

A SAVOX GUIDE TO POC COMMUNICATIONS

A Practical Approach to
Improved Mobile Team Communications

SAVOX
You're never alone

WHY PUSH-TO-TALK OVER CELLULAR IS MORE EFFICIENT AND AFFORDABLE THAN TWO-WAY RADIO AND HOW YOU CAN TEST IT EASILY.

EXECUTIVE OVERVIEW

For years, two-way radios have served as reliable communications devices for mobile teams. More recently, the broad demand for mobile communication devices has led to the rapid development of mobile phones – cell phones – and their cellular networks. More recently still, the development of Push-To-Talk (PTT) applications has allowed companies to turn their mobile phones into two-way radios, thus allowing simplex and duplex communication through a single, multi-function device. This technology is most commonly known as Push-to-talk over Cellular (PoC) in reference to the push-to-talk communication of two-way radios.

The adoption of the technology is relatively simple. Most companies are currently equipped with mobile phones and data plans; they need only to add a PTT app subscription to gain PoC capabilities.

PTT application providers, realizing that a hard switch from radio to PoC may be too uncertain for many organizations, are investing in software development or acquisitions to provide PTT apps that integrate PoC into two-way radio communication. This allows mobile phone users to communicate on specified radio channels and makes adoption easily scalable. It also makes group tests virtually risk free and allows companies to scale their adoption rate up to a suitable point in the organization, which could be a total replacement of two-way radio communication by PoC.

At the same time, more and more countries are running trial projects for private government LTE networks, e.g. FIRSTNET, which would reduce the deficiencies of LTE networks compared to radio networks. These projects will help governments to free up frequency bands that can be reused for other purposes. As the infrastructure develops further and further from the LTE network expansion, to LTE compatible mobile devices, to the creation of more and more PTT applications as well as the customization of PoC accessories for specific industries, we see a clear trend to PoC as the preferred choice for mobile team communications.

SIGNIFICANTLY REDUCED COSTS

IMPROVED EFFICIENCY

IMPROVED GROUP COMMUNICATION

LOW-RISK IMPLEMENTATION

HIGHLY SCALABLE

THE TRENDS

WHILE THE RISK TO ADOPT THE NEW TECHNOLOGY IS RELATIVELY SMALL, THE ADOPTION RATE DIFFERS AMONG VARIOUS INDUSTRIES.

LOW ADOPTION RATES

First responders, due to consumer-grade handheld devices and concerns over the reliability of the mobile phone network in crisis events. PoC communication could be highly distorted during peak usage times which could occur during natural and man-made disasters.



0%

LOWER BUT INCREASING ADOPTION RATES

Industries such as utilities and heavy industries such as petro-chemical, law enforcement and public safety where a coexistence of PoC and two-way radio communications is often preferred and access to data is critical.



HIGH ADOPTION RATES

Industries such as transportation and logistics, construction, manufacturing, and hospitality, where cost reduction is often the main driver for a 100% switch to PoC.



THE ENVIRONMENT TODAY

In any team work situation, the success of the team is highly dependent on communication. The transfer of information and coordination among team members are key factors of success. Starting with the military, the requirement to communicate within and between groups, particularly when those groups are mobile, has created communications solutions that are more and more advanced. Predictably, solutions from radio communication to the internet and more are finding their way into our personal and business lives to help optimize work processes and thus reduce costs significantly.

Two-way radios, analog and digital, have become an essential part of mobile team communication. Organizations in all kind of environments from restaurants to trucking companies to police and fire fighters rely on these solutions to improve processes and coordinate units to an extent where communication can save lives.



A NEW OPPORTUNITY

Push-to-talk over Cellular (PoC) is an app that turns a mobile phone or tablet into a two-way radio. A relatively new technology, PoC is also known as mobile phone radios, LTE radios (referring to the internet speed), or IP-radios (the LTE network uses IP-protocols).

The speed and convenience are attractive to organizations with a high demand for fast one-to-one and one-to-many communications. PoC communication is instant; the connection is established at the press of a button – as fast as 50ms compared to several seconds when establishing a phone call from one mobile phone to another one.

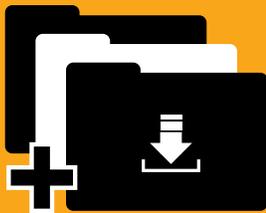
In most regions of the world, the PoC technology has reached a level of adoption that is increasingly becoming the standard. In USA and Canada, all major carriers offer a carrier-graded PTT application. In many regions of Latin America, especially in mountain regions, end users with the highest requirements – fire departments, for example – prefer PoC over two-way radios since the mobile phone network is more developed than the radio network, resulting in fewer black-outs. European Carriers in Europe, CIS and APAC are following this trend.



