Next Generation of Push-to-Talk

Why PTT?

In numerous industries, using push-to-talk is a technology that has become irreplaceable. PTT customers value the convenience and productivity of being able to set up individual or group calls with the push of a button and instantly communicate over the speaker of the recipient's handset (vs. taking the time to dial, answer, go through greetings, etc., all before getting down to business). For example, a dispatcher can communicate location and delivery instructions over PTT faster than it would take most drivers to answer a ringing phone. For a construction worker, hearing messages burst out of a speaker on their handset is more convenient than putting down tools and removing gloves to answer a standard phone call. Since PTT calls are half-duplex, they are typically more informal, sporadic, and business-focused than a standard phone call.

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Characteristics of a PTT Service

Frequent PTT users share the key characteristics of the service:

Speed
Sub-second latency (the time it takes for users to volley back and forth)

Simplicity
Easy to understand, access and use, as simple as pushing a button to initiate a call

Call Bursts
Less than a minute in talk time on average, allowing users to 'get things done' quickly without taking the time that is common for typical phone calls

Group Calls
Ability to pull multiple people together into a voice call instantly and simultaneously, without the inefficiencies of scheduling calls, reserving conference bridges, and waiting for participants to join

Handsets and Accessories
Rugged PTT handsets built with military-grade specifications to ensure durability, coupled with special accessories for ease of operation (e.g., Remote Speaker Microphone)

Since PTT became a proven communications tool to industries in the mid-late 80's, it has been primarily delivered through three types of networks:

- Private Land Mobile Radio (LMR.)

- The iDEN network (built out by Nextel as a commercial PTT network, shut down by Sprint, June, 2013.

- Commercial cellular networks with PTT added as a new service (PTT over Cellular, or PoC.)

Below are examples of industries and business types that have been using commercial PTT and LMR-based services.

Manufacturing/Logistics	Transportation	Field Services
• Manufacturing plants	• Shipping, delivery, and freight	• HVAC servicing
• Warehousing facilities	• Airport passenger facilities, security and tarmac operations	• Automobile towing and heavy equipment recovery companies
• Supply chain/logistics management organizations	• Marine terminals and port operations	• Facilities maintenance services
Government/Public Services	Hospitality	Construction
• Government and public safety	• Hotels	• Engineering and design
• Trash, refuse, and recycling services	• Convention centers	• Contractors
• Schools/universities	• Coliseums, sports arenas & stadiums	• Electricians, roofers, plumbing and safety coordinators
• Utilities	• Restaurants	• Landscapers

Industry Developments Making PTT More Relevant Today and Tomorrow

Over the past few years, several key industry developments have changed the dynamics of PTT and made the service even more useful. Such developments include the emergence of 3G/4G networks, the development and adoption of industry standards for PTT over cellular, the abundance and versatility of smartphones, rapid market adoption of broadband mobile data, and efficiency of integrated business applications.

3G/4G Networks

Mobile networks have been going through a rapid evolution. Within less than ten years, mobile network have advanced from 2G to 4G. AT&T has invested billions of dollars every year to upgrade its mobile network and make mobile broadband a reality.
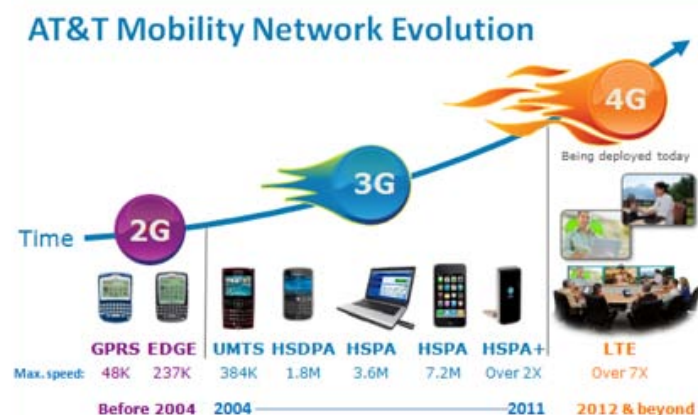
Today, AT&T is the only U.S. carrier deploying two compatible 4G technologies (4G LTE and 4G HSPA+), and it has created the nation's largest 4G network. Virtually 100 percent of AT&T's mobile data traffic already runs over enhanced backhaul that supports both HSPA+ and 4G LTE data traffic. Even as AT&T continues to expand its 4G LTE coverage, customers can get 4G speeds in most areas outside of 4G LTE areas with 4G HSPA+, unlike competitors whose customers fall back to slower 3G technologies when outside of LTE coverage.[2]

