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IP Telephony Emerging Applications

An Educational White Paper

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Industry sages have been forecasting the 'year of convergence' for many years now, and some are still waiting. However, for many organisations, convergence happened in 2002, actually deploying emerging IP Telephony applications in serious business scenarios.

IP Telephony - A History

The drive towards packet based telephony is not a new concept. Service providers and vendors have striven to develop effective solutions based on the best media available.

VoIP Solutions

The first true attempt at packet telephony was the adoption of VoIP (Voice over Internet Protocol), delivering packet voice over a data network directly to the end-user.

Handsets and microphones were attached to a PC, with call management delivered from an inhouse, server-based platform. This solution removed the need for two separate voice and data networks, thus reducing capital costs. Nevertheless, VoIP had multiple limitations. For instance, the PC had to be on all of the time, the phones could not have geographical numbers and they could not receive incoming calls. Additionally, the solution had limited scalability, poor voice quality and involved high network costs as a result of operating VoIP predominantly over leased lines or dial-up services.

xDSL - Achieving Voice Quality & QoS

The development of xDSL marked a turning point for IP Telephony. xDSL was designed to utilise existing infrastructures whilst delivering multiple services (e.g. voice, internet and video) at cost saving prices acceptable to end-users. x is a variable derivative (such as Symmetrical) and the DSL refers to Digital Subscriber Loop.

The xDSL proposition brought a new and far greater opportunity, providing the capacity and flexibility necessary for true convergence and business-standard solutions.

Above & Beyond Capacity Issues

Capacity issues aside, IP Telephony take-up has also been held back by a clash of cultures between the voice channel (used to selling high margin TDM systems), and the data channel (used to lower margin products with higher service opportunities). Many voice resellers, aided by traditional vendors who were not yet ready with their IP-based products, discounted the new IP

Telephony products, claiming QoS issues and reliability weaknesses.

Additionally, the equipment to deliver the packet voice had to be addressed. It took a number of years to iron out the issues and to make a compelling story for the truly converged network to come to fruition. With the implementation of industry standards by all of the major hardware vendors, together with development of new technology platforms, this has now been achieved.

IP Telephony Protocols

The protocols on which VoIP has evolved have themselves taken great strides. Today there are many proponents advocating their desired protocol, leaving the end-user totally confused. Each protocol has its strengths and weaknesses, and the protocol of choice depends on user requirements.

H.323

This was the original protocol for VoIP, offering a standard design to deliver multi media services including video, voice and data exchange. As a standard it has high functional capability. Nevertheless, it is complex to implement and infrastructure dependant, resulting in limited scalability and flexibility. H.323's high functional capability and ability to interoperate with other applications still makes it a credible choice for basic converged solutions.

SIP (Session Initiation Protocol)

SIP is a next-generation protocol. It is less complex to implement than H.323, costs less, delivers a high level of functionality and interoperates with multi-media applications (e.g. video). However, SIP is dependant upon the infrastructure it operates over for security and quality.



The emergence over the last two years of the SIP protocol standard is set to change the way telephony interacts with applications in the future. The way we handle our voice and data messages will change as IP telephony solutions evolve into personal assistants.

MGCP (Media Gateway Control Protocol)

MGCP is the third protocol available and currently the most appropriate for business telephony solutions. It delivers high functionality and flexibility in terms of services and requirements, although not totally comparable to the multi-media capability of H.323.

With MGCP all of the application logic resides on a platform located at the service provider. This enables not only flexibility but also the ability to easily integrate with various business applications. Moreover, MGCP requires very little configuration, and does not require complicated installations at the customer premises. Consequently it provides a full voice solution with the greatest flexibility from a commercial perspective.

Protocols & Solutions

In terms of integration and deployment, the table below indicates which protocols are utilised for different business applications:

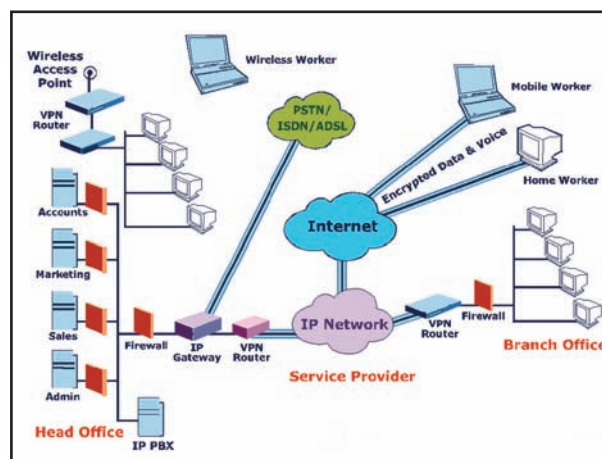
	MGCP	H323	SIP
Telephony with PBX functionality & full business capability	✓		
PC based telephony (soft phone)			✓
Telephony with multimedia capability (video)		✓	✓
Telephony with home worker solutions	✓	✓	

A Market Driven Technology

The Voice over IP arguments - about Quality of Service and voice quality - have largely disappeared. Few people now dispute that it is possible to deliver a fully converged network service which is cost effective, scalable and truly geographic, whilst delivering business quality voice.

