Voice over LTE: PTT, Timing and Reality

Dominique FREDEZ
Design Authority
THALES
Mission critical voice requirements:

The recent passage of the bipartisan legislation has enabled the reality of the deployment of “National Public Safety Broadband Network” under FirstNet authority.

– 3GPP LTE (Long term evolution) is the choice of technology to build Firstnet.

– One of the key requirements of FirstNet is to provide Mission critical voice application over LTE

– PSCR (Public safety communications research) program, an effort of NIST (National Institute of science & technology) is actively working on Firstnet requirements and evaluating technological solutions in Boulder, CO.

– Working groups released drafts requirements that include push to talk mission critical voice and Off network communications.

Link: www.PSCR.org
1st responders & Public Safety have “high demanding” PTT features:

- Capacity to talk instantaneously, fast and efficient call setup => Push to call, direct call setup
- High prioritization for crisis type communication (e.g. emergency calls, data for most critical event)
- Individual calls, one to one => selectable between Full duplex and half duplex
- Capacity to set group calls, between fleet members under the coverage, and also on other areas => automatic inclusion of members anywhere
- Capacity of group call background scanning, to be alerted by different groups call, with different levels of emergency
- And Proximity services (talk around) for direct communications
Network must support Mission Critical application services:

Also:

– Capacity to preempt the talking party (PTT preemption) and also Talking party ID (to know the current talker)
– Telephony calls, PABX Calls, PMR gateway calls, with call baring according to the Subscriber’s profile => operation as a conventional mobile,
– Status and Short messaging, -> individual or “group addressed” => to send text messages to all the group in 1 call

And:

- Resiliency, guaranty of service => to maintain the highest level of services, and to minimize the points of failure in the network, able to cope with disaster scenarios.
PTT Over LTE can be implemented on different architectures, from the regular centralized networks, and distributed networks which offer the following advantages

Locating the “PTT application servers” at the edge provides:

– No single point of failure (no ‘central’ unique application server)
– Direct traffic from one cell to the other one (no triangular routing)
– Local enhanced service, in case the cell is isolated (strong fall back modes) => to maintain the level of service in case of backbone outage
– Fast call setup and optimization of the traffic (reduction of number of hops to cross)
Example of LTE Architectures

LTE network architecture
Centralized

- Communication up to the central PTT application server
- PTT Application Server
- PGW
- SGW / MME
- IP
- ENodeB
- UE

LTE network architecture
Distributed

- Direct communication
- From site to site
- Local Group call
- IP
- UE

Conference: March 11-15, 2013
Exhibits: March 13-14, 2013
Las Vegas Convention Center
Halls C1-3
Today, the pictures & video exchanges over broadband is a reality -> and enhancing pictures and video exchanges can raise the PTT service to a new level

- Everybody acknowledge the efficiency of the Push To Talk communications, for mission critical communications
- Let’s offer the same efficiency for data, pictures and video

⇒ One to many can share the same instant situation awareness
⇒ Reduced handling on the handset => fast action
Beyond Push to talk - enhanced applications:

**Push to Com:**

- **Push to Talk**
  - Traditional LMR Services
    - Group Call, Individual Call, Emergency call

- **Push to Data / Photo**

- **Push to Video**
Thank you

dominique.fredez@us.thalesgroup.com