SOLUTIONS THEN AND NOW

TWO MAJOR TRENDS ARE THE MAIN DRIVERS OF THIS NEW TECHNOLOGY:

1. THE CONTINUOUS INCREASE OF TRANSFERRED DATA MADE POSSIBLE THROUGH DATA SPEED AND REGIONAL COVERAGE

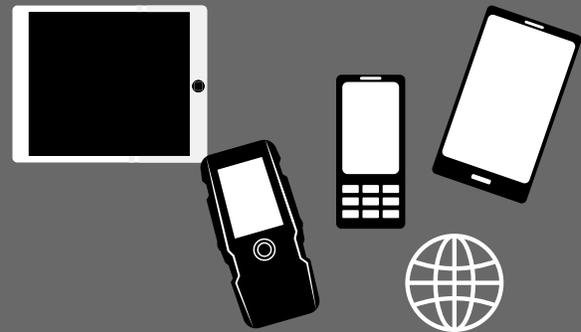


Analog two-way radio communication has existed since the early 20th century. With a wide network spread and a broad range of affordable analog two-way radios, the analog system is still a preferred solution by many end users.

Digital two-way radios with their multiple sub-segments (e.g. TETRA, P25, dPMR, DMR, TETRAPOL) offer additional advantages such as the use of smaller bandwidth, better battery life; additional features such as text messaging; and arguably, a better audio quality in noisy environments. Consequently, digital two-way radio sales have reached a sales level similar to analog radios..

For over two decades, Nextel Communications (initially known as FleetCall) has allowed cellular network users to communicate in a push-to-talk mode as well as directly dialed voice calls using a specially-designed push-to-talk phone/radio. At the time of its 2005 merger with Sprint, Nextel had over twenty million subscribers in the United States, with its iDEN network being used by up to 6 million subscribers. In 2013, Sprint eliminated the iDEN network due to frequency issues while bringing in their PoC application DirectConnect. They have since struggled to reach the same customer base as Nextel alone had achieved. Nevertheless, PoC is the clear candidate to replace major parts of the two-way radio markets.

2. THE SPREAD OF MOBILE DEVICES



Looking at the different wireless generations, we have seen an incredible development of data speed. While the steps from 1G (2.4kbps) to 2G (64kbps) have been rather incremental, the big leap forward came through the broadband solutions 3G (2,000kbps) and the data-focused 4G/LTE network with 100,000 kbps, with a future outlook of 1Gbps for 5G networks.

Between 2005 and 2014, the mobile cellular subscriptions per 100 people in the United States rose from 68% to 98%. By the year 2014, Africa had reached 69%, APAC 89%, and Europe and CIS countries have gone past the 100% penetration rates. In many companies today, workers carry at least two communication devices – a two-way radio for group communication and a mobile phone for 1-on-1 communication.

The foremost reason for the success of PoC technology lies in its potential to **reduce the costs** of communication. System administrators have found PoC highly suitable in a variety of field applications to handle voice and field force automation. This applies especially in organizations still depending on radios. But even in applications where mobile phones are being used, PoC creates cost improvements and further benefits like the **increase in efficiency** due to faster communication and improved group communication.

WHAT COMPANIES ARE LOOKING FOR

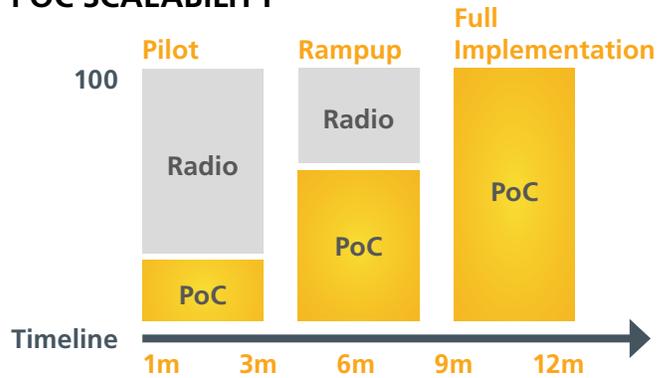
AN AVERAGE CELLULAR PHONE CALL TAKES 2 MINUTES WHILE THE AVERAGE PTT CALL TAKES 30 SECONDS.

An example? In today's dispatch centers, individual numbers are called to inform teams about tasks or changes in the schedule. In searching a contact, dialing a number, making the call, waiting for the other person to pick up, and handing over the message, approximately 2 minutes might have passed. With PoC, sending and confirming a message is usually done in a time frame of 30 seconds. Moreover, instead of making 10 different calls to 10 different numbers, multiple phones can be reached at the simple press of a PTT button. Thus, PoC improves not only 1-to-1 communication, but also 1-to-many communication. For a team working together, being connected in a group talk **improves inter- and intra-group communication** significantly. Since all communication is through the data network, PoC even allows international group communication.