The new IP Telephony vendors and their resellers have had to prove their case by installing pilot sites, but 2002 saw the move from these pilot sites to the full 'roll out' of IP Telephony. According to In-Stat/MDR1, while the

enterprise telephone system market as a whole went down by 18% from 2001 to 2002, the IP PBX market continued to grow by over 46%. Moreover, this market is poised to continue its forward march, and in the US, 2003 was the year when IP station shipments first exceed traditional PBX stations.



Recent studies of early IP Telephony installations indicate interesting findings. While many customers had bought their new systems on the back of promised cost savings, from the use of a single wiring system and lower costs of 'adds, moves and changes', most thought that the biggest impact was in the productivity of their users. Some claimed a 30% productivity increase resulting from more intuitive call handling and the ability to hot desk2.

What we are seeing here is a market that is being driven by solutions to meet today's changing business environment. The move to more distributed work environments and the rapid expansion of the mobility marketplace are two of the key factors in the deployment of IP Telephony.

IP Telephony Benefits

There are many cost savings to be had from IP Telephony, particularly for businesses with multiple offices. Nevertheless, if all IP Telephony delivered was a more modern, cost effective wiring system, its take up would be rather pedestrian. One of the greatest benefits of IP Telephony is that it starts to deliver real choice to the end user.

◆ In-Stat/MDR, April 2003; press release on 'LAN Telephony 2003: IP or nothing' report (www.instat.com).
◆ Channel Business Convergence Leaders Summit, December 2002

Flexibility

The flexibility of IP Telephony solutions means that users can configure the telephony to support their work practices. This flexibility comes about from the evolutionary, rather than revolutionary nature of IP Telephony. It embraces all the old world telephony values, maintaining features and operational commands, as well as bringing lots of new features.

Intuitiveness of Advanced Functionality

Most people only use a fraction of the features of their digital telephone systems, as they must remember which function to use at what stage during the call. IP phones on the other hand, particularly those with large screens, highlight which functions are available at what stage of the call and are more intuitive to use.

An IT manager from Surrey County Council claimed that when they installed a 15,000 user county-wide IP Telephony system, they were astounded at how the users adapted to the system with minimal instruction.

Better Connectivity & Reach

The decentralisation of businesses, combined with the need to provide the same services wherever the employee happens to be, requires utilisation of IP.

Providing the voice element over traditional telephony architecture means duplicating the communications costs as well as the hardware infrastructure. The use of IP Telephony allows organisations of all types to connect additional branches and home workers to the central office telephony system, providing them with abbreviated dialling and full functionality as if they were located in the head office.

Unified Communications

Using a single architecture, IP Telephony reduces costs and opens up opportunities for next generation, Unified Messaging systems. Indeed, utilising 'thin client' and web applications, IP Telephony can start to deliver true multimedia solutions involving not just voice calls but 'web chat' features, email and fax functions. These are all integrated into a single Web and phone-based communications 'centre'.

E-Business Applications

IP Telephony is fuelling a whole new array of applications that integrate the IT and telephony worlds more closely. With standards like XML and SOAP, and with voice manufacturers opening up the APIs to their core voice processing engines, there is the opportunity to develop much more sophisticated applications in vertical market sectors.

IP Telephony Today - IP PBXS

The IP PBX is the most commonly implemented IP Telephony solution today. Using a converged voice and data network, and a 'server / gateway' architecture, it separates the core call processing software from the physical architecture and device control. Call processing software can sit on any server, either within the organisation or even at the service provider. The connection to the outside world or to non-IP devices is via gateways, again sitting anywhere in the network.

Resilience

The architecture allows an organisation, by deploying multiple server and gateway devices, to build highly resilient systems with failover services in main locations and 'survivable' branch solutions. This resilient architectural design answers the question of the sceptics who claimed IP Telephony could never match the 6 sigma reliability of traditional systems. Many IP Telephony advocates claim that this architecture is stronger than traditional systems as there is no single point of failure.

