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# A British APCO White Paper

## Next Generation 999

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# Next Generation 999

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## Introduction

The UK is justifiably proud of its 999 service. The world moves on though, never more so than in the field of technology. With every new device, app and feature, the public has ever greater expectations that our emergency services and their supporting ecosystem will make full use of the best technology and information available to keep us safe and to answer calls for help.

We know the reality does not match those expectations. New features and functionality cost time and money and join an ever-growing list of competing priorities. This is as true for BT as it is for the emergency services. One of BAPCO's roles is to run the 999 App Accreditation Scheme on behalf of the UK's 999 Liaison Committee, and we see apps emerging that have real potential benefit for the emergency services and for public safety providers. However, these cannot progress into the 999 system because as of today, BT can generally handle only voice calls and a limited number of messages via SMS.

There are times when those in need cannot make a voice call. On other occasions, valuable information could be available from the scene, but the caller has no option to communicate other than by voice.

To catalyse debate and discussion on the future of this critical service, the BAPCO NG999 event, part of the BAPCO Satellite Series, brought together industry, users and a range of other stakeholders to discuss the future of the 999 service, the choices, the challenges and the caveats. This paper seeks to summarise the discussions and form the basis for further debate and the development of what must be a robust project plan that will ultimately result in a comprehensive technology roadmap for NG999.

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## Current status

First introduced in the London area on 30 June 1937, the UK's 999 number is the world's oldest emergency call telephone service. All 999 calls made in the United Kingdom are connected through BT. Last year (2018), BT's team handled more than 34 million calls at an average of 93,000 per day. Of those calls connected to the emergency services, 49% were for the Police, 47% for the Ambulance Service, four per cent for Fire and Rescue and less than one per cent for the Coastguard.<sup>1</sup> There were also 10.9 million calls 'not connected' – those filtered out by BT including silent and pocket calls.

It was generally accepted that BT does a good job; guarantees a fast connection and provides a stringent mechanism to ensure the most vulnerable are protected. The UK is lucky to have a single emergency number, with 999 and 112 both doing the same thing. In France for example, 112 has local variations with very different service levels.

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<sup>1</sup> <https://www.btplc.com/news/index.htm#/pressreleases/999-service-gears-up-for-the-busiest-night-of-the-year-2818813>

BT has a huge amount of infrastructure in place, and not much has changed since 1937 – the 999 process still starts and finishes with the caller. A public study<sup>2</sup> of the 999 system revealed basic and not unexpected or unreasonable requirements:

- People prefer to call and speak to the emergency services rather than use any other communication platform. This does not rule out other platforms that may enhance the service.
- People don't expect to be put on hold when they dial 999 and it is a shock to them when this happens.
- People expect the emergency services to easily pinpoint their location when they call from their mobile phones.
- Waiting for the emergency services to arrive is very stressful and people in these situations appreciate any form of communication that updates them with regards to the progress of the emergency services.

In addition, a delegate at the event noted that responses should be homogenised – the public should expect the same level of response irrespective of the emergency service.

Overlay those requirements on to the emergency services' wants and needs from the 999 system, and there is pretty much a mirror image. Their requirements are reliability, resilience, the 'what, where and when', and timely and relevant updates from the control room.

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## Planned upgrade

BT is upgrading the platform that currently handles the 999 service, working on the basis that voice is still the priority. However, the point was made that it is very difficult to get guidance on what the emergency services actually want from the planned IP platform. Should BT look at support for multimedia? The platform will have the capability for data, and it is expected that the first phase upgrade will be in place by the end of March/April 2021 following a two year programme. This will provide backward capability for voice, telematics (eCall)<sup>3</sup> and SMS. A three-month migration period will see the old platform remaining in place with extended support. The goal is for a seamless change with no loss of resilience or reliability.

While acknowledging a 'messy' telecoms environment, BT plans to have support for 'normal' voice calls plus VoIP, and alerts from wearables and smart speakers/digital home assistants to be in place by 2025.

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<sup>2</sup> User needs of a modern 999 emergency system: A Report commissioned by GDS (Government Digital Service) Cabinet Office 2017.

<sup>3</sup> <https://www.bapco.org.uk/what-we-do/e-call/>

New interfaces will be able to handle data from apps, two-way messaging, and information from smart sensors – so for instance an alert if there is a sharp temperature rise in a building would automatically trigger a request for fire and rescue assistance.

