

ESChat Comes to the 2016 Rose Parade

ESChat and Sonim Technologies provide secure Push to Talk over LTE on the LA-RICS FirstNet Band 14 LTE Network including Interoperability with the Los Angeles County Sheriff's P25 Land Mobile Radio Network.

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The Rose Parade

The Tournament of Roses has been held since 1890. Not always a parade that led up to a New Year's Day college football game, it was started by the Pasadena Distinguished Valley Hunt Club, which invited clubs from the east coast to watch chariot races, jousting, foot races, polo, and tug of war sessions. The parade expanded each year to include marching bands. Today, of course, the parade of roses is watched every New Year's Day by millions of people, including standing room only crowds along the parade route.

Today's Rose Parade has become one of the largest events to be held on a regular basis in Southern California. During the run-up to the parade and the game that follows, the public safety community spends many long hours planning and preparing for keeping order, handling emergencies, and making sure those viewing the parade stay on the sidewalks along with a multitude of other tasks. In today's world the threat of a terror-related attack must also be taken into account. The number of agencies required to provide all of these services and others grows with each year.

Public Safety Services

Public safety services for the Rose Parade are provided by a host of local and federal agencies. In 2015 this annual event attracted an international audience of more than 53 million television viewers. The local experience begins days in advance as crowds begin scouting the 5 1/2 mile parade route. In total, nearly one million spectators will line the streets to watch the parade in person. First responders are responsible for activities ranging from local crowd control to anti-terror. The City of Pasadena maintains responsibility for local law enforcement services and first responder services. Due to the magnitude of the operation, the City of Pasadena contracts with the Los Angeles County Sheriff's Department to augment police services and inter-agency coordination activities and, while not under contract, the Los Angeles County Fire Department stands ready to provide assistance at a moment's notice.

Solving Parade Communications Issues

According to the L.A. County Sheriff's Department, coordinating and running the 2015 Rose Parade required every available public safety tactical channel in the area and did not leave any Land Mobile Radio (LMR) tactical channels for another incident if needed.

To prevent a similar situation during the 2016 event, the Sheriff's Department sought to utilize the LA-RICS Band 14 LTE infrastructure and industry partnerships to augment first responder communication capabilities. The LA-RICS LTE system operates in its own block of radio spectrum known as Band 14, which is dedicated for public safety use. Unlike the commercial wireless networks, the LA-RICS network is not affected when spectators begin uploading large amounts of photos and video to their friends and social

networks. While the commercial wireless carrier networks are bogged down and unable to support voice or data services, the LA-RICS network continues to provide unfettered LTE service.

There were numerous objectives for this event, including:

- Validate the LA-RICS Band 14 infrastructure for Push-to-Talk Voice and video services.
- Offload non-critical first responder communications from the mission-critical LMR network.
- Determine the viability of Push-to-Talk over LTE to augment mission-critical LMR radio networks.
- Validate inter-network communications between LTE PTT users and LMR users.
- Provide critical feedback to participating vendors to assist in future developments.

Strategy

The strategy was to leverage the LA-RICS Band 14 LTE network deployed on the parade route along with Push to Talk over LTE on the Sonim handsets. This would provide first responders with an alternate secure communication platform for use before, during, and after the parade. Additionally, Sheriff's department elected to interconnect the Band 14 LTE network and the P25 LMR network to facilitate cross-network communication.

Why ESChat and Sonim Joined LA-RICS for the Parade

A member of the FirstNet staff headquartered in the Los Angeles area traveled to New Mexico for the 2015 Albuquerque Balloon Fiesta where he witnessed the very successful use of Sonim Technologies' (www.sonimtech.com) XP7 ultra-rugged Android handsets operating with the ESChat (www.eschat.com) Push-to-Talk (PTT) service over the early-builder FirstNet deployment. As a result, Public Safety personnel were able to use LTE Band 14 (FirstNet) for Push-to-Talk services as well as their own existing LMR systems. In essence, the LTE network provided a platform for interoperable PTT across a multiplicity of public safety agencies. The success of this trial was covered by a number of local and national media outlets.