Push-to-Talk over Cellular (PoC) is a service that allows subscribers using a commercial cellular network to turn their handset into a two-way radio transceiver but without the range limitation and high cost of private LMR systems. IP-based PoC transmits voice as data packets over the data channel of a mobile network.

With the availability of broadband wireless networks using advanced 3G and 4G technologies, PTT can now become a high-performance and business-grade application. 3G/4G technologies deliver much more bandwidth than 2G and also provide superior quality of service for IP-based applications. With the right PTT technology platform, IP-based PoC over high-bandwidth 3G/4G networks can deliver the following:

- Sub-second call set-up.

- Multimedia and other advanced mobile broadband data applications.

In addition to having built-out the nation's largest 4G network, it is noteworthy that AT&T is also the nation's largest Wi-Fi provider, with more than 32,000 Wi-Fi Hot Spots in the U.S. AT&T Enhanced PTT includes Wi-Fi support.

Development of Industry Standards

Traditional PTT systems are proprietary. AT&T, however, is the first U.S. carrier to offer a PTT service based on industry standards. In 2005, the Open Mobile Alliance (OMA) first defined PoC as part of the IP Multimedia Subsystem and developed the first OMA PoC standard. In 2011, OMA officially approved PoC v.2.0 as a new standard. The OMA release of PoC v.2.0 is well aligned with operators' deployment of advanced mobile networks that enable high performance of IP-based PoC.

The goal of OMA-PoC is to provide interoperability among equipment and software manufacturers and avoid market fragmentation by developing the PoC service in a widely standardized manner.

AT&T's Enhanced PTT is aligned with OMA's PoC V2.0 standard. PoC V2.0 enables audio (speech, music), video, still image, text, and file sharing with a single recipient (one-to-one) or among multiple recipients, as in a group session (one-to-many).

Smartphones

Smartphones not only support regular voice communication and text messaging but also provide advanced computing capabilities (such as e-mail and Web browsing), a portable media player, GPS navigation, a built-in camera, and network connectivity via both cellular and Wi-Fi. Various business applications that once were supported by separate technologies are now rapidly moving to the smartphone.

AT&T offers the most extensive portfolio of smartphones among all carriers in the U.S. in the fourth quarter of 2013, the percent of postpaid subscribers using a smartphone rose to 77%.

The positive impact of smartphones on PTT is very significant. Below is a summary of how smartphones make PTT more relevant today and tomorrow.

- Wider handset choices via a downloadable PTT client: now PTT users can use a downloadable PTT client for smartphones. Thus, PTT handset choices include not only feature phones but also smartphones that run iOS, Android, BlackBerry, and Windows Mobile/Windows Phone operating systems. Today, AT&T provides the widest choices of smartphones compatible with AT&T Enhanced PTT.

- Integration of GPS-based location tracking in PTT handsets: with GPS built into smartphones, dispatchers can track where mobile workers are and can allocate resources much more efficiently. Fleet management systems, which traditionally require a variety of special devices, can now leverage smartphones. AT&T anticipates offering an available dispatch console that integrates GPS tracking functionality.

- Application consolidation into one PTT-enabled device: mobile workers no longer have to carry a PTT phone for instant voice and a smartphone for data applications. With AT&T Enhanced PTT, they can use a single device for both purposes, which reduces handset cost and increases productivity.

