COST-EFFICIENT TETRA OPTIMISATION FOR THE CITY OF CAPE TOWN

THE CITY OF CAPE TOWN

The City of Cape Town provides a wide range of civic services to over 3 million citizens including metropolitan policing, traffic and transportation, law enforcement, emergency services, housing and utilities.

The City uses TETRA to provide robust and reliable communications to its first response and municipal support teams. But user numbers had spiralled way beyond initial predictions to 10,250 and capacity issues were becoming apparent. The City added more base stations but users reported service problems from time to time where they experienced difficulties due to a lack of resources or problems with signal strength. With this in mind, and with the 2010 World Cup approaching, Motorola Solutions was commissioned to analyse the system. The team applied Motorola Solutions' TETRA Intelligent Optimisation Service to the network (TETRA IOS) in a pilot study and subsequently recommended a range of changes. The City was impressed with the project and gave the go ahead for the optimisation service to be deployed across the whole network. As a result, dropped calls fell by 15 per cent and incidents of 'busy calls' by 16 per cent – without any additional hardware investment.

Organisation
- City of Cape Town

Location
- Cape Town, South Africa

Industry
- Public Safety

Motorola Solutions' products
- Motorola TETRA Intelligent Optimisation Solution (IOS)
- Motorola Dimetra 6.2 wireless communications infrastructure
- Motorola radios as follows:

Generation one
MTP200/300
MTH300
MTM300

Generation two
MTP700 and MTM700
MTH500 and MTH650

Generation three
MTH800
MTP850/850S
MTM800/800E

'Motorola Solutions' TETRA IOS has delivered a huge improvement in the level of service. For example, network coverage has improved across Cape Town and dropped calls have been reduced significantly. Our teams' calls get through first time, every time, enabling them to safely conduct their missions and better serve citizens and visitors. We are now looking forward to gaining further network performance improvements as we implement Phase Two of the project which will see Motorola Solutions' TETRA IOS rolled out across the network.'

Tommy Bosman
Manager: Specialised Electronic and Radio Services, City of Cape Town

CHALLENGE

In 2000, Motorola Solutions installed a TETRA radio communications network for the City of Cape Town, the first of its kind in South Africa. The network experienced huge growth. There are now 10,250 users including 1,400 metropolitan police officers, over 1,000 emergency services personnel and around 3,000 utility workers, as well as National Parks staff and external partners. The system comprises 29 remote sites, 168 base stations and 86 different frequencies.

The massive rise in calls and data traffic meant field users experienced degradation in service. Motorola Solutions' Lead Field Engineer, Francois Stoffberg, explains, 'This was largely due to calls not being switched correctly. As a result, calls were being dropped or blocked so that the user had a busy tone, and the signal strength they received on their handset was often weak.'

In addition, the World Cup was due to be held in Cape Town. 'One of the main reasons for optimising the network was so that it could provide robust and reliable communications for first response teams and municipal services,' says Francois Stoffberg.

SOLUTION

The City of Cape Town, with its limited resources, endeavoured to improve the network capacity and coverage to address inferior communications in certain areas. But it was not able to significantly improve services without the new optimisation tools available. So, in 2010, Motorola Solutions was appointed to review the network. It recommended implementing its TETRA IOS. Its field specialists tested the network for four weeks.

A limitation with TETRA is that the network does not automatically capture performance information. TETRA IOS overcomes this by changing the base station's software; whenever a subscriber's radio sends a GPS message, the message is accepted and additional data is collected. This includes the user's ID and location, signal strength and talk group. The captured data is sent to a central server and is complemented by standard drive testing.

Operating data revealed network performance relative to the predicted coverage map of signal strength. It showed geographical coverage for each site and, if users were out of range, whether the base stations handed them over correctly. Several instances were found when users should have been connected to a particular base station but were being served by a site that was much further away.

The data was fed into the TETRA IOS server which applied algorithms to recommend changes to the City of Cape Town network and the predicted outcomes. The results were manually reviewed by the Motorola Solutions team before work was carried out on the network. The team removed co-channel interference and tuned mobility parameters to ensure that radios handed over between base stations more efficiently. Also settings for each base station were amended to better reflect its operating landscape – e.g. if it was serving a rural or urban area.

BUSINESS VALUE

Performance has significantly improved without additional Capex. The number of dropped calls fell by 15 per cent, busy calls were reduced by 16 per cent and radios now operate within the predicted 'best server' coverage area. The City of Cape Town adopted the TETRA IOS recommendations in time for the World Cup. The enhancements to the network helped first response teams perform at their best during the prestigious event.

The City of Cape Town is entering Phase Two of Motorola Solutions' TETRA network optimisation programme. This includes deciding on a final frequency plan for the system to maintain optimum performance. The recommendations are being implemented across the network to deliver further performance benefits without new hardware.

Applications

- **Network analysis**: Motorola's TETRA IOS enables the City of Cape Town to build an accurate picture of its network performance.
- **Network optimisation**: TETRA IOS applies the data captured from users and the network to recommend changes to optimise performance.
- **Comprehensive analysis**: The entire network is optimised – this spans 29 sites across 4,500 km, to 10,250 users, and 2,760 portable radios equipped with GPS for personnel tracking.

Key Benefits

- **Improving performance**: Using Motorola Solutions' TETRA IOS, the City of Cape Town reduces dropped calls and busy calls (currently by 15 per cent and 16 per cent respectively).
- **Better coverage**: Radios also now operate within the predicted 'best server' coverage area.
- **Better service for subscribers**: The improvements ensure better service for the 10,250 subscribers.
- **Cost savings**: The optimised network reduces the need for additional hardware while increasing the usable capacity of the network.
- **Continual improvement**: Motorola Solutions, in conjunction with the City of Cape Town, carries out a month-by-month performance analysis, ensuring continual improvement to the TETRA network.

For more information on how Motorola Solutions' TETRA IOS can cost-efficiently enhance the performance of your TETRA network, please visit us on the web at www.motorolasolutions.com or access our global contact directory at www.motorola.com/Business/XU-EN/Contact_Us

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