

An Aspire Technology Success Story

Rise of the Network: Delivering Improved Experience Without CapEx

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Introduction

Aspire Technology has supported numerous network operators through end-to-end optimization to improve customer experience and maximize their return on investment.

This success story gives an overview of a 6-week project where Aspire faced a particularly challenging optimization project. Our customer was suffering from high congestion, external interference and a very high 2G-only device penetration, which had resulted in poor voice and data experience, continuous complaints and a high rate of churn.

Aspire's team of experts were able to achieve the following results:

- Voice Quality 'bad' samples reduced by 30%
- Voice Drop Call Rate reduced by 27%
- Voice Call Setup Failure rate reduced by 20% in 2G
- Network capacity maximized deriving in a 15% increase of data volume
- Data drop rate improved by 15% in 3G



Problem

To better understand why the operator had reached this point, it was imperative to investigate the environment of this particular network and country. Specifically:

- Our customer was using the 900MHz band both for 2G and 3G, and a competitor was using 850Mhz: both were overlapping at the edges, creating some very damaging interference
- The number of 2G-only devices was above 60%, greatly limiting the ability of the operator to move traffic to 3G
- Special security requirements led authorities to deploy jammers across the country, creating another source of interference affecting performance

Taking the above into consideration, our team studied the network's configuration and behavior, evaluating the exact impact of each factor and determined the corrective action needed, focusing on the following areas:

Interference

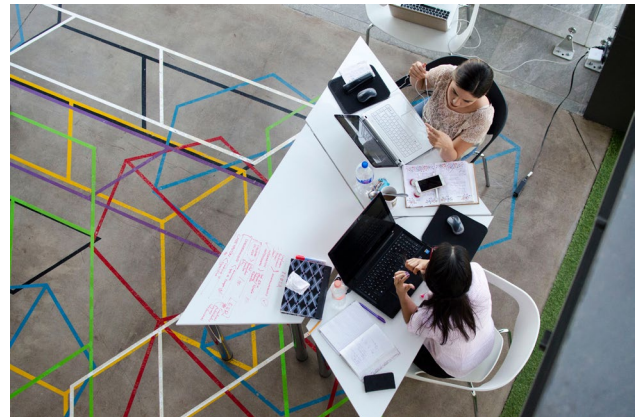
- As may be expected due to overlapping frequency bands and jammers, UL interference level measured by ICM bands 3-5 was 3.3%, which was very high
- In addition to those external factors, the 2G frequency plan was very tight with a limited number of available channels
- Overshooters were abundant, all of this adding at to a very poor radio environment

Transport network

- Utilization was very high, congestion was frequent across many sites
- Iub interface and aggregation links were suffering the most
- Many LAN ports were wrongly configured to half-duplex

Network Configuration

- Due to high load in the 2G network and to sub-optimal configuration, half rate traffic was abnormally high deriving in poorer voice quality
- Key features such as inter-RAT mobility or power control were not properly optimized to account for this network specific characteristics; they had the legacy vendor configuration
- A high number of inconsistencies were found network wide



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Solution

In only 6 weeks, multiple optimization activities were tackled, moving from trials to network wide implementation, or deriving into a cell-level specific deep-dive, troubleshooting and optimization. All with the purpose to provide a long-lasting solution for the whole network.

In particular, the primary technical targets were:

- Reduce internal interference, and mitigate the effect of external interference
- Ensure the maximum number of customers remained / moved to 3G, alleviating somewhat the congested and interred 2G network
- Increase the usage of better speech codecs to provide better Voice Quality
- Correct all inconsistencies in the network both in the RAN and TX sides

In order to achieve those the following actions were performed:

1. **Activation of vendor features available to the operator**
2. **Tuning of already activated vendor features**
3. **Overall parameter tuning**
4. **2G neighbor optimization**
5. **Filter installation to mitigate 850Mhz interference**
6. **Transport node LAN ports operating at half-duplex modified to full-duplex**
7. **NW consistency check and inconsistency correction**
8. **Parameter and feature alignment**
9. **Alarm analysis and corrective actions**



Results

Voice quality improvement



Figure 1

Voice Quality was improved reaching the network's all-time highest value in both 2G and 3G. This was verified by the customer as well as through subscriber feedback (Figure 1).

Voice drop rate reduction

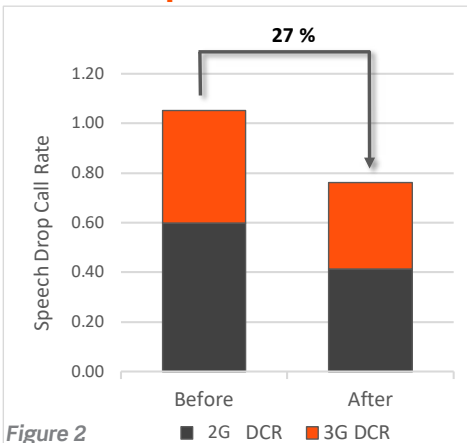


Figure 2

Voice Drop Call Rate in the network was reduced by 27% combining 2G and 3G (Figure 2).