In addition, AT&T enables select LMR radios to interoperate with its Enhanced PTT service, providing further convenience and cost savings for customers by extending the useful life of their legacy equipment. LMR interoperability also allows newly installed LMR systems running on a narrowband frequency to be conveniently supplemented by the broadband capabilities of AT&T's 4G network.[3]

Meeting LMR Users' Growing Need for Mobile Broadband
Land Mobile Radio (LMR), also called public land mobile radio or private land mobile radio (PMR), is a term that denotes two-way radio systems used by commercial entities, government agencies, and other organizations to fill a wide range of communication requirements, including logistical coordination, quick communication, emergency response, and security. According to IMS Research, there are about 12 million LMR users in North America, and worldwide installed base of licensed mobile radio is about 36 million.

LMR users have a strong need for mobile data applications. However, not all traditional LMR networks can support data communications, or can only offer very limited data rates, restricting the applications that can be utilized by end users. A recent IMS Research study shows the following[4]:

- 90% of organizations with LMR systems are using mobile data.

- Only 39% of such organizations are using their own LMR networks for data applications (with the rest using commercial cellular networks.)

- The best long-term solution to meet LMR users' data needs is LTE.

AT&T's next-generation Enhanced PTT service provides an ideal solution for organizations seeking to take advantage of today's cell phone features while still having PTT that provides the reliability, speed, and features of LMR. AT&T's Enhanced PTT is designed to deliver three key benefits to LMR users:

Cost savings: Instead of purchasing expensive LMR radios, which typically run between $300 and $5,000+ apiece, organizations can simply add AT&T Enhanced PTT service to an existing AT&T cell phone plan at a low incremental cost.

Convenience: A mobile worker can carry just one mobile device (e.g., an Enhanced PTT-enabled smartphone that supports both instant voice communication and data applications).

Advanced data capabilities: AT&T's 3G/4G network provides hundreds of times more data capacity than current LMR systems.
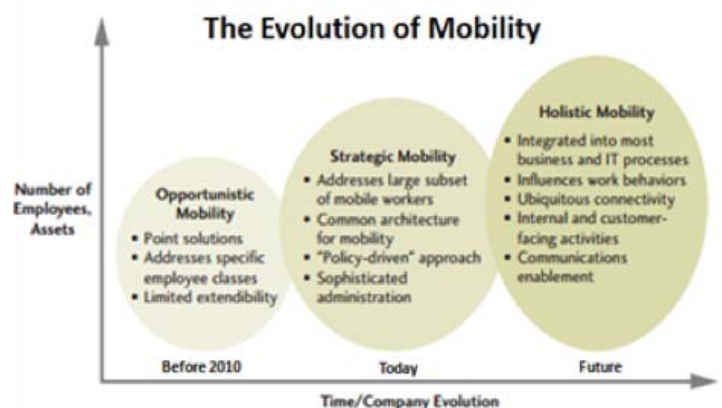

As noted above, AT&T's Enhanced PTT supports interoperability with LMR. Therefore, for LMR based organizations that want to retain their own private radio networks, AT&T Enhanced PTT can help these organizations' field workforce meet their diverse communication needs seamlessly.

Evolving Field Force Management and Next Generation of PTT
A key component of field force management is communication. While mobile technologies have continuously evolved, so has the need for field force management. Today, organizations that have a mobile workforce face the following challenges:

- Demand for real-time intelligence or information, such as field workers' status and location.

- Fragmentation of communication technologies (e.g., LMR, 2G/3G/4G cellular, Wi-Fi, wireline, etc.)

- Proliferation of new mobile devices and applications (two-way radio, smartphones, tablets, etc.)

- Pressure to reduce communication costs and increase efficiencies.

- Diverse needs functions of the workforce.

- Changing organizational structure, due to streamlined operations, increasingly matrixed environment, closer cooperation with partners, etc.

