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Secure Managed Messaging for the 21st Century

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Emizon

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Introduction

The security alarm industry faces a dilemma. How can the industry embrace the benefits of the new IP environment in terms of functionality, flexibility and cost effectiveness, without compromising on security? With IP becoming a universal protocol and BT's plans for 21CN well underway, failure to set a clear strategy for this new era will lead to at best, stagnation and at worst, loss of revenue as a result of customers disconnecting alarm systems that are incompatible with the newly deployed IP networks.

In responding to this challenge this paper explores reasons behind the move to IP and its impact on our communication structures. More specifically it reviews the issues that IP and Internet environments raise for alarm signalling from both a technology and a customer perspective. Armed with this understanding it sets out a clear strategy to take the industry forward.

> "We were impressed with how Emizon genuinely engaged with industry players right across the value chain"
> Paul Miller, National Monitoring

This strategy is based on working collaboratively across the industry, designing for the IP environment whilst continuing to meet the highest industry standards. The result is the first secure, managed messaging service, future proofed for the 21st century. That service is provided by Emizon, a company dedicated to supporting the industry move to the new IP age and to realise its benefits without compromising on security.

The information age is here

The world is changing and with it the way we live our lives! eCommerce, telecommuting, video and music on demand and access to instantaneous information are all now available through the Internet. This information "super motorway" is the on-ramp to a technological future which promises to deliver new and exciting avenues in which we will enhance our personal lives, expand our business horizons and increase revenue potentials.

In this new age, network communications has become the vehicle for managing information, with software the engine driving the innovation process. When you buy products today you pay more for the intelligence embedded in the software and technology than you do for the materials used in manufacture. Google and e-Bay have emerged as the biggest success stories of the decade.

With this technological shift comes tremendous opportunity! Traditional thinking and "business as usual" attitudes must be set aside to make way for revolutionary ideas and creative innovation. Ideas that will come from more collaborative ways of working. Developing intellect, innovation, technology and services, not managing physical resources, are what will provide the growth for today's 21st century security alarm companies.

Communication infrastructures are evolving

Satisfying this need for information is driving the radical transformation of our communication infrastructure. Our legacy public switched telephony network (PSTN) is currently based on a hierarchical circuit switched infrastructure that was designed for one service; voice. Traditional communications providers now find that these types of telecommunications networks, designed for that one specific function – the transport of voice calling services, are now carrying more data traffic than was originally intended or ever imagined. This is unprecedented, deeply concerning and extremely costly for all traditional voice telecommunications companies!

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A new service for a new age.

72% of jobs in the UK are now in the service industry.

Steel in the latest luxury cars costs less than a third of the cost of the vehicle electronics.

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In order to survive, telecommunications providers need to be more flexible. The next generation of networks; LAN, WAN, WiFi, and 3G will better service these demands by delivering multiple applications; voice, data and multimedia services simultaneously over a single core IP network infrastructure.

IP is the catalyst

IP or Internet Protocol is the enabler for this growth in data traffic. IP is simply a transport and delivery method, allowing data to be carried from source to destination across a vast, interconnected network that provides the backbone infrastructure for the Internet. The global acceptance of IP as the common delivery method has opened up public and private networks, bringing the benefits of improved flexibility, functionality, simplicity and cost effectiveness. Voice, the driving force behind the telephony network, has now been relegated to "just another application" on today's IP networks. Voice over IP is quickly replacing traditional PSTN services, with providers such as Skype now serving over 20 million users around the globe.