Intruder alerts would trigger requests for response from the police (or private security firms if applicable). In short, the new platform will have the potential to handle a range of new non-voice information streams.

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## The danger of the data deluge

***“There is no single consolidated system to centralise data – who owns it, who wants it, who pays for it?”***

While the potential of having access to a vast range of information is immense, there are a number of very ‘real world’ considerations for the emergency services that keep feet firmly on the ground while considering the bright new future.

- There needs to be a culture change with service leaders seeking investment to allow apps into control rooms
- Consideration needs to be given to how future next generation control rooms adapt to embrace digitisation, not just ESMCP but general public methods of communicating
- Various demographics need to be accommodated, both senior generations pre-internet and more recent generations. All have preferences as to how to interact using technology, from analogue telephone to ‘what3words’
- Much of the data received could be of a personal nature, which raises questions around personal privacy and GDPR
- Data is only useful if it can be analysed and evaluated – it should be a supplementary source of relevant information, not a tsunami
- There is a perceived mis-match between security requirements and the ability to share/receive data
- The use of data/video could be used to enhance the response. But each service has different operating models so it would not be a standard set of data – and it was also felt that any data/video flows should be direct from the caller to the emergency services, and not routed through BT systems.
- The emergency services and control room personnel need to be protected from possible mental health issues that could arise from the impact of visual data which by its nature is likely to be graphic and shocking
- Voice controlled home assistants already support calling 999 so there is already potential for hacking, as well as unforeseen actions – i.e. a TV or radio programme that utters the words ‘Alexa! Call 999...’
- Integration of smart speakers, connected sensors and the wider IoT into the 999 system raises security issues, including the danger of hacking smart devices. Rigorous testing would need to be carried out before allowing access

- The use of drones to relay data back to control rooms has great potential, but is currently limited by network coverage and bandwidth – will ESN solve that?
- Sharing of video surveillance feeds can be a problem due to contracts and budget limitations – red tape gets in the way of collaboration and effective policing
- Emergency services’ IT departments are sometimes not in tune with operational capabilities or requirements

Using data to build up behavioural profiles is already proving valuable, and the more data, the more potentially intelligent the ‘system’. For example, at some regular major events, the Ambulance Service has the empirical information to enable it to predict where to site ambulances. The Fire and Rescue Service does not have that capability. There is no single consolidated system to centralise data – who owns it, who wants it? Who pays for it?

Overall – who will take ownership to make sure the emergency services collectively and individually stand up to their responsibilities of being able to intelligently use all the information available?

There is a data storm coming – collectively, are the facilities in place to deal with it? If artificial intelligence, machine learning, the data deluge happens: all that data needs to be drawn together and the emergency services are nowhere near being able to achieve that with the information services they have today.

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## Artificial Intelligence (AI)

*“AI should be limited to making recommendations, not decisions.”*

There was a stated view that while artificial intelligence (AI) will be useful going forward, there would always be a need for human to human interaction to provide reassurance, even for the generation used to doing everything via apps and data.

It was generally agreed that the ‘ownership’ of 999 calls needs to remain with the human interface. AI for instance can add much insight and analysis, but should be limited to making recommendations, not decisions. AI can be used to predict expected call volumes and system loads and could for example help by producing heat maps of social media activity monitoring for key words i.e. ‘shots’, ‘fire’, etc. However, the responsibility for actions taken as a result would remain with the human command and control.

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## Social Media

*“There are concerns about privacy – who will use the data?”*

Social media has a place for emergency alerts - the public are tweeting before calling, for instance. The channel should be appropriate to the situation and the users themselves. Today’s generation is comfortable with multiple social media channels. With the ubiquity of social media such as Twitter, Facebook, Snapchat etc, it makes sense that the channels should be integrated into the 999 system.

However, concerns about data privacy are raised – who will use the data? A clever simple solution was suggested – integrate an ‘emergency services’ data button into the social media platforms. Users would need to opt in and agree in advance to allow the emergency services to use the data for the preservation of life and the protection of property.

It was also suggested that social media could be utilised more for outgoing messages rather than incoming, for example warning people away from incident areas.

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## Procurement

***“Compatibility needs to be demonstrated otherwise we will all be commercially led.”***

It was generally agreed that procurement did not have a good record in the emergency services, with poor choices made historically for IT provision, and the services finding themselves locked into outdated systems with high charges for minor technology changes.