Gradual Migration to IP Telephony

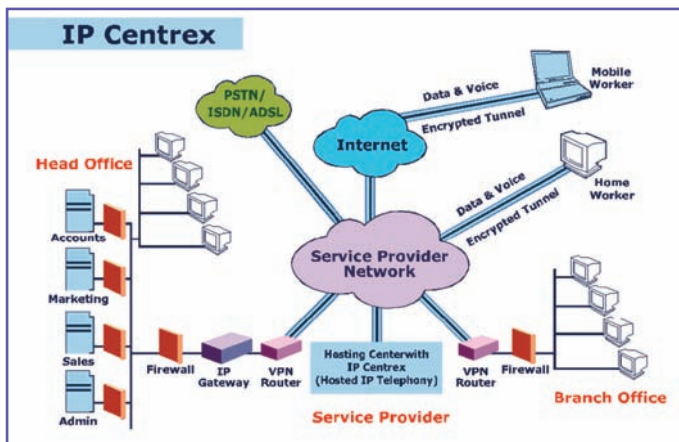
With this new architecture, the end user has an array of options enabling migration to convergence at any pace. For those who are not ready to replace a relatively new PBX, there is usually the option to install an IP card and deploy IP Telephony. In many cases, they can install an IP PBX on the network to talk to the older system over IP and then eventually phase across to a full IP Telephony solution once the need arises. For those users who cannot integrate IP with their traditional PBX, many IP Gateway units can talk to the older system via analogue or digital (ISDN) interfaces.

Users who have made the decision to migrate to an IP PBX, but cannot afford to get rid of their old analogue or digital phones, can usually be supported via an IP Gateway on the network.

Moving Forward With IP Centrex

In today's distributed business world, deploying technology to provide voice and data services to all staff, wherever they are located, can mean a major investment, particularly in the SME market, where costs per head for IP PBXs may prohibit the purchase of advanced telephony functionality. Controlling, managing and budgeting for such resources can also be a major headache.

IP Centrex, based on Centrex values of hosted telephony solutions, combined with IP Telephony, offers a flexible and scalable alternative to owning an in-house IP PBX.



It also offers data providers a cost-effective, 'real' telephony solution, with full 'PBX functionality'.

Implementations of IP Centrex

Based in the service provider's premises, the core telephony processing uses all the same technology as today's IP PBX systems, but with carrier class scalability and resilience. IP Centrex services are provided to the client site via the most appropriate broadband service, and are connected to the local LAN via an industry standard router. IP phones are then deployed across the LAN with no security concerns, or analogue phones plugged into converters, to provide telephony services to users.

Most IP Centrex services support digital and analogue phones via gateway appliances on the network, thus protecting user investment. Additionally, if the customer already has an existing PBX - whether TDM or IP-based - IP Centrex services can bring them into the wider network, and in many cases integrate their call dialling number systems.

Ensured Reliability & Security

Calls between branches and home workers connected to the IP Centrex system travel over a Virtual Private Network across the service provider's network. This VPN functionality ensures that within this network voice calls take priority over any data, each organisation on the network is secure from intrusion from other network users, and voice packets travelling over the Internet (say from mobile workers) are secure from hackers.

Zero Maintenance

The beauty of the service is that as users are added and new branches or remote workers come on board, connecting them to the service is simple and involves no upgrade or maintenance costs. This comes a long way from the expensive costs involved in re-programming a PBX when employees move locations or are added to the system.

Advanced Functionality

The new IP Centrex service differs greatly from traditional Centrex services. It is much more cost effective to deploy and offers many extra services (e.g. Unified Messaging and Call Centre applications). In particular, hosted call centre solutions based around IP Centrex offer small businesses the facilities normally only available to major enterprises spending millions on their own systems. The nature of IP Centrex means call centre facilities can be distributed easily to remote workers across the world.

All new IP Centrex solutions are based on industry standards, so as developers bring new and exciting applications to the IP Telephony world they will be easily deployable to IP Centrex users.

The whole marketplace is excited at the possibilities for IP Centrex and this was reflected in an IDC report in March 2003, where they projected that worldwide revenue for IP Centrex solutions would increase from \$281 million in 2003 to \$6.7 billion in 2007.

Summary

The IP Telephony market appears poised for take off during 2007. There is confidence at all levels in the channel that the technology is sound, and there are enough reference sites out there to prove the case. What we are now seeing is phase two of IP Telephony - the role out.

Return on Investment has never been so closely measured, and all reports suggest that IP Telephony is delivering better and shorter returns than anyone forecasted, with real business benefits to the end user. This is particularly the case with IP Centrex, making advanced functionality available to even the smallest SMEs, with no upfront investment.

Applications that are now starting to emerge on IP Telephony platforms will revolutionise the way we work, enabling organisations and people to take control of their communications world.

♦ IDC, February 2003, press release on 'US hosted IP Voice: Market Analysis and Forecast 2002-2007' report (www.idc.com)