Broadband
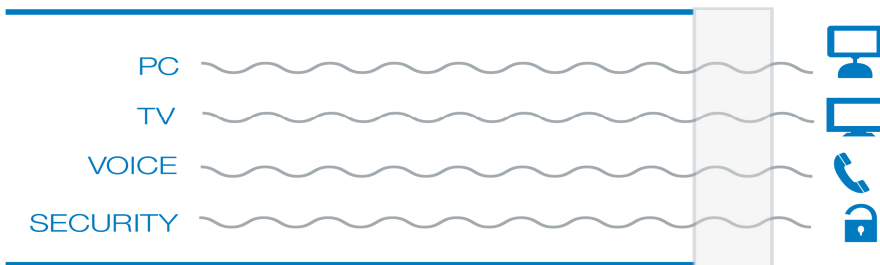
Over 10 million UK homes are now connected to this Internet backbone network, and being networked is changing our behaviour. In 2005, 24 million shoppers in the UK spent with £19.2bn online, 32% more than they spent in 2004. Moreover it's not just PC's that are being connected. By 2010 Harbour Research predicts that 1.5bn devices will be internet connected worldwide generating a $700bn revenue opportunity.

In recognition of this need to change, BT has set out ambitious plans for an IP based, 21st century network (21CN). Plans that will see 30 million end-user phone lines switching to managed IP (VoIP) services. Under the 21 CN programme, BT's 16 legacy network systems will be consolidated into one platform. By radically streamlining its existing infrastructure BT has the potential to increase capacity, functionality, speed to market and dramatically cut costs. It is a huge undertaking - the Company is set to invest £10bn in this programme between now and 2010.

Should the security industry be "alarmed"?

Yes, most definitely! The impact of 21CN on the Security Alarm Industry will be immediate and dramatic. PSTN service will become an IP application (VoIP) on the 21CN network and many of the 1 million Digital Communicators will be affected. It is critical that the security alarm companies begin an orderly migration to IP alarm communications services in parallel with the migration that is currently underway in the telecommunications industry. This action will insure that no customer is left unprotected and event monitoring is not compromised!

On the positive side, the global move to IP networks will open up new service offerings and revenue opportunities for the security alarm industry. The trend towards converged services and this facility to share applications cost effectively, has already led to a number of growth areas. In particular it has supported the boom in high bandwidth services such as CCTV, the emergence of 'Intelligent Buildings' and the advent of the "work at home" concept. Working at home, as just

The Internet has become the fastest growing medium in human history.

Cardiff will provide a blue print for 21CN's march across the country, a program to migrate 150,000 lines each week, every week for the next four years.

a single example, will open up new revenue opportunities for the security alarm industry, in that assets that were once centralized and quite easy to protect with a single alarm system, will become distributed into consumer premises and will produce new revenue opportunities for home based managed security systems.

What are the issues involved in moving to IP?

For simplicity we have grouped these issues under four areas to include the technology and customer perspective.

- **Technology -** How will IP networks impact on the end to end transmission of alarm signals?

- **Security -** How will IP networks secure the end-to-end transmission?

- **Ease of use -** What is the impact on current practice and infrastructure?

- **Value for Money -** How will the expectations of cost efficiencies be met?

Technical issues affecting alarm transmission

There is a fundamental mismatch between the signalling technology deployed by legacy Digital Communicators and IP networks; a mismatch that stems from the signalling transmission process. To be transmitted successfully over an IP network, the analogue alarm message has to be converted to digital. When signals that are already digitally encoded such as alarm signals, used by the majority of Digital Communicators, go through the above process, three issues affect the conversion process: reshaping, latency and jitter.

> **Reshaping** of the analogue tones is known as distortion. Reshaping is necessary to fool the ear into thinking that the signals are the same as transmitted. It works by filtering out the high frequency quantisation noise inherent in the process. This has the effect of 'rounding' previously digital signals such that they look more like audio signals and this can affect the ability of the system to detect in-call signals accurately.

> **Latency** is the delay in coding, transmitting and decoding the signals and becomes very important when typical alarm system protocols use guard tones that have to be recognised within strict time limits. Any delay outside these limits will adversely affect the communications between the Digital Communicator and its receiver at the ARC.

> **Jitter** is the variation in this shift in time of signals due to time delays on the IP network. Any jitter in the latency (delay) can cause digits to appear in the wrong timing though the network causing lost digits and corruption. It is potentially more troublesome than pure latency.