If the services combined their buying power for technology and coordinated effectively, significant savings could be made.

Technology itself has enabled radical changes to purchasing power, and several delegates made the point that the emergency services are not keeping pace. With budgets set up to five years in advance and procurement processes way too lengthy, there is a need to get operational staff to be more in control of identifying requirements, and a more agile approach to procurement.

Rather than a massive procurement exercise, the process needs to be simplified otherwise the purchase is in danger of being out of date before it is delivered. Today’s technology moves quickly, and the gap between specification and delivery needs to be bridged. Why can’t an approved app be added to a device immediately, if it makes the work/response more effective?

However, caution is advised. All this ‘stuff’ is being done, but what are the benefits? There are different technologies and platforms – BT is implementing NICC standards and testing with the emergency services on the new platform; all should be open standards. How can those responsible for procurement, and more importantly the users, see if a new app or service will be useful without the assurance that it will work? The benefits need to be qualified. One delegate summarised the issue as follows: *“How do we know we’re doing the right thing? What are the user requirements, what is the business case, where is the evidence? Compatibility needs to be demonstrated otherwise we will all be commercially led.”* There is clearly a role for BAPCO here, as we already work with the 999 Liaison Committee to approve apps for connection to BT 999.<sup>4</sup>

There is a need for accreditation/standardisation – the emergency services are being plagued by app developers working in isolation (and even text messaging is not unified across the services). There should be more development of core technology like the MAIT hub – to have something that people can plug into and it works.

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<sup>4</sup> <https://www.bapco.org.uk/what-we-do/999-apps/>

Does centralisation work? Should there be a central provider – or is an open marketplace the right approach?

Should the Home Office be mandating a standard level that the emergency services can base their requirements on – move to the cloud, buy only what you can afford, sign up to it only if it's useful?

There is a tendency to buy technology to solve problems when the actual problem has not been clearly identified. The purchase of technology is often reactive – technology is moving quickly, it's shiny and new, buy it now! One telling statement was: *"We have a number of systems doing the same thing – the same number of systems as the number of good sales presentations made to our leadership team ..."*

There are emergency services organisations with the same or similar systems that cannot 'talk' to each other or share information, and there are also challenges in terms of incorporating legacy hardware on both current and future systems.

In addition, technology upgrades are not being done – upgrades are sitting on the shelf because user requirements are not requested or taken into consideration, or resources to implement the upgrades are not available within user organisations.

There needs to be far more user engagement – investment in asking the user what is required. Asking for a racehorse results in the delivery of a camel due to lack of investment in the initial requirements. There also needs to be quality control in place – i.e. a £20 dashcam is not the same as one costing £300. It's not about cost, it's about cost-effectiveness.

There is a long lag between concepts and ideas and the ability of suppliers to universally offer the provision, EISEC and MAIT being examples. It was felt that these should be standard functionality from all suppliers and the emergency services mandated to use them.

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## Governance

***"Someone needs to be brave enough to take ownership."***

It may come as a surprise to know there is no contract between BT and the Government for the provision of the 999 service – and no contract between the Government and the emergency services.

While it was agreed that this has not affected the performance of BT, with the rapidly changing technological landscape there needs to be a clear roadmap. With no contract terms to refer to, there is no leverage. Some governance is needed to know the route to go for changes and to enable the emergency services to control their own destiny. Stakeholders need to influence the future look and feel of the 999 service, and ministerial support is needed to get it enshrined.

Someone needs to be brave enough to take ownership. To get consistency of response across the services there needs to be a clear and agreed roadmap of future development including MAIT, AML, use of data, video and AI, and the demise of PSTN in 2025. As examples, currently AML is used by all Ambulance services, nearly all Fire and Rescue services, but only about 60% of Police forces. MAIT is used by very few agencies although trials are ongoing in two regions to build MAIT Hubs.



Not all agencies seem to be aware of the possibilities available to them.

A widely published and promoted roadmap would enable them to build available enhancements into their own development roadmaps. There was a discussion on how the benefits of these enhancements could be quantified, which is not always easy.

It was felt that the Government should lay out a clear strategy and roadmap, acting like a private company and considering KPIs, setting clear expectations and focusing on future 999 performance, responses and consistency.

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## The Workplace

***“There is a lack of understanding of what the call taking/resourcing problems are in the first place.”***

It was pointed out that technology can be a cause of poor performance, as well as a benefit and in terms of staffing, that there is a lack of understanding of what the call taking/resourcing problems are in the first place. There is a clear need to work through the business process before selecting the right technology and making the investment.