When the FirstNet staffer returned and discussed the success of the Balloon Fiesta with LA-RICS, Pat Mallon, the Executive Director, and others immediately seized on the idea of implementing the solution during the Rose Parade in order to both highlight the capabilities of the FirstNet LTE network and to provide better coordination between public safety services. With limited time to prepare before the parade, Sonim and ESChat were able to move quickly to configure and deploy the XP7 Android devices and LMR radio gateway equipment.

Twenty Sonim devices were deployed to the public safety parade administrative professionals including the LA County Sheriff's department and the LA County Fire Department. After the initial personnel were trained

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(which took less than five minutes per person), they then ended up training the rest of the users in short order. The consensus of ESChat users was that the training period was quick and easy and the smartphone devices made a difference in their ability not only to communicate with each other and with existing LMR radios on the Parade route, but also to locate their colleagues along a very crowded parade route.

In gathering the information for this case study we interviewed a number of people involved with the project at LA-RICS and at the LA County Sheriff's department. One person who was interviewed stated that very soon after he began to use ESChat on the Sonim device he realized he no longer needed his LMR radio in order to stay current and in the loop. Another tells of someone who at one point during the parade wanted to contact an ESChat user from inside a fire station that was outside the LA-RICS LTE coverage. Fortunately, the ESChat user called him using ESChat and he was able to respond because he had access to Wi-Fi and the Internet inside the fire station and he was able to continue to use the system.



Sonim XP7 Ultra Rugged Handsets with ESChat

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The Radio Connections

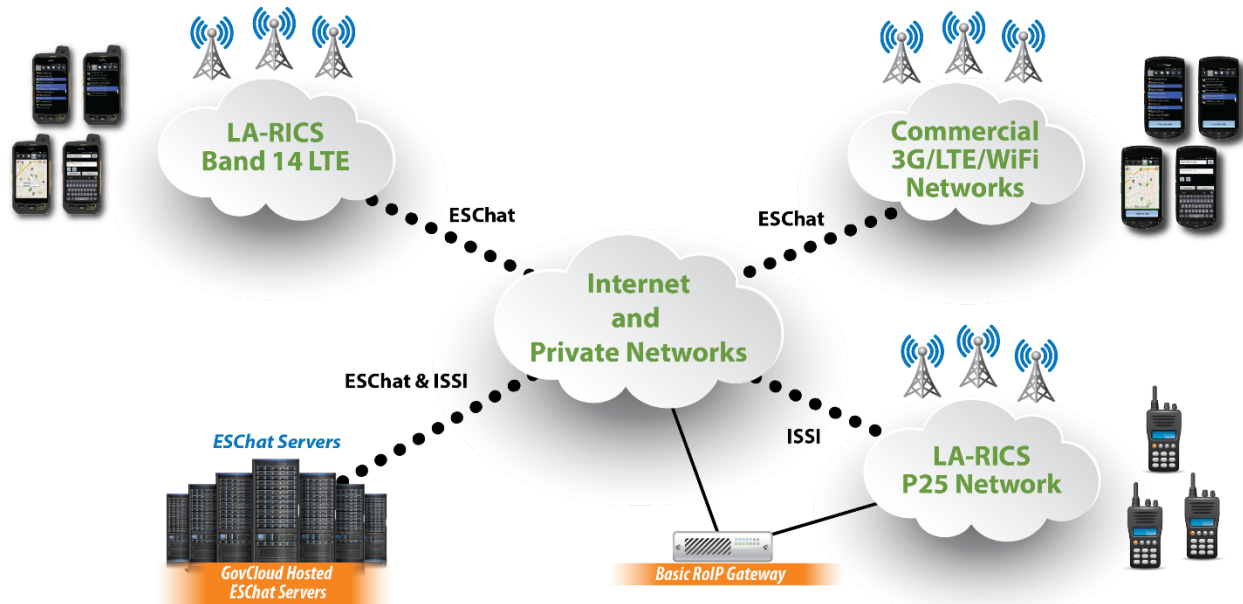
Due to the limited preparation period, it was decided to interface the LA-RICS P25 LMR system via ESChat's basic Radio over Internet Protocol (RoIP) interface. This is a simple yet reliable interface to provide communication between the LTE and LMR systems though it is limited to simple group communications. The preferred method of interfacing a P25 LMR network and the ESChat over LTE network is to use the P25 Inter Sub System Interface (ISSI) that was created to allow different P25 systems to interoperate. ISSI provides for a full-featured experience including private calls and P25 emergency calls as well as group calls. Although the basic RoIP method is limited, it did provide a reliable means to establish communications across the P25 and LTE networks when needed. The table below illustrates the capabilities supported by ESChat using the advanced digital interfaces available in P25 and DMR radio networks.