The Evolution of Mobility

Number of Employees, Assets

Opportunistic Mobility
- Point solutions
- Addresses specific employee classes
- Limited extendibility

Strategic Mobility
- Addresses large subset of mobile workers
- Common architecture for mobility
- "Policy-driven" approach
- Sophisticated administration

Holistic Mobility
- Integrated into most business and IT processes
- Influences work behaviors
- Ubiquitous connectivity
- Internal and customer-facing activities
- Communications enablement

Before 2010 — Today — Future

Time/Company Evolution

Source: The Yankee Group

AT&T's Enhanced PTT retains the traditional strengths of PTT and offers numerous new capabilities. The table below summarizes how AT&T's Enhanced PTT can help organizations optimize field force management.

Enhanced PTT Offering from AT&T

AT&T's Enhanced PTT has set the utmost standard for PTT and provides numerous features and benefits not available from alternative services.

Key Features of AT&T Enhanced PTT

AT&T Enhanced PTT leverages the latest advances of mobile communication technologies and delivers an unprecedented user experience of PTT. AT&T has re-defined PTT in the following key areas:

- Supports PTT over both 3G and 4G LTE networks to provide the fastest speed, best voice quality, and integration of numerous mobile communication applications.

- Allows customers to use PTT over not only cellular networks but also Wi-Fi, providing effective in-building coverage through more than 32,000 Wi-Fi hot spots offered by AT&T and also Wi-Fi access points installed by organizations themselves.

- Provides PTT client on a desktop PC, enabling easy integration into existing computing/communication infrastructure and workflows within organizations.

- Supports the widest portfolio of PTT-compatible handset clients in the industry, including all smartphone operating systems as well as low-cost feature phones, giving organizations great handset flexibility that meets their specific communication needs and budget requirements.

- Aligned with industry standards, which eliminates lock-in to old technology and the reduces the cost of being forced to switch to new handsets and service plans in the future.

- Enables simplified, efficient, cost-effective, and feature-rich communications service for the mobile work force through a single device for both PTT and mobile broadband data.

- Offers best-of-breed PTT performance and product features.

Challenges of Field Force Management	How AT&T's Enhanced PTT Can Help Meet the Challenges
Demand for real-time intelligence or information	PTT-enabled smartphones with built-in GPS
	Integration of voice and data on mobile devices
Fragmentation of communication technologies	Integration of communication applications
	Interoperability with LMR
	PTT over both cellular and Wi-Fi
	PTT on a desktop PC
Proliferation of new mobile devices and applications	Consolidation of mobile devices into a single smartphone or tablet that can support both PTT and other applications
Pressure to reduce communication costs and increase communication efficiencies	Fast voice and group communication
	Future-proof PTT service
	Leverage of existing commercial cellular network
Diverse needs of different functions of the mobile workforce	Versatility of 3G/4G networks and PTT-enabled smartphones
Changing organizational structure	Centralized management of internal/external contacts and real-time synchronization with mobile workers' PTT handsets
	Increase of contacts/groups on the PTT handset

The following two tables provide a summary of the key differentiators, features, and benefits of AT&T's Enhanced PTT.

AT&T Enhanced PTT Is NOT the PTT You May Think You Know

	AT&T Enhanced PTT	Nextel iDEN	LMR	AT&T's Competitors Offering PTT
3G and 4G support	Yes	No (2G only)	No	No (3G only)
PTT over Wi-Fi	Yes	No	No	No
PTT on a desktop PC	Yes	No	No	No
Handset choices	All smartphone operating systems and feature phones*	Feature phones only	LMR radio only	Limited device choice
Single device for both PTT and mobile data	Yes	No	Minimal data capability	Limited device choice
Standards-based	Yes	No	Partially	No
Future-proof	Yes	No	No	No

* Smartphone operating systems supported by AT&T Enhanced PTT include iOS, Android, BlackBerry, Windows Mobile.

