



VoIP – out with the old and in with the new

The growth in VoIP is presenting a whole new set of challenges for the emergency services, as BAPCO Journal found out recently. Dan Worth reports from The London Fire Brigade Training Centre, the location for the South East Region conference, "What does VoIP offer?".

*London Fire Brigade
appliance bay.
Photo by David
Hares.*

➔ **BAPCO South East Region VoIP conference: What does VoIP offer?**

The London Fire Brigade Training Centre in London (November 23) was the apt setting for the South East Region conference, "What does VoIP offer?", with experts from leading companies related to VoIP, it proved to be an insightful and eye-opening look at how the emergency services need to remain open and aware of the benefits and challenges this new technology can bring in equal measure.

➔ **Transforming communication using VoIP**

Bruce Everest, Emergency Technologies Director, Avaya

Bruce Everest of Avaya, the sponsor for the day, looked at how VoIP has impacted companies and the emergency services from a business point of view.

The benefits from a business level are numerous Bruce said, especially when you consider the cost savings that can be made. With improved interoperability VoIP is clearly a massive plus for emergency services and by having a system where phones can simply be unplugged, moved to a completely different location, even in another country, and still work, issues of engineering and functionality are removed and everything can be brought into one network that follows a centralised administration, security policy and reporting structure.

Avaya already serves over one million customers and Bruce explained that while VoIP has benefits it also has many risks. Skype, the VoIP Softphone application that

is now owned by eBay is a good example. Over 245 million people have downloaded and installed this application, and in 2007 over 10 million people are online at any one time. However, it works by simply using the net as the connection. This means there is no guarantee of encryption or security or even of having a good connection, but more worrying is the lack of support for emergency services contact; there is no ability to call 999 or 112 for instance.

However, with the emerging latest generation of VoIP, technology known as SIP, which is based on the same methodology as web and email, interoperability between vendors becomes possible. And, as most large global businesses begin to adopt VoIP inside their own companies, issues of emergency services support and complexity will be solved, which brings enormous benefits to emergency services for improved communication links as well as lower costs.

Another issue is that many of the companies that supply VoIP software are not even telecommunications companies but are basic high street retailers – Bruce highlighted the fact he had seen Robert Dyas selling a VoIP system for £9.99 as evidence of this. This lack of a defined security system or retail guidelines means there is a lack of standards that the public and the emergency services can rely on so something resembling a "highway code" of IP telephony should be created. Ofcom have been reluctant to get too involved in creating legislation for VoIP but the following talk looked at this in more detail.

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➔ The Emergency Services' perspective

Lee Warhurst, Secretary to ACPO Communications Group

Serving Police Officer Lee Warhurst gave some perspectives on the Emergency Services' concerns with regard to emergency calls being made over VoIP systems, as well as giving an overview of the Ofcom consultations into the regulation of VoIP services and the potential issues this has raised.

He emphasised that ACPO (the Association of Chief Police Officers) welcomed any new technology that affords access to more effective and efficient telecommunications services. However, the embracing of new technology is subject to the overarching requirement that such innovations result in an improvement of existing services, and not degradation.

Looking at some fundamental differences between VoIP and the traditional PSTN systems Lee noted that VoIP calls are dependant on wall power to make the phone run as well as the need for a quality internet connection to make VoIP viable. He also pointed out that the technology differs in that packets of information are sent rather than using the traditional circuit switching technology of the PSTN. However the most important difference was the business model adopted. With VoIP services the consumer buys different elements of the end-to-end process from different suppliers. The two main issues of concern to the emergency services regarding VoIP are; 1) access to the emergency services via 999 (and 112), and; 2) provision of the caller location information associated with that call.

Ofcom's original position was that "regulation stifles innovation", which Lee accepted might be true. But he countered this by suggesting that without barriers to entry in the industry there was nothing to stop irresponsible companies entering the market to just cherry pick the services they offered, and make some quick money by offering a minimal service, then move on. This he claimed would be to the potential detriment of the responsible service providers who were willing to invest in the provision of services for the longer term, to the emergency services, and ultimately to the end consumers of the service – the general public.

Furthermore, and perhaps most strongly, Lee argued that surely all VoIP phones must provide emergency services access by dialling 999. Somewhat surprisingly this may not be a requirement for these phones depending on the definition of the service being provided (PATS vs ECS), and Lee highlighted the problem this can cause citing two cases in the US where people frantically trying to call 911 discovered their VoIP telephone did not have that capability. The FCC (Federal Communications Commission) has consequently mandated the provision of emergency services access on VoIP service providers in the USA.

Ofcom had proposed that consumer education and information would reduce the potential for this situation – ideas such as making sure the person buying the phone knows it doesn't call 999 by signing a form at point of sale had been suggested. However, this does not cater for situations where someone else, such as a

babysitter, or guest, is not aware of this and is unable to call for help. The placing of prominent labels on the phones stating that 999 calls are not possible would negate this, although this solution does not assist those who are visually impaired, for some other reason unable to read, or whose first language is not English and so may not understand the notice.

Ofcom have changed their original position to one where they accept that all VoIP phones should be able to call 999 and a statement is currently pending from them to clarify this position.