In addition, PoC app makers have created **customized solutions for specific industries** to take advantage of the many functions a mobile phone offers. These can involve a variety of features such as GPS location, task tracking, or bar code scanning. Instead of carrying several devices for different tasks, the mobile device becomes a Swiss Army knife for the worker to complete all his tasks and stay connected with the dispatch center and his team.

Unlike older push-to-talk technology, the PoC app approach is **highly scalable**. PTT app makers understand that after approaches like Nextel's, many companies are

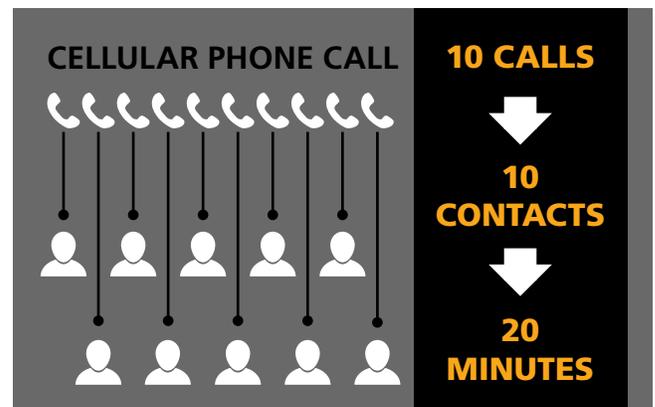
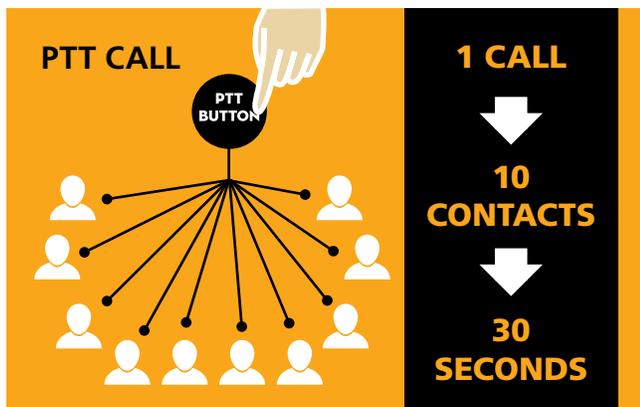
POC SCALABILITY



reluctant to do a hard switch in moving away from radio communication. For that reason, they have created ways to integrate with radio communication, allowing the PTT app users to communicate with radio users and vice versa.

Many companies prefer to run a small pilot project with about ten PoC users while the rest of the organization continues to use two-way radios. After the pilot project, the organization can decide to continue and deploy a bigger number of PoC users or, if desired, move back to only two-way radio communication. The costs of such a pilot project are close to nil which reduces the risk of implementation to an absolute minimum. An organization can decide on an individual basis what persons, roles or teams should use PoC, two-way radios, or both.

For organizations only using mobile phones, adding a PTT app and setting up talk groups is a one-day task for a system administrator. Removing the PTT application if the pilot project is not a success, even less.

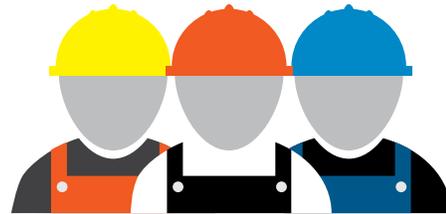


WHO IS MOVING TO POC COMMUNICATIONS

PoC customers come from a variety of industries, but PoC integration rates vary among these. Industries with a high cost pressure are the currently the biggest adopters of PoC technologies. These could be manufacturing, construction, transportation and logistics, and hospitality. In these industries, we see a clear shift towards 100% PoC adoption.

Other industries see the need to maintain two-way radio communication as a fall back solution. One example is utility companies, which have about a 50%-90% adoption rate for PoC. Others include law enforcement and public safety, and heavy industries such as petro-chemical.

Organizations with a lower rate of PoC adoption are those with a high percentage of mission-critical communication such as first-responders and military. But with private LTE networks being implemented in bigger cities, we will also see a shift towards PoC in these field applications.



HOW COMPANIES ARE MAKING THE TRANSITION

POC TECHNOLOGY DOES NOT REQUIRE MANY DIFFERENT COMPONENTS TO BE ABLE TO REPLACE A TWO-WAY RADIO SYSTEM.