Analogue to digital signal conversion

"IP can enhance communications , but the progression to new technologies has to be made with a close eye on ensuring that security is not compromised."

PSI Aug.06

For the last 20 years, alarm signalling services have been designed on the premise that the connection to the outside world is via a copper pair of wires and will be switched though an analogue network.

An analogue signal that has been passed through the digitisation process is then only an approximation of its original wave form.

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The combination of these potential issues often results in a failed alarm message. The Digital Communicator will make multiple call attempts trying to get the alarm message through. The receiving equipment, unable to read it, marks it as "bad" and it is moved to a dump file – in other words generally ignored.

Which signalling systems are most affected?

Most, but not all of the current base of Digital Communicators will be effected by this issue. Identifying which are affected is likely to be a key challenge going forward. In addition, the dynamic properties of digital IP networks open up the possibility that Digital Communicators that work today, may not work tomorrow.

Legacy copper signalling services that rely on a derived channel present a different technological challenge; how to deal with fibre? Provided the physical path to and from the exchange equipment remains a copper pair of wires, and the connection capabilities in the exchange remain available, these services may not be affected. The issue here relies with the introduction of fibre into the local loop and the accompanying introduction of newer digital equipment at the end of the local loop. Fibre networks do not transmit the lower frequencies used by some of these technologies and those lower frequencies are simply filtered out.

The issues for security

The purpose of an alarm system is to ensure that the alarm signal is delivered to the appropriate response centre; securely, reliably and quickly.

Taking each of these requirements in turn, security is an issue for the Internet. Many of today's VoIP services are insecure and use the Internet for their communications medium. Being a public service, the potential exists for anyone, anywhere to monitor and or interfere with communications across the Internet leading to issues such as denial of service, redirection of signals, tampering with packets and IP spoofing. Not surprisingly unsecured Internet communications are vulnerable to attack – it's like sending a postcard into the postal system. A worse case VoIP scenario could result in critical security alarm being 're-shaped', arriving in the ARC as a completely different message, such as a trouble report.

For fixed lines, the move to the new IP environment raises the issue of how compliance with the performance standards for the end-to-end communication path(s) can be validated. PSTN customers have grown accustomed to guaranteed or established service levels which have not translated well to the new broadband world. While quality of service data does exist the increase in service providers makes it difficult to compile such data accurately for the while transmission path.

Meeting standards on availability are less of an issue for the wireless path. Both GSM; Global Systems for Mobiles and GPRS; General Packet Radio Service are more akin to private networks with Quality of Service (QoS) data readily available and regularly outperform Grade 4 standards - with GPRS outperforming GSM.

Transmission speed is not an issue for IP networks, including GPRS; it can be measured in milliseconds. IP networks can easily outperform the Grade 4 Signalling requirement in this area.

The issues for ease of use

Ease of use from a user perspective equates to the need for minimum disruption. The move to dual path systems provide a good illustration of how hard it is to change existing practice; despite a change in standards and vast amounts of publicity these systems took almost three years to gain a significant foothold.

Identifying which Digital Communicators associated with which ARCs are effected by the move to the IP environment is a major challenge facing the electronic security industry.

Using unsecured communications over the internet is like putting a postcard into the postal system

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Due to the speed at which BT is deploying its new 21CN technology, adapting to IP will require a much faster migration than has been done before. Paradoxically the more complex the technology the simpler it needs to be. All parts of the value chain; end users, installers and ARCs must be comfortable and confident with any change in procedures. Early IP signalling devices were far from easy to use, often requiring complex on site configurations such as entering IP addresses via a laptop. For the ARC, they often required having to contend with racks of PCs, each with their own bespoke products and maintenance support.

