense of upgrading

their existing data network to provide the extra bandwidth needed to carry voice traffic, plus the cost of an IP phone system and IP handsets (available from established telecoms suppliers or one of several data equipment manufacturers that have now entered the market).

Voice over Internet Protocol (VoIP)

Another option is to install an IP Gateway for an existing telephone system, which converts the circuit-switched telephony signal into IP for transmission over the data network. This means that businesses can continue to use a reliable, fully featured circuit-switched telephone system, with an IP routing option for voice and data over the company's private network.

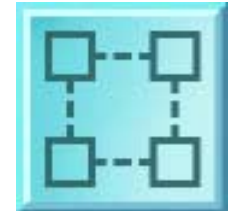
Such systems are commonly referred to as Voice over IP (VoIP) Gateways. Like LAN telephony, VoIP uses IP signalling. However, whereas LAN telephony refers to voice and data convergence over a corporate

LAN, VoIP refers to the transmission of voice over a wide area network or the internet.

The concept of Voice over IP has been popularised by suppliers extolling the benefits of being able to make national and international calls over the internet for the cost of a local call. However, the quality and reliability of internet telephony are still a long way off the standard demanded by business users.

The main business benefit of VoIP is that it allows a multi-site organisation to transmit voice over the company's existing wide area data network, saving the cost of using the PSTN to make inter-branch phone calls. This is usually set up as a least cost routing option, giving seamless access to the IP network.

VoIP Gateways also allow separate sites to be treated as one, with integrated voice and data, application sharing and a single point of access for system management. ■



CASE STUDY

Convergence

A firm of solicitors has a private data network linking its London and Manchester offices, giving staff in both offices access to a common database and the ability to share files. Inevitably there are a large number of internal phone calls between the two sites.

As the firm's accounts department is based in the Manchester office, it is sometimes necessary to transfer customer calls between offices. To eliminate the call charges associated with internal communications, the firm added VoIP Gateways to the ISDN phone systems at each site. Internal calls are now carried across the company's existing data network, maximising the use of existing resources and eliminating the need for calls to go over the PSTN. Calls can also be transferred seamlessly between the two sites.





Future trends

EXECUTIVE SUMMARY

- ▶ New business applications are driven by need for better customer service and greater flexibility.
- ▶ Cordless technology such as DECT will provide real improvements in productivity.
- ▶ Unified Messaging and ACD functionality will be available to all with genuine return on investment.
- ▶ Systems will need to be 'convergence-ready' to take full advantage of voice and data over the IP network.

To date, people have expected very little from their telephone systems. In most companies all that's been required has been a simple, reliable means of communicating with colleagues and customers. This is all that some organisations will ever want.

Others will expect more.

By breaking down the barriers between computing and telephony, ISDN and emergent technologies like IP telephony enable businesses of all sizes to exploit technology to change the way they work. The promises of greater flexibility, improved customer service and reduced overheads mean that in the future more and more companies are likely to adopt many - if not all - of the technologies explained in this guide.

Homeworking and mobile working practices, for example, are far more likely to be successful when combined with ISDN features like DDI numbers and Unified Messaging. Similarly, hot desking practices can be more effective if combined with DECT cordless phones that provide staff with a per-

manent 'extension' number no matter where in a building they choose to work.

Because cordless communications ensure that key staff can be contacted at all times, many organisations will embrace the technology simply to provide customers with a better service. The same motivation will drive the uptake of Computer Telephony Integration (CTI) applications, such as screen-popping, which deliver relevant customer contact details to an agent as he or she answers a call.

Dealings with suppliers can be revolutionised through videoconferencing. The roll-out of broadband services, such as ADSL, combined with a desire to reduce the costs and risks associated with business travel, suggest that this technology may soon achieve its potential.

The fast changing nature of today's telecoms market underlines the importance of choosing a phone system that is flexible enough to adapt to your changing needs and sophisticated enough to accommodate technological devel-

opments as they occur. Much the most significant of these is the transition to IP telephony, which makes it possible to carry voice traffic over a data network.

Convergence

The take-up of IP telephony is still fairly low, but there is little doubt that in the next few years it will establish itself as a viable alternative to traditional, circuit-switched technology, finding favour among businesses of all types and sizes - not just the start-ups and multi-branch organisations that have been amongst the early adopters.