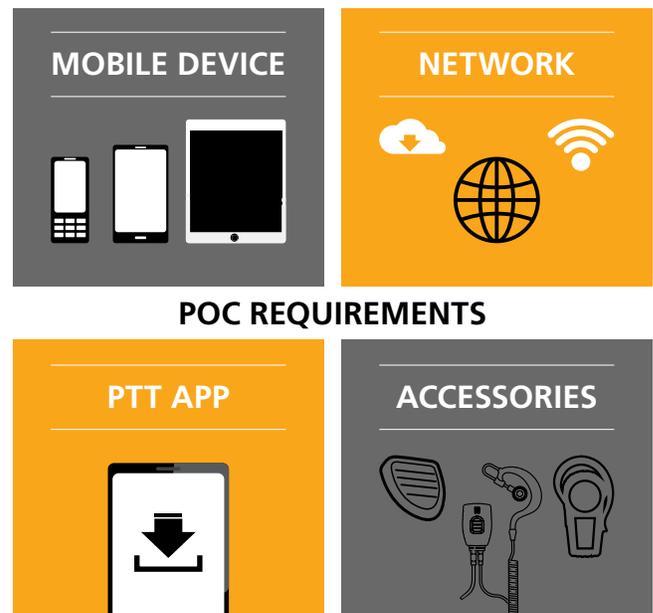
The **mobile device** can be a smart phone, tablet, flip phone, or a featured phone supported by a specific PTT app maker. Common choices are Android phones and tablets from manufacturers such as Samsung, as well as Apple's iPhones and iPads. For industries in rough environments, a ruggedized phone is often a preference; these phones often carry an integrated PTT button. No matter what mobile device is selected, the user should ensure that the PTT app and other work tool apps and needed audio accessories are available and supported by the device and function flawlessly.

Different types of **data networks** are available for PoC technologies. For data speed and therefore speed of communication and reliability, LTE networks are the networks of choice. Most PTT application work well even in 3G networks with only limited effect on communication quality. The data consumption of PTT apps has proved to be relatively low. Even in high communication environments, the data rarely passes 1 GB per month.

For local applications such as airports or in the manufacturing industry, WiFi networks are a reliable option.

PTT apps from different providers have different features and options. Some PTT apps are free for up to a designated number of users which might be extremely valuable for smaller companies with few users. PTT apps are also offered by carriers; most work with at least one PTT app maker to offer a solution for their business customers. This can be convenient – one-stop-shopping when talking to a sales representative who can provide the mobile device, the data plan, the PTT app and the accessory. A disadvantage of the carrier solution is that it is restricted to a certain network while other PTT apps that can work cross-carrier might be a better option for organizations with global communication requirements.

Because most mobile phones and tablets are multi-task tools, they have not been designed specifically for PoC communication. **PoC accessories**, however, can optimize their PoC use. These accessories allow the user to keep the mobile phone in the pocket safely protected from dust



and moisture but still communicate with a single button press. This ease of use leads to an additional increase in communication. Accessories also boost the volume output of mobile phones and tablets. In noisy environments, accessories can increase the volume output from 60 dB of a mobile phone to 100 dB, a significant improvement. Accessories can also resolve other communication concerns. A classic example: in trucks where the use of a wired PTT accessory is not considered talking on the mobile phone. This also complies with the hands-free rules as PTT is only a single button press for communication.

There are several types of accessories for different end users. A company might deploy a variety of PoC accessories depending on the application, e.g. a loud wired speaker microphone for a truck driver, wireless speaker microphones for workers who do not want to get tangled up in cords and small in-ear PTT accessories for employees in office environments.

In some cases, the sales representative of a PoC accessory supplier can provide one-stop-shopping convenience for companies considering a PoC pilot project. The accessory partner can coordinate all components of the test and supply accessories at no charge for the test period. This allows companies to experiment and evaluate potential PoC solutions with no network restrictions and next-to-no project costs.

A NEXT GENERATION IN MOBILE TEAM COMMUNICATION

THE INDICATORS ARE POWERFUL.

- ✓ Cellular networks are improving coverage, becoming virtually universal. LTE networks – faster, even more reliable – are becoming more common.
- ✓ Mobile phones are practically required equipment for mobile teams.
- ✓ PTT apps are providing smooth, easy access to PoC communications.
- ✓ PoC accessories are optimizing mobile phone capabilities for PoC usage.
- ✓ PoC pilot projects, easy to do with next-to-no cost or disruption, are minimizing implementation risk.
- ✓ PoC solutions are proving to be more affordable, more efficient than two-way radio solutions.
- ✓ The cellular-networked world continues to grow and improve almost exponentially.

THE CONCLUSION IS CLEAR

POC IS RAPIDLY REPLACING TWO-WAY RADIOS AS THE PREFERRED CHOICE IN MOBILE TEAM COMMUNICATION NOW AND IN THE FORESEEABLE FUTURE.

BENEFIT OF POC

- ★ Significantly reduced costs – reduce communication to a single mobile device
- ★ Increased efficiency – faster communication, multi-function device with productivity applications
- ★ Improved inter- and intra-group communication – up to a global level
- ★ Low implementation risk – easily integrated into your existing communication technology
- ★ 100% scalable – ramp the implementation rate up or down to find the right balance for your organization
- ★ Additional features – provided by the PTT app for specific industries
- ★ No frequency license costs or requirements

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