The issues for value for money

Alarms systems are often seen as a grudge purchase driven by the need to comply with insurance requirements. Against this backdrop the move to IP raises two issues in terms of value for money. First the need to realise cost efficiencies while addressing the common perception that any application using the Internet is 'free'. This perception may have its roots in the Skype business model where users tend to forget that the broadband service has already been paid for. Second, how to avoid what are often perceived as 'hidden' costs – i.e. those arising from unexpected call charges, the need for a dedicated line and or additional hardware.

Emizon: A new service for a new age

The Emizon philosophy is one of technical know-how combined with industry collaboration to adapt the established principles of security to the new IP Age. The result is the first secure, managed messaging service for the global information age. Designed specifically for the IP environment, the Emizon service is scalable and compatible with BT's 21CN rollout, yet at the same time, is compliant with the highest industry standards.

Being designed specifically for the IP environment by experts with both security signalling and software backgrounds. the Emizon service draws on proven technical know-how and operational experience, while at the same time being free from the shackles of a legacy infrastructure.

What makes the Emizon service unique is that it works actively to secure **message delivery** rather than to control the various paths the message travels over. This is where the real intelligence of the service resides. And because all messages are managed over both fixed and wireless networks, service resilience levels of 99.99% or better can be achieved.

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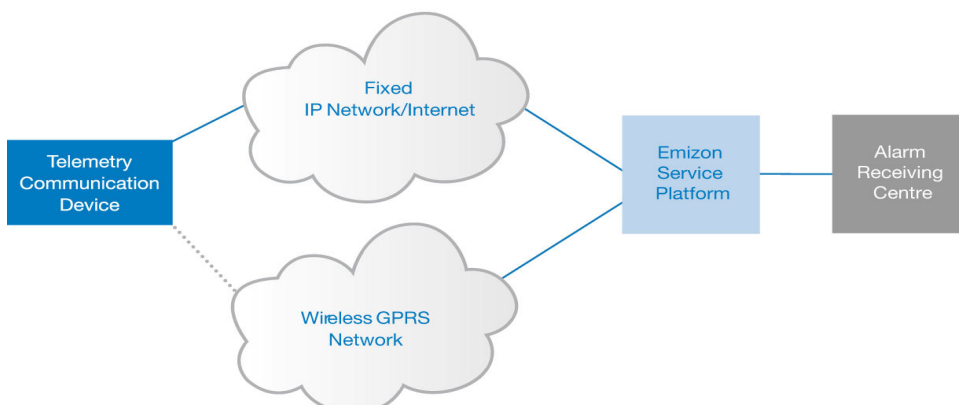
In this new IP converged era there is a need to protect the integrity of the alarm signal across its entire journey when alarm signalling may be just one of several applications.

- Managed
- Dual Path
- Future proofed
- Grade 4 Signalling
- Cost effective

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The diagram below shows the three key elements of the patented Emizon service:

- **Emizon Communication Device** (TCD); connects the alarm panel to the Emizon service platform via broadband or other fixed IP networks and via GPRS for wireless networks. The TCD is plug-and-play; no onsite configuration is required, and it is available for fitting within the panel or as a separate unit.

- **Emizon Service Platform**; a central hub of duplicated servers, providing the processing capability to manage the message delivery process. Using a unique set of patented protocols and secure encryption the service platform continuously interrogates the message delivery process. As the alarm message process is actively managed the service provides a full audit trail for the overall delivery process.

- **Connection to the Alarm Receiving Centre (ARC)**; via multiple redundant, secure, encrypted connections allowing the ARC to receive alarms and interrogate the alarm panel via a unified contact point.