The availability of new technologies can make the working environment more flexible, but only for some roles – i.e. currently control room staff cannot work remotely. Flexibility can make staffing levels dynamic and budgets more effective, enabling services to ramp staffing levels up and down as needed. Technology can help volunteers provide targeted support to the emergency services during both planned and unplanned events.

Will technology take the place of operators? It was generally agreed that technology will coexist – it will aid and advise, but the human voice is still needed for reassurance in many situations. However, the management of demand in the control room is seen to be a major challenge. There are agreements and working practices in place but not legal standards or regulations for call management. How will a NG999 call/data feed be transferred from an overwhelmed call handler to a peripheral call centre, especially in a crisis situation?

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## Joined up thinking

***“We are not good at sharing good and bad practices.”***

In terms of investing and using technology, the emergency services operate in silos with generally poor levels of inter-agency cooperation. We need to get all the related links to join up otherwise there is continued potential for fragmentation, and this is a real concern. However, the question is how much should be mandated nationally? Localism still gets in the way. Why do some services do A, and others do B? 999 should be boundary agnostic – how is it that some Police forces have chosen to not implement core location services such as EISEC and AML? BAPCO stands willing to assist to create a mandate to drive this forward.

A delegate made the point that the different agencies are not good at sharing good and bad practices. Too many agencies are trialling the same things, there needs to be an official forum for sharing so all can learn from each other.

More events are needed to share information at a more granular level, bringing suppliers and users together. Control room suppliers should all offer a 'standard' package that enables agencies to make best use of all available systems rather than having them offered as enhancements.

There needs to be a cultural change – we know there are a lot of chief officers with many competing priorities, but the technology roadmap is a priority. There needs to be a transformation in the way the emergency services cooperate in terms of business processes and procurement.

One size doesn't really fit all in every circumstance, but EISEC for example should be consistent. There seems to be a gap between the desire to achieve the digitisation agenda and the operational needs. As we move to NG999, we need to ensure that digitisation is delivering value for the emergency services and for the public. There is a great deal of flag waving in individual services, but little accountability or useful records of which practices work, which do not and what is done differently as a result.

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## Conclusion

The advance of technology is inevitable and ongoing at high speed. Used properly it can bring great benefits and potentially save lives. There needs to be a paradigm shift in how the emergency services approach the requirements for new technology. The 999 service should be seen as a 'system' – people tend to focus on their own areas of expertise but the future needs to be approached in an integrated way. 999 is a complex system. There needs to be an agreed, shared understanding of what 'the 999 system' is and where the boundaries lie, with ownership and responsibilities clearly set out.

Much of what was discussed at the event in terms of advances is possible, but there are political and cultural barriers preventing the integration of the new elements into a seamless network.

There is a need for better education – users need to know what the technology can do for them and how it can enhance their work. There is so much going on, is the choice just creating confusion? Should there be a central provider, or is an open marketplace the right approach?

Rather than massive procurement exercises, the benefits of adoption need to be made clear so informed choices can be made, and purchases specified based on cost-effectiveness and need. Purchase decisions need to be quick – the rate of technology obsolescence is accelerating, and public safety agencies need to radically narrow the gap between specification and delivery.

BT needs a high level, clear set of requirements that are backward compatible and future-proof.

The importance of BAPCO was highlighted and underlined – there is a need for more events with demonstrations and service providers so users can see the potential and understand what the capabilities deliver in terms of benefits – before investment is committed.

BT should be able to pilot new proposals with users, there should be a formal process with clear governance, with outputs shared across the services and feedback properly taken into account. This would lead to the production of a more granular, viable and realistic roadmap.

The barriers to advancement are organisational and political, not technological. Technology is leaping forward, but the transformation of the emergency services is sluggish – there is a real danger of being left behind and failing the public.

## Ends

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## Acknowledgements

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### Speakers:

- Darryl Keen, Chair of the 999 Liaison Committee & Chief of Hertfordshire Fire & Rescue Service
- John Medland, 999 Policy Manager, BT
- Andrew Richardson, Chief Commercial Officer, Realsafe Technologies Ltd
- Chantal Bonardi, EMTEL Technical Officer, ETSI
- Amir Elichai, Chief Executive Officer & Founder of Carbyne
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