AT&T Enhanced PTT Sets a New Standard for PTT Features and Performance

Feature		Benefit
Call set-up	Sub-second	Comparable to or better than other PTT solutions
# of contacts	Up to 1,000	Larger than any other existing PoC platform
# of groups (pre-defined)	Up to 100	Larger than any other existing PoC platform
Members per group	Up to 250	Larger than any other existing PoC platform
Ad hoc group calls	Supported	Convenient for calling a non-pre-defined group (up to 10 members per ad hoc group)
Centralized& Web-based contact and group management	Feature-rich tool	Contact/group management by a corporate administrator and real-time synchronization with PTT users' devices wirelessly
Voice quality	High MOS score: ~3.6	Better than a regular cellular call (GSM MOS score: ~2.33)
Presence	Real-time presence	Most robust in the industry. Presence status includes Availability, Do Not Disturb (DND), and Offline
Late join/Re-join	Yes	Allows a participant to conveniently join or rejoin a group call after it has already started
Supervisory override	Yes	Allows a supervisor to take over the floor any time during a group call, even when someone else is speaking. Supervisors are assigned by a corporate administrator through a centralized contact management tool
PTT/cellular call interaction	Yes	Allows a PTT subscriber to put a PTT call on hold to answer an in-coming cellular call
Speaker identification	Yes	Useful for identifying who has the floor
Instant personal alert	Yes	Convenient feature for requesting a call-back
Encryption	Yes	Uses Advanced Encryption Standard (AES) 256 for voice and signaling encryption
Cellular/LMR interoperability	Yes	Allows AT&T Enhanced PTT subscribers to communicate with LMR radios
Application integration	Yes	Allows users to access AT&T-deployed productivity applications integrated on PTT-enabled devices

Corporate Administrator Tool (CAT)

AT&T's Enhanced PTT comes with a feature-rich, Web-based Corporate Administrator Tool. With this tool, a corporate administrator can perform the following centralized management functions:

- Create/manage internal and external contacts, and talk groups for corporate employees using PTT, providing very efficient contact and group management for PTT subscribers within the organization.

- Synchronize contacts and groups with PTT subscribers' handsets over the air, in real time.

- Assign/manage supervisor override, , and desktop PTT users (an organization can have multiple CAT Administrators, depending on organization size/need.)

- Ease administration workload through powerful organizational management tools.
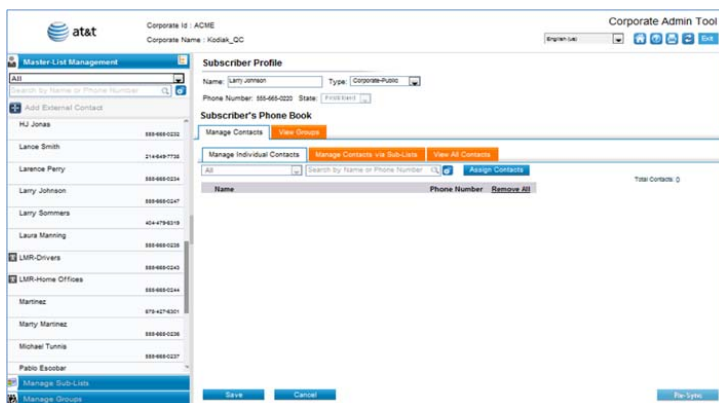
AT&T Integrated Dispatch

AT&T's integrated dispatch console will be Windows-based and will provide an intuitive user interface. The console will allow one or more dispatchers to operate from a centralized location enabling them to manage, command, and control activities for PTT subscribers working in the field. This product will provide the following key capabilities to the dispatcher:

- Manage the corporation's PTT contacts and groups for dispatching purposes.

- See presence status of all contacts and get presence updates in real time.

- Initiate a PTT call to an individual, a pre-defined group, or an ad hoc group.

- Use supervisory override to take over the floor of at any time during a PTT call by pre-empting the talker.

- Monitor various talk groups and join or leave active group sessions.

- Locate an individual or group members through Google Maps and make calls or send alerts by selecting members from the map.

- Manage alerts received from the workforce in the field.