The talk ended by asking what is to be done about stopping offshore providers offering services that don't have to adhere to rules and – perhaps most importantly – about issues of call placement. As VoIP phones are unable to inform the call centre of their position it makes it a lot harder for the emergency services to locate the situation and so the telephone operator is under more pressure to interrogate the caller for their position. However, the caller might not always be either able, or indeed willing, to provide this information verbally. This issue was taken up as a full topic in the next talk.

➔ Handling VoIP emergency calls

John Medland, BT 999 Policy Manager

Starting with some statistics John Medland underlined that VoIP only makes up a relatively small percentage of the calls that come through to emergency centre control rooms – about 1,000 a month compared to 2.4 million a month from fixed and mobile numbers. But despite this the issues surrounding VoIP still demand serious attention.

Top of the list is how to solve the problem of locating the call as the definite link between telephone number and the terminating copper line is broken for VoIP. Currently conventional landline calls can generally be placed to within a few metres of their location, and even mobile calls can be approximately located with a helpful degree of precision and certainty (especially when overlaid on a map). However VoIP calls give no certain information as to their position. This means that whereas before an operator could rely on the database to provide positioning for the emergency services, now they must return to asking the caller for their position (or at least confirming it). As John pointed out, in some cases people are in shock or panic and put the phone down too soon leading to problems for the emergency services.

999 operators are still usually presented with a default/registered address for VoIP calls, which corresponds to normal place of use of the VoIP application (phone or PC based), and have to try to verbally confirm this (or change it) before onward routing of the call. Likewise the Police, Fire, Ambulance and Coastguard control rooms have to try to get the user to tell them where they are calling from without the benefit of knowing whether any automatically provided location is correct. Although most VoIP calls are currently made from a fixed location, this is increasingly likely to change as users make use of the ability to log-on at a number of access points with the same identity (telephone number). As John noted, this

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means current methods can only be a temporary solution for calls that therefore take longer to handle and to respond to than conventional calls.

It had been proposed that mobile VoIP users be asked to update their own location whenever they log-on but this was considered unlikely to be followed even if callers knew the location accurately – which is borne out by experience in the USA where this has been tried.

Therefore the emphasis must be on finding a way to locate the phone from within the network it is calling on – requiring cooperation from the underlying access provider (eg copper wire, cable), the Internet service provider and the VoIP service provider (possibly three separate organisations). While John believed a solution would be forthcoming as UK and international groups continued to work on the issue, he believed it would be several years before it could be routinely solved. But, as his statistics underline, with 600 of 1,000 monthly VoIP calls being genuine, and 250 control rooms to field them, only four or five calls a month maximum would be received, which means there is still some time for a solution to be discovered before sheer numbers make this a severe problem.

➔ VoIP forensics and evidence gathering

Mark Hayward, Security Consultant, SELEX Communications

The talk was opened with the straight-to-the-point statement that 'VoIP is hackable', and Mark went on to outline some of the ways in which this can happen. He also looked at some of the actual and potential solutions to this hacking. Flooding the network with info to stop voice calls being made, eavesdropping on conversations to gather information or even to save money are some of the way VoIP can be attacked. Identity fraud can take place too and there are numerous free-to-download programmes designed to allow people to hack into VoIP accounts.

However, Mark went on to explain how SELEX systems (Professional Communications) provide the ability to be able to access information on; who had logged on to a system; where they had been while on; what web sites had been visited; what emails had been sent/received; and even the equipment they had used to do so, in

order to comply with company policies. This security helps augment the protection users can give themselves by using SIP enabled firewalls, spam filters, application gateways and regularly changing passwords.

Like the internet, VoIP is often targeted by people wishing to hack into systems operating across open communication channels. But with systems like those offered by SELEX to help reduce the risk of people hacking in, VoIP can remain a workable communication system.

➔ Converged communications within public sector and Emergency Services

Kelly Scott, Extreme Networks

The final talk of the day focused on the need for a network infrastructure that provides organisations, groups, and people, a secure, reliable and available environment to guarantee application delivery and combat the security issues of today's networks.

Kelly Scott of Extreme Networks looked at how reliant on the internet we have become, citing some four million e-payments that take place between the public and local authorities. Extreme Networks was, and still is, the fastest growing company in Silicon Valley history. They have achieved this through providing Ethernet switches that help to control access to networks and automisation of the network that in turn helps save on power consumption and provide lower cost, energy-efficient networks.

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➔ Summary

The curate's egg that is VoIP is currently presenting both positives and problems and it still requires a critical eye to make sure technology does not lead purely because it can. But as conferences such as this demonstrate, there are companies and protocols being developed all the time that the emergency services will be able to turn to for guidance.

The 33 delegates in attendance (plus attendees from exhibiting companies) also enjoyed guided tours of the London Fire Brigade Museum that had been organised so they could appreciate how far emergency services had developed over the years.

Companies exhibiting at the conference were: Avaya, APD, Mercury – Technology, CYFAS, Samdale, Extreme Networks, Arqiva, Resilience Communications and Milltelecom.

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