Meeting the challenge of the IP environment

The table below highlights how the Emizon service addresses the issues raised:

Area	Potential issues	Emizon solution	Result
Technology	Incompatibility between legacy and IP network signalling technology.	Designed specifically for IP Future proofed for 21 CN	✓
Security	Migration from private/dedicated lines to public networks.	Dual path Managed end-to-end Grade 4 Signalling Compliant	✓
Ease of use	Change in practice New skill sets Customer retraining	Plug and play No onsite configuration for standard installation Integrates with ARC software No need for laptops!	✓
Value for Money	Additional network infrastructure Hidden call costs	Managed IP service with No additional infrastructure No dedicated line No hidden call costs.	✓

Taking each of these areas in turn:

Technological Perspective; the Emizon service is designed for the IP networking environment thus avoiding any issue of incompatibility. Unlike Digital Communicators, there is no need for an analogue to digital signal translation. Unlike copper derived services Emizon is compatible with fibre and changes to the PSTN infrastructure. With its IP and wireless duplicated network, using data centres built to BS5979 standards, the Emizon services manages both paths and complies with the highest current Grade 4 signalling performance standards. Unlike VoIP services, Emizon is designed for security alarm services.

Emizon is secure. Emizon uses secure IP communications. All messages are authenticated and encrypted across the end-to-end delivery process. This means messages can only be read and received by the legitimate receiver. Its unique

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The Emizon service brings a cost effective, secure, managed messaging service that ensures ARC, installers and their customers are prepared for the deployment of IP networking.

secure key system goes still further, ensuring that the commissioning system is simple and secure. Moreover because the messages are managed over both fixed and wireless network technologies the service meets the highest industry transmission standards.

This ability to actively manage the end-to-end communication securely across both paths helps to allay fears caused by the current debate as to whether the router is part of the equipment or the network. With the Emizon managed service **any** disruption from any part of the message delivery process, whether resulting from a lack of power, lack of signal, or attempt to breach the security will result in detection or failure. For Emizon the network and equipment are integral to delivering the message securely, reliably and quickly i.e. total customer service.

Emizon is easy to use. Working collaboratively across the value chain has ensured that Emizon has taken the full spectrum of needs into account. Panel manufactures have the option of embedding the software into their panels or using the simple plug-and-play communication module. The plug-and-play module means that the service for installers is easy to order, easy to install and easy to commission. With an in-panel model requiring no additional power supply the service is designed for same day installation. Because the service integrates with existing management software, does not involve any expensive infrastructure and uses a one touch commissioning process, this has meant early acceptance within the ARC community. Turning to end users – they now have the opportunity to opt for a signalling solution that complements IP ensuring a future proofed security solution going forward.

Emizon delivers value for money. Because the Emizon service is designed for IP as a managed end-to-end service there is no need for a dedicated line and no need for expensive additional infrastructure. Emizon delivers the managed GPRS service, avoiding the potential for any unforeseen charges. This means that the Emizon service represents a considerable saving over existing dual path analogue services without compromising security.

A secure global future

The end result is a service that benefits the whole value chain. End-users benefit from the peace of mind that comes from a managed service that meets industry standards while being able to embrace the IP world. Installers benefit from a cost effective, simple to install service that provides peace of mind to their customers while protecting their future business revenue streams from 21CN network deployments. Alarm receiving centres benefit from the ability to offer a competitive fully managed IP messaging service that integrates seamlessly with their existing software. Panel manufacturers benefit from the opportunity to upgrade to IP signalling simply, quickly and efficiently. Alarm Receiving Centres that adopt secure IP technologies will also benefit from operational savings as a result of downsizing the amount of required incoming digital dialler PSTN services as more and more customers migrate to IP based security alarm systems. In addition, the cost of opening up new markets will be greatly diminished as IP communications is not constrained by geographical boundaries or the cost associated with acquiring new customers requiring toll free PSTN services for communications. Overall, the security industry as a whole benefits from the ability to embrace the IP world while maintaining the security standards that made the industry the world leader it is today.

A clear way forward for IP brings several benefits. It means that the industry can protect its crown jewels of secure alarm transmission. It means it avoids the dangers of stagnation caused by continuous debate and confusion. It means keeping the aggressive advances of the IT industry at bay. More importantly it allows the industry to move forward to a prosperous and secure future.

Secure

Easy to use

Value for Money

www.emizon.com