

PUSH FOR "PUSH-TO-TALK"

Executive Summary

Recent months have seen a flurry of activity in the field of PTT (Push-To-Talk) all over the world. In US, Sprint and Verizon have announced plans to launch PTT services later this year. In other parts of the world, lot of PTT deployments are taking place based on various technologies and the market seems to be poised to take off in India as well -

- Procall in India plans to offer PTT solution based on Motorola's iDEN technology and cater to customers that need walkie-talkie type communication means – Trucking, Ports, Security, Public Safety etc.
- Airtel, Tata Indicom and Idea have been trialing a PTT like solution from Kodiak Networks. The solution is really a conferencing solution rather than PTT, but provides similar set of capabilities. This will be marketed as Value Added Service to existing cellular customers.
- With 3G launch impending in India; the PTT scene will get even more exciting with OMA-POC solutions based on 3G technologies coming into play.

With this background, Tonse Telecom looks at the Push-to-talk technology closely. In this white paper, we attempt to analyze current status of PTT in India, some historical perspectives and what the future holds for the PTT market in India.

Introduction

Push-to-talk (aka press-to-transmit) is a way to communicate using two-way radios. It is basically a half-duplex way of two way communication where one can only speak or listen at given point of time. If the PTT key is pressed, the user is allowed to speak and when the key is unpressed, the communication received on the frequency is directed at the radio speaker. This mode of communication was predominantly used at situations where lot of co-ordination and simultaneous communication is needed. Truck drivers, parcel delivery services, security personnel are some examples of users of digital radio (walkie-talkie). The technology since then has been adapted to work with a cellular phone so that a walkie-talkie can double as a cellular phone and cellular phone can double as a walkie-talkie. It not only provides the consumers convenience, but also allows operators to increase the ARPU by charging this as premium value added service as –

- It is an Instant Communication service for quick communication.
- It is extremely valuable as a group communication tool.
- Some PTT solutions offer features like presence to avoid wasted calls and intrusion at unwarranted time.

PTT implementations and some History Lessons

Nextel and IDEN story

Fleet Call, Inc which later became Nextel launched the PTT market even though the initial offering was not technically a PTT over Cellular. In US, in late 80s, FCC decided to open up the cellular market by earmarking some frequencies as Specialized Mobile Radio (SMR) frequencies. This would allow new operators to operate in different frequencies instead of crowding the existing frequencies. Fleet Call, Inc started operation during this time frame by acquiring several of these frequencies. Fleet Call partnered with Motorola who was the dominant manufacturer of digital radios that operated in SMR frequencies. The network was launched TDMA network in 800 MHz band and became the first company to offer mobile phone service, paging and two-way radio. At this time the company changed its name to Nextel and began a phase of rapid expansion.

The network technology used by Nextel is the famous iDEN (Integrated Digital Enhanced Network) by Motorola. This is a proprietary standard. iDEN accommodates non contiguous frequencies. The channels are 25 KHz wide with 5 kHz guard band. It can support up to 6 phone users and 6 dispatch users per channel. The service from Nextel became very popular and attracted close to 20 million subscribers across US when it was acquired by Sprint in 2004. The biggest problem with the iDEN network is that it is incompatible with other networks and hence no hand-offs are possible with other networks. With Sprint acquisition of Nextel, Sprint plans to convert the PTT technology to run on their CDMA network to overcome the incompatibility issue. However what Nextel and iDEN did was to open up the POC market and sparked innovations in the industry.