3G usage increase

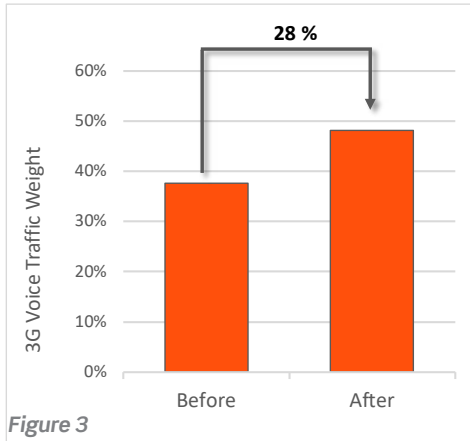


Figure 3

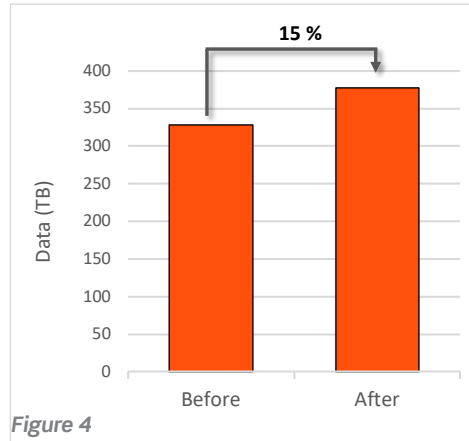


Figure 4

3G voice usage was increased by 28%, bringing strong benefits to user experience (Figure 3). This also alleviated 2G load, improving performance in that technology.

Overall network capacity was increased due to better management of resources. We observed a 15% increase of data traffic bringing additional revenue to the operator (Figure 4).

3G Retainability

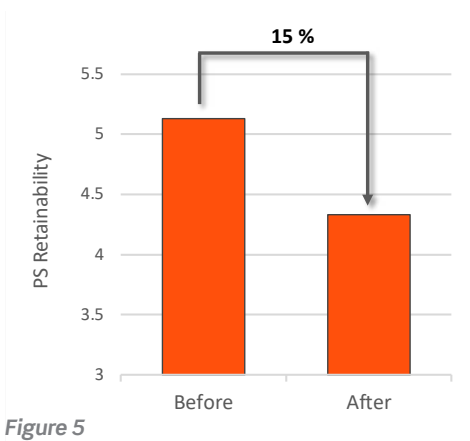
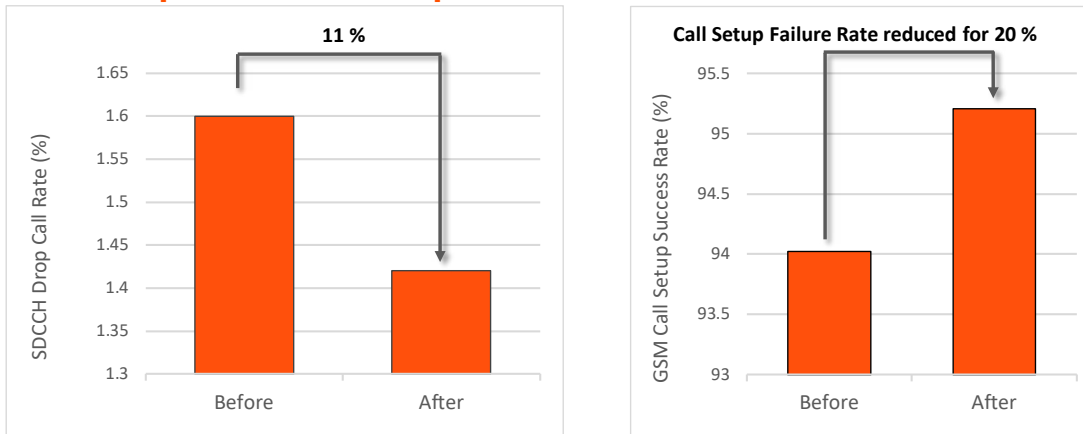


Figure 5

Interference reduction, preventing 3G users from making unnecessary Inter-RAT handovers and keeping them in better radio conditions, brought a 15% improvement in data retainability (Figure 5).

Call setup and SDCCH improvement



2G signaling Drop Call rate was improved by 11% (Figure 6) and 2G voice Call Setup Success Rate by 20% (Figure 7).

UL Interference Decrease

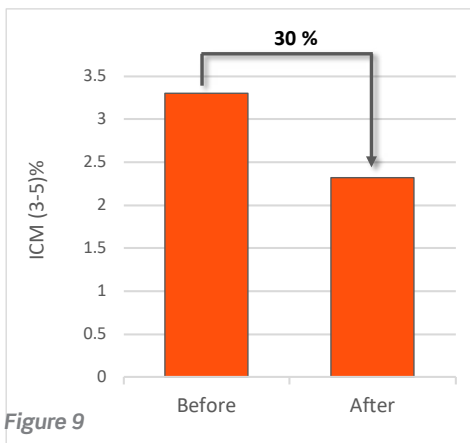


Figure 9

Finally, UL interference in 2G was decreased by 30%. This had a direct effect in the improvements highlighted above (Figure 9).

Benefit to the operator and their subscribers

From a subscriber point of view, the benefits were very noticeable:

- For voice services, customers now were more likely to be able to successfully establish a call (i.e. improved call setup success rate) and to retain it (i.e. improved drop rate). Besides, voice quality was improved, improving the experience during such calls.
- From a data perspective, the simple fact that all customers with a 3G device were now able to connect and stay in 3G made a dramatic difference in their perceived network quality. As it is well known, data services for 2G are not suitable for anything besides MMS and very low bandwidth and non-real-time services.

For the operator, the above resulted over time in reduction of churn, increased NPS and more importantly it increased network capacity and improved revenue. The revenue increase was due to greater data volumes and allowed the operator to defer CapEx investment.

The operator could see first-hand how former service providers were not supporting them to take full advantage of the network and how particular configurations were not optimized for their current traffic and quality demands. Having a trusted, independent partner in Aspire has resulted in a long-term business win for this operator.



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