Interoperability Feature	Basic RoIP	P25 via ISSI	DMR via AIS
<i>Private Calls (1:1)</i>	✗	✓	✓
<i>Group Calls</i>	✓	✓	✓
<i>Emergency Calls</i>	✗	✓	✓
<i>Inter-Network Radio ID's</i>	✗	✓	✓
<i>End-to-End Encryption</i>	✗	✓	✓
<i>Inter-Network Location Display</i>	✗	✓	✓
<i>Reduced Inter-Network Latency</i>	✗	✓	✓
<i>Interoperability as a Service</i>	✗	✓	✓

According to those who used the system before, during, and after the parade, it worked flawlessly. As mentioned, it soon became evident to those using the Sonim devices that they did not need to use their LMR radios. When asked about any delay evident between the LMR and LTE PTT sessions, their response was that there was a perceptible delay but this was only noticed when a Sonim user was standing near an LMR user and could hear the LMR radio. When Sonim users were not near LMR devices they said they did not notice any delay in their ability to use PTT over the LA-RICS broadband system.

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Network Architecture Diagram

Results

The consensus among a number of those who arranged for ESChat and Sonim to provide PTT over the LA-RICS LTE network was that it worked well. If they had received the devices earlier they would have deployed more of them. The use of PTT over the LA-RICS LTE network will, in the future, enable public safety to hold back several LMR channels for use during other types of incidents.

Perhaps the best result of the use of ESChat on the Sonim smartphones as described by the LA-RICS Executive Director was that it provided a real-world example for public safety of the benefits of the LA-RICS broadband network. Many public safety professionals who came in contact with the ESChat/Sonim solution had only heard about the LA-RICS system and seeing it in action gave them more insight into what is coming in the world of public safety communications.

The mission of all Band 14 networks is to provide first responders access to LTE data service that is always available and not encumbered by non-public safety users. The LA-RICS Band 14 public safety broadband network successfully achieved this mission by providing reliable LTE service throughout the 2016 Tournament of Roses Parade, enabling Secure Push-to-Talk over LTE, Real-time Location Tracking and Mapping, along with broadband video. While the commercial carriers were congested due to public access, the LA-RICS network was able to service all first responders. At the start of the Rose Parade, the LA-RICS LTE network was providing service at higher than 16 Mbps while the commercial networks were slower than 0.044 Mbps.

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Conclusions

It should be mentioned here that use of the LA-RICS Band 14 LTE network for PTT services will not replace the need for public safety to keep and update their existing LMR systems. Certainly there are those who believe at some future point PTT over LTE will provide the same level of reliability as is currently available through the use of LMR networks. However, that day is still well into the future.

That is not to say that the judicious use of PTT over FirstNet does not make sense. It is an easy way to provide interoperability across multiple LMR networks and FirstNet. It can and has solved such interoperability issues before but the caution here is that today's LMR networks are well established and have inherent levels of fallback capabilities that are not yet available in any LTE system including the FirstNet system. It is important to realize how well the ESChat PTT services worked for LA-RICS during the Rose Parade and that people using ESChat PTT did not need to use their LMR radios. Even so, they maintained their LMR radios in case they needed to revert back to them (which they didn't).