IP-IMS based solutions (OMA PoC)

This is 3GPP/IMS based solution that uses VoIP to carry the voice and Session Initiation Protocol (SIP) for call initiation and call management functions. To compete with hugely successful Nextel; Sprint, Verizon and many others launched PTT services based on some variant of this solution in US in 2003 timeframe. These were based on a Soft switch from Winphoria. These solutions centered around providing PTT solutions on 1xRTT networks that the CDMA operators had at that time. Later Motorola acquired the company. The term often used for PTT is that it needs "Always On" connection. This is critical to achieve the latency or lack thereof in order to give users acceptable performance. However the problem with 1xRTT network was that technically it is not always-on. When the user requests PTT call to be connected, the data call needed to be set up, resources needed to be allocated in the network and that introduced a delay. Some articles from those times suggest that the delays were as long as 5 -10 seconds. Nextel in the mean time had established itself as the major player and iDEN allowed almost instantaneous call set up and minimal latencies in terms of round-trip-delay. The push to talk service is based on multi-unicasting. The traffic is sent to a dedicated push to talk server and, in the case of a group call, the server then duplicates the traffic to all the recipients. The wireless data networks had not matured enough (no built-in QoS) at the time to support VoIP type applications over data channels and the technology did not become hugely successful at the time.

Sonim Technologies was another player at the time that provided solutions for GSM networks based on GPRS.

As the time went on, there seems to be resurgence in the PTT drive from these carriers. That is because of the advance in packet data networks and evolution in network architectures via IMS. Today's cellular networks are much better equipped to handle VoIP calls. Companies like Nokia, Ericsson, Motorola, Siemens have come together to form an alliance with a goal to work towards standardization of PTT technologies based on 3GPP/IMS architectures (W-CDMA technologies)

QChat (QUALCOMM)

Qchat is a software application from Qualcomm that allows mobile operators to introduce PTT over 3G CDMA (CDMA2000) networks. It uses standard VoIP technologies to support the one-to-one and one-

to-many calls. In US, Sprint has announced to launch Qchat in summer of 2008 on the EV-DO Rev-A network. It requires Qualcomm's BREW (Binary Runtime Environment for Wireless) enabled Handsets. Qchat application server, that sits in the operator's WAN acts as the mediating agent to facilitate the call flow. Qchat claims to be fastest IP-based PTT solution and claims to have sub-second call setup latencies.

Circuit Switched Implementations (Voice channel based solutions)

This is the fourth major category of the PTT implementation, coming from US based company called Kodiak networks. Kodiak solutions connect the PTT call with PTT server via circuit-switched connections. At the heart of the implementation is the Kodiak Real-Time Exchange system (aka RTX server) that serves as the PTT relay. The calls get routed through the RTX, which establishes circuit connections to other users. This totally skirts the issues on call-setup latencies encountered by IP-based solutions discussed above. This solution offers the advantages of circuit switched voice in terms of being able to provide much better latencies and better voice quality. However, it does cause half-duplex PTT voice to compete with Full-Duplex normal voice calls and can cause issues for network loading. However, Kodiak enjoyed fair amount of success as the market had a void. IP based genuine PoC solutions either struggled to meet the performance benchmarks and the later implementations were not available. Kodiak filled the void by supplying PTT solutions in the mean time.

The table below summarizes the options available –

	Technology/Solution to provide PTT			
	IDEN	Voice-Channel based solution	OMA-PoC	Q-CHAT
Standard Based OR Proprietary	proprietary	proprietary	Standard Based	Proprietary
Vendor	Motorola	Kodiak Networks	Various	Qualcomm
Base technology	TDMA	Circuit switched/voice channel	VOIP	VOIP
Strengths	Huge install base, popular, pioneered the technology, very fast call-setup times and very low latency	Presence information, simple to implement both at server/client, good voice performance, fast call setup, low latency, easy migration path to 3G for both CDMA2000/WCDMA standards	Working towards standardization, huge support for handsets, powerful industry players pledge support, much better performance with 3G, Presence Information	Broad Handset support, fast call setup times, low latencies, allows CDMA 3G operators to roll out PTT solutions, Presence Information
Weaknesses	Proprietary, compatibility	Proprietary, circuit connection is	Not usable with 2G technologies,	Proprietary, CDMA2000 only,

	issues, presence information absent	expensive - may load up network	initial rollout scared users away due to bad performance on CDMA 1x and GPRS networks	needs separate implementation for each operator to tweak parameters
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The technologies have enjoyed varying amount of success in terms of carrier deployments. iDEN is the pioneering technology providing PTT solutions and is widely deployed over dozens of countries. Kodiak solution has also seen deployments in major carriers in US, Europe and Asia. Qualcomm solution will be deployed in United States by Sprint and Verizon. OMA-PoC will gather steam with 3G deployments.