- Record voice calls and view call history.
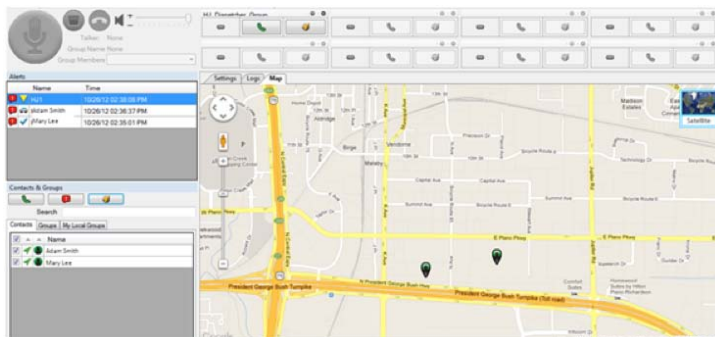
Summary

Commercial Cellar PTT is a proven and critical communications tool for numerous industry verticals due to its core capability to deliver instant voice and enable group communication with the push of a button. PTT is now becoming even more relevant due to the combination of the following industry developments:

- Availability of high-bandwidth 3G and 4G technologies that enable high-performance PoC.

- Development of PoC industry standards that can ensure interoperability and future-proof PoC service.

- Versatility of smartphones that can consolidate PTT and multiple other applications into a single device.

- LMR users' need to leverage commercial cellular networks for mobile broadband data, leading to fragmented communication networks and devices, an issue addressable by next-generation PTT.

- Evolving needs of mobile work force management, which call for more effective and efficient mobile communications.

AT&T's Enhanced PTT is built on the latest mobile communication technologies and addresses customer needs in a continuously changing business environment. AT&T has taken PTT to the next generation of push-to-talk through the following:

- The first U.S. PTT service over a 4G network.

- Compliance with PoC industry standards.

- Delivery of PTT through both cellular networks and Wi-Fi.

- Widest mobile client portfolio for PTT, including smartphones as well as low-cost feature phones.

- Support for PTT on a desktop PC.

- Superior PTT performance and features.

- Productivity application integration on the same device.

In summary, there is a strong resurgence of PTT due to advances of mobile networks, changes in the business environment, and new capabilities of next generation of PTT. AT&T's Enhanced PTT provides the most compelling value proposition to industry verticals seeking to leverage the power of PTT to improve business operations.
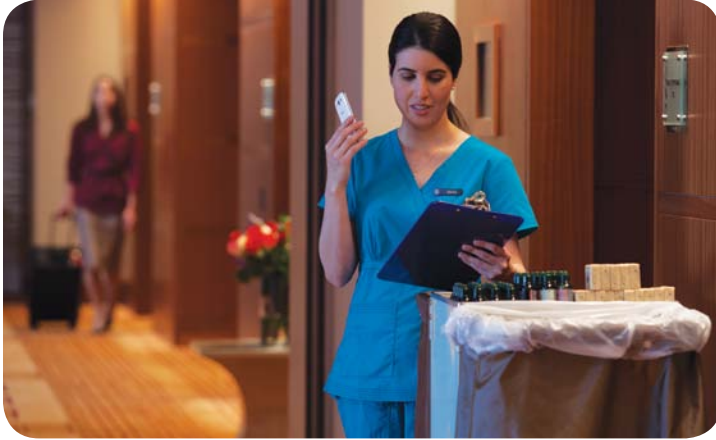
Notes

1. Limited 4G LTE availability in select markets. LTE is a trademark of ETSI. 4G speeds not available everywhere.

2. Enhanced PTT is designed to work over an AT&T cellular wireless data network connection or Wi-Fi connection where available. Wireless data coverage is not available in all areas. Enhanced PTT is not compatible with International Roaming. Enhanced PTT performance may be limited in 2G coverage areas. Availability, security, speed, timeliness, accuracy and reliability of service are not guaranteed by AT&T.

3. LMR Interoperability with AT&T Enhanced PTT requires equipment not available from AT&T.

4. Source: IMS Research Analyst Blog - The Future of Broadband for Mobile Radio. http://imsresearch.com/blog/The_Future_of_ Broadband_fo_Mobile_Radio/165

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