The LA-RICS participants from the Executive Director down who were involved in the planning, implementation, and use of ESChat on the Sonim devices voiced only one regret. If they had received the devices sooner they would have been able to deploy more of them during the parade. The ease of use, ease of tying LMR and LTE networks together, and ESChat's one-to-one and group capabilities of a P25 LMR system made it an obvious choice for LA-RICS during the grandest yearly parade and associated activities in the L.A. area.

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Statistics

Summary Usage Statistics (Operational + Preparation Period)

Total Calls Originated (Calls Placed):	461
Total Calls Terminated (Calls Answered):	1,966
Total Call Endpoints:	2,427
Average Users per Call:	5.26
Total Call Time:	38.48 hours
Average Call Time:	57.08 seconds

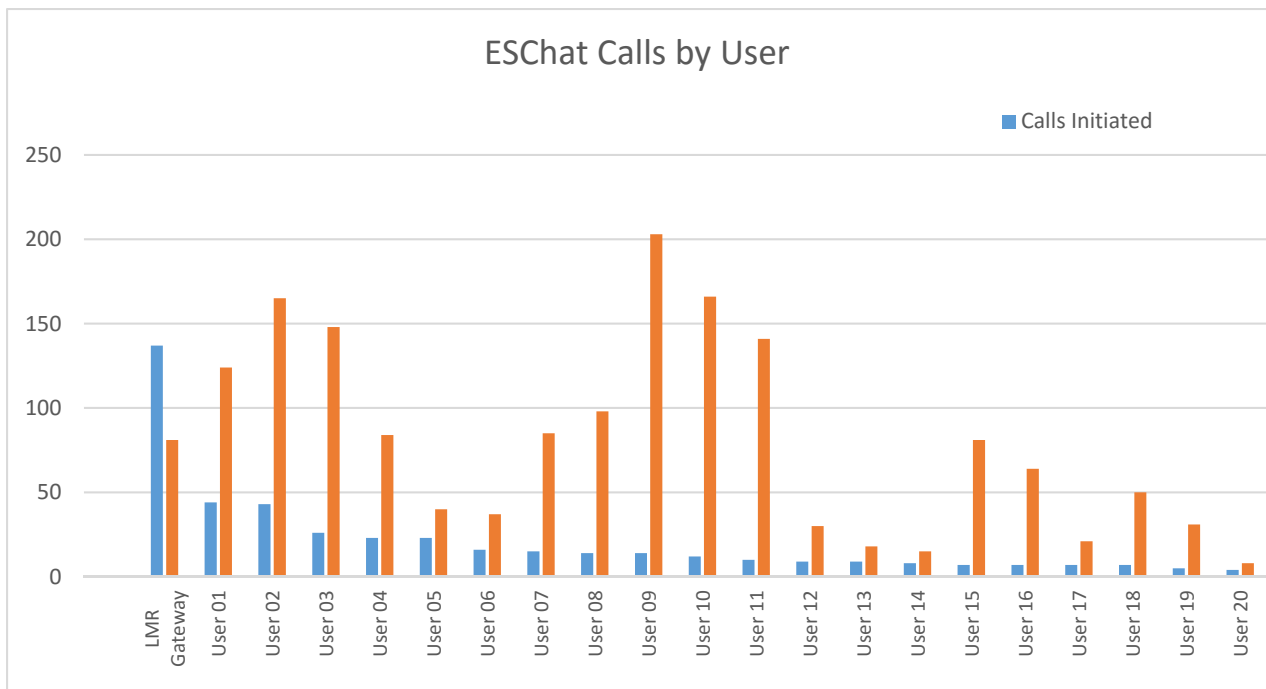
Summary Usage Statistics (Operational Period Only)

Total Calls Originated (Calls Placed):	403
Total Calls Terminated (Calls Answered):	1,830
Total Call Endpoints:	2,233
Average Users per Call:	5.54
Total Call Time:	36.27 hours
Average Call Time:	58.47 seconds

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Calls Initiated and Received by User

December 31, 2015 at 1600 to January 1, 2016 at 1100



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Call Volume and Call Duration Graphs

December 19, 2015 thru January 2, 2016

