Short Communication

Private LTE Networks for Businesses: The Basis of Connectivity for Today's Digitisation and a Guarantee of Success for the New Services of Tomorrow

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DESCRIPTION

The widespread digitisation of all operational trades, such as ground operations around aircraft for airlines and airport managers, has been underway for several years. Nevertheless, the quality of connectivity remains an obstacle to the success expected by operational staff.

Today's professional mobile networks

Either highly critical and therefore exclusively private or semi-private networks such as PMR but dedicated to voice, or dedicated to data such as Wi-Fi today but more difficult to bring to the service level of so-called critical solutions. While fixed networks have been emerging, converged networks for at least a decade, long term evolution LTE is the radio technology that enables converged networks to be offered for all operational mobile terminals. It is this migration to LTE for businesses that will finally make it possible to adapt many uses today in the cabled world to the mobile world [1]. What could be more mobile than the field of airports, their aircraft, the many ground agents, baggage tractors, baggage container loaders, etc.?

It appeared in 2012 that this future single network should then follow the most constraining characteristics that are those of voice networks. Its most important characteristics being network coverage adapted to needs, high level of service, independence between private and public flows, homogeneity of coverage, dedicated and licensed frequencies that can be used locally by each company, security, independence from any major event such as weather conditions, and any other event that would place exceptional demands on the public networks [2].

Once this has been achieved, many of the characteristics of today's voice networks still remain in the shadow of operators, such as the level of service, adapted coverage and a few other points mentioned above. We then naturally come to the PMR operator-type network model vs. public network type network.

This naturally leads to a change in the deployment model for 4G mobile solutions compared to 1, 2 and 3G. The last 3 generations have not known the specialized world of business-critical radio. Manufacturers of infrastructures, SIM cards, terminals, and the whole 4G ecosystem must now take into account this new market, which is very specific but well known to integrators and providers of networks called PMR [3].

As the deployment of private LTE networks begins in France and in various countries around the world, and as the implementation of new services based on this technology, such as mobile video services, is underway, it is now legitimate to be concerned about the advent of 5G and IOT for Verticals.

The digitisation of operational personnel will therefore be able to take place under the best connectivity conditions for ground teams, and this 4G technology remains sufficient for human and dedicated to enterprises use. Nevertheless, current standardizations such as NB-IOT and LTE-M will make it possible, in the years to come, to add to this collaborative exchange environment information concerning the objects necessary for the smooth running of operations [1-4].

What could be more reassuring for an operator at the foot of an aircraft than to see the loader of the luggage containers on approach or even during loading appear in his business application with the right information in accordance with flight safety without having to call the operator in charge of the subject who is in the middle of the manoeuvre? These are the subjects that it is now essential to be able to tackle as quickly as possible to allow for even greater efficiency in operations while allowing agents to focus on their initial job [4].

It is this new LTE private network platform that can be optimized by adding these functionalities and these "new users" who remain within the same perimeter. The famous "edge computing" also related to the security concerns of the IOTs but also to the optimization of latency times, will be even easier. An upgrade of the infrastructure to comply with the latest 3GPP releases should allow this addition.

Proof of concepts are more than necessary today in order to prove the interest of this connectivity to business services, both for the businesses themselves and for the entire ecosystem that has yet to be built in this area.

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5G is also a real topic that needs to be addressed today. It is true that many solutions are being studied and considered by industrialists, but it seems that there is little real coordination with connectivity, which remains a major issue [5]. There are still some unknowns such as the spectrum but here again POCs in the spectrum already dedicated to businesses by maintaining a 4G on car parks while deploying a network of antennas oriented on traffic lanes in 5G NR, wouldn't this be a rapidly deployable solution?

The interior is also a real problem and as in airports, the difficulties of coverage by public networks remain in buildings or hangars or factories for companies. What could be more practical for a company than to be able to deploy its own indoor network for automation, robotization, monitoring, predictive maintenance of machines, etc.? Other questions remain unanswered, such as the roaming of operational personnel (e.g. aircrew) but also remote spot operations, etc. This is where public operators and other providers of IOT-type solutions have their place [6].

Hybridization of private and public networks, be it IOT, M2M or human-to-human communications, is another area of development. As the last subject for the companies themselves, it is essential for the future of companies, in order to be ever more efficient and therefore competitive, that the ecosystem linked to the business world can evolve in a broad way, both on the public and private network side, on different but why not complementary frequency spectrums [7].

Usage cases are still less known, the needs of businesses are not always understood, but the launch of POCs or of a grouping of businesses and industries from different fields such as transport, energy, logistics, production could help to highlight their uses and needs. In many events or working groups, we see operators, infrastructure and terminal providers, but rarely the industries themselves to be in control of their future. A first step could be to bring together airlines, airports and all players in the future smart airports, including manufacturers. A first step could be to group Airlines [8].

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