INDIA PTT Scene

India saw initial PTT deployments in 2003/2004 timeframe from Tata and Essar, but soon the regulatory authorities shut it down as they violated regulations. However, now there is renewed interest in PTT and a couple of interesting solutions are just launched/about to be launched.

Procall Offering

Recently Push-to-talk has been in news in India after Procall; a wireless solution provider company announced its plans to launch PTT solution in India. Procall will deploy iDEN network to supply the PTT services. They announced the launch of service in Bangalore. Procall already has licenses in seven circles - Karnataka, Delhi, Mumbai, Kolkata, Maharashtra, Goa, Tamil Nadu and Andhra Pradesh. Procall attempts to target industries that will benefit from one-to-many type conversations. These are the industries that walkie-talkie is popular in - Construction, delivery, farming, trucking etc. In addition, advanced features such as GPS are also available.

Kodiak Offering

In addition, Kodiak network is aggressively planning to launch their version of PTT. It is not technically Push-to-talk as it does not require PTT handset. The Kodiak solution is positioned as a conferencing solution instead. It is a powerful solution that is under trials on Airtel, IDEA and Tata networks. It is a clientless solution in the sense that users do not need to have a PTT enabled handset. An application can be downloaded over the air which will allow the users to engage in conferencing options with users not having a handset that has Kodiak PTT application. Normal voice conference, group SMS or group voice SMS can be sent using this application. Since the solution is a circuit based solution and uses voice channel to carry the conference calls, NLD, ILD charges are levied correctly as per usage. As explained above, Kodiak solution is provided by the RTX box that sits at the MSC.

Value proposition of PTT

PTT as a core technology has tremendous potential in Indian market. It allows achieving things not previously possible. The ability to reach instantly without having to call and the ability to call multiple people instantly will hold value in any market and India is not different. The Indian consumer, who is known to be very price sensitive, will love the idea of reaching out multiple folks without having to make multiple calls!

Consumers

Different PTT solutions provide different advantages/use cases; however all provide the basic facility to reach multiple people simultaneously or a single person instantly without having to call. Various demographics will find it appealing for various reasons.

- College kids/Young professionals - Ability to decide on time/place to meet with one call instead of multiple calls!

- Public Safety/Emergency Handling Team – Reach out to all people of importance via single call
- Construction/Mining/Security/Shop floor – Ability to reach multiple employees at once.
- Business Executives – Conference in all the stake holders and hold meetings without having to set up Conference Bridge.

These are some examples of PTT/conferencing benefits and it is easy to extrapolate from these.

Operators

In addition to offering new conveniences to the consumers, operators will benefit from PTT solutions tremendously. The licensing conditions have changed in India since initial PTT offerings and VoIP can be now offered. Operators can sell this as a value added service that can be charged a premium. If Nextel example is anything to go by, it was able to maintain highest ARPU among all service providers. Different type of PTT solutions will enable different type of opportunities to the operators.

- PTT will load up the networks bringing in efficiencies.
- Procall solution, which is IDEN based is a simple model where they can come up with tariffs for the services. Procall has published tariff plan on their website and they plan to charge Rs 850 per subscriber per month for basic service.
- VoIP based solutions can be charged based on usage, activity, monthly rental fees, premium for originating the call etc. Kodiak solution can provide other ways of charging. Since it is in reality voice call, normal call accounting can take place. As with POC, monthly rental, premium for downloading the application, premium for services like Voice SMS (Group voice mail) can be charged. So the potential for generating additional revenue is definitely there.