A wide range of IP telephony options exist, from fully fledged LAN telephony systems to Voice over IP gateways that work with existing PBX systems to provide a least cost routing option for inter-branch call traffic, for example. In this way IP gateways combine some of the benefits of IP telephony with the resilience and sophistication of feature-rich PBX systems.

Some businesses will embrace

the technology wholeheartedly and install a LAN telephony system, where all voice traffic is carried over the corporate data network: others will continue to maintain separate voice and data networks, with the option of using IP telephony as a least cost routing option. The former must make sure that their data networks have sufficient bandwidth to support additional voice traffic: the latter will need to choose a 'convergence-ready' phone system.

Flexibility

In today's fast moving world, it is important for businesses to remain flexible. The extra functionality of digital PBXs and LAN telephony systems provides businesses with the tools needed to adapt quickly to changing circumstances. There can be little doubt that in the near future, DECT, CTI, Voice over IP, ACD functions and Unified Messaging will become commonplace as businesses look for an edge over their competitors. ■

Glossary of terms

▶ ACD/Automatic Call Distribution

An automated system for answering, queuing and distributing incoming calls to a number of agents. Popular in call centres, ACD systems also provide statistics, such as the number of calls waiting, average length of call etc., which can be incorporated into historical reports or displayed in real-time on electronic wallboards.

▶ ADSL/Asynchronous Digital Subscriber Line

A broadband technology that delivers very high data transfer speeds (potentially 10 times faster than ISDN) over existing phone lines.

▶ Auto Attendant

An automated answering system that uses prompts to direct callers to the right department or extension e.g. 'For Sales press 1'.

▶ BRI

Basic Rate ISDN2 provides one 'D' channel and 2 'B' channels, each of which is equivalent to a normal telephone line. These can be used for two voice calls; two data calls; one voice call and one

data call; or one data call using two channels. As each channel can transmit data at speeds of 64Kbps, this represents a data transfer rate of 128Kbps.

▶ Call Forwarding

A feature of ISDN phone systems, call forwarding enables incoming calls to be diverted automatically to a different number, for example to a mobile phone or home office.

▶ CLI/Calling Line Identity

One of the key ISDN features, CLI displays the phone number of the caller on the answering phone's display. CLI alphanagging also shows the caller's name and company. CLI is the enabling feature of many computer telephone integration applications.

▶ CRM/Customer Relationship Management

Generic term for applications designed to streamline spoken interactions with customers.

▶ CTI/Computer Telephony Integration

The term used to describe the linking of the telephone system with a computer or network. The classic CTI application is



'screen popping', which uses CLI to identify the caller and display his/her database records on-screen before the call is answered. CTI also enables calls to be made directly from a contact management package by clicking the call button. There are two types of CTI: first party CTI, a standalone solution that requires each PC to be connected to a telephone, and third party CTI, a multiple terminal solution requiring a single link between the telephone system and the network.

▶ DDI/Direct Dial Inwards

A key ISDN feature is the ability to assign individual phone numbers (DDI numbers) to extensions and departments, enabling callers to dial them directly without going through the operator.



are broken down into packets and reassembled at the receiving end. Eliminates the need for separate voice and data networks by converging all traffic on one network.

▶ IP Gateway/VoIP Gateway

A gateway for an existing telephone system, which converts normal circuit-switched telephony traffic into IP for transmission over a data network, such as a private data network between two sites.

▶ ISDN/Integrated Services Digital Network

ISDN is a 'dial up' digital public network for voice and data communications with charges based on line rental and usage. The de facto standard for business use ISDN provides a number of advanced telephony services, such as CLI and DDI, which form the basis of today's advanced telephony applications. It is available in two forms Basic Rate ISDN2e (2 lines) and Primary Rate ISDN30e (30 lines).

▶ **IVR/Interactive Voice Response**
IVR systems automate routine transactions, such as literature ▶▶



▶ DECT/Digital Enhanced Cordless Telephony

DECT cordless handsets provide wireless communications within an office or company premises. The handsets can be fully integrated with the company phone system, allowing users to make, take and transfer calls securely as they move around the office.

▶ IP/Internet Protocol

The signalling standard used to transmit data across the internet and local area networks. IP uses packet-switching techniques to send data in small chunks (packets).

▶ IP Telephony

The use of IP signalling methods to send voice traffic across a data network. Voice signals