Analysis and Future

Tonse believes that current options available for Indian market (Procall and Kodiak) are inherently different applications catering to different markets.

Procall/IDEN

IDEN is a time-tested and proven methodology for providing PTT type of services. It is most widely deployed and most reliable technology to provide true/genuine PTT type applications. However the biggest hurdle it will face is that it is incompatible with other networks. This means that no hand-offs will be possible between Procall and non-Procall networks.

- The PTT, as supported and targeted by IDEN is short conversations. It will be mostly used for quick conversations, instead of true voice conferences.
- Procall is targeting a different market segment – Market segment that needs one-to-many communications to increase productivity. (e.g. Shipping, public safety, truckers, construction etc)
- Procall will probably be not looking to enter other consumer markets like college students, family/friends, business executives who will also benefit from one-to-many communication.
- We think, some sort of partnerships with other service providers might emerge that will enable Procall to come out with dual mode handsets just the way Sprint-Nextel operated after the merger. That will allow Procall to reach other networks and build a bridge.

Kodiak Conferencing Solution

Kodiak solution on the hand targets different market with their conferencing solutions. The solution is available as a download on most handsets.

- It allows consumers to initiate call conference, group SMS, group voice SMS etc.
- Kodiak solution will appeal the most to people who have genuine conferencing needs – not short bursts of conversations.
- These kinds of applications will appeal to college kids, business executives, families who want to talk to each other and other demographics that have the need of conferencing but also will not want to carry two phones – not withstanding all the other communication devices they carry.
- It will provide users a way to send group SMS and group voice SMS which also will appeal to same demographics.
- So this will be positioned as a Value Added Service by the service providers with innovative tariff plans instead of a new service like Procalls.

3G Effects

A lot of action will happen in India with 3G launch impending. The operators will have other choices. If some networks make a move to 3G in terms of 3GPP technologies (HSPA/UMTS) they might be in a position to offer OMA-PoC solution discussed above or Kodiak solutions which are also compatible with OMA standard implementation. If CDMA network operators like Reliance decide to go with 3G compatible solutions, they will have an option of Qualcomm Q-chat type implementations. However these solutions (except Kodiak's solution) might face issue with Indian regulatory bodies as they might not be able to meet the lawful intercept requirement. Some work will have to be done in that area before these solutions can be implemented in India. SO until 3G becomes reality, Kodiak solution will have an edge over OMA-PoC. These solutions will provide an easier migration path for the operators as and when 3G comes up. With 3G picking up real steam and with lot of interest in PTT worldwide, we believe that the standardizations will happen sooner than later.

Concluding Remarks

In this white paper, we have looked at the Push-to-talk technology and the solutions that are enabling this in the networks worldwide. PTT and conferencing type of applications clearly provide value to both consumers - by providing efficient communication means and operators - by increasing ARPU. The main question is what technology makes sense for what market segments?

iDEN is the most widely deployed technology worldwide and with 3G launches happening around the world, technologies are moving towards OMA-PoC type implementations. Biggest example is the move of iDEN and PTT pioneers; Sprint-Nextel's to Q-Chat from iDEN. In India, iDEN is being launched and the service holds promise for various sectors in the industry that will have a much better way of communication with the service.

End users/consumers will probably be lured away by solution like Airtel Group Talk based on Kodiak networks' solution that allows users to avail conferencing, group SMS and group Voice SMS facilities to add efficiencies in their communication.

In the mix, thrown in some 3G deployment plans by the mobile operators and possibility of OMA-PoC type solutions and the picture becomes even more colorful.

About Tonse Telecom

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Tonse Telecom has onboard, a team of reputed senior industry executives and consultants who provide advisory services on specific projects. Tonse covers a broad spectrum of telecom technologies that include BWA / WiMAX, IMS, FMC and Triple Play, VoIP, Mobile VAS, End-device Applications and Mobile Content

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