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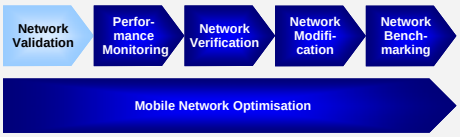

Mobile Network Optimisation

As market mature, focusing on costs and network utilisation becomes increasingly important. Mobile network optimisation can save capex, reduce dropped calls and improve the user experience, thus reducing churn. Therefore money spend on network optimisation is likely to shown rapid returns.

The methodology developed for Coleago's mobile network optimisation service includes a breakdown of the mobile network optimisation process in five sub-processes:

- mobile network validation,
- mobile network performance monitoring,
- mobile network verification,
- mobile network modification,
- mobile network benchmarking.

Mobile Network Validation

By using Coleago's Mobile Network Validation service the correctness of the initial configuration of a mobile network and the conformance with the technical plans can be ensured. The Mobile Network Validation service is relevant to incumbent mobile operators in the process of completing the expansion of their networks or to new entrant mobile operators completing the build-out of their mobile networks. It is especially relevant in the case of a turnkey build-out to assess if what is paid for is what is delivered by the mobile network vendor.

The scope of the Mobile Network Validation service is to ensure that the mobile network has been implemented according the technical plan, that each radio site is correctly integrated and that all the services are properly delivered. The methodology developed for the Mobile Network Validation service includes:

- A preliminary consistency check of the network parameters for switches, controllers, cells, frequency and code allocation, neighbour relations and for algorithm such as cell selection, handover and power control,
- A verification of the antenna type, height, azimuth, tilt, clearance and a verification of the cabling for each cell of the radio sites,
- A verification of the coverage for each cell of each radio site and of its continuity with a test of the selection and handover algorithms using drive test equipment,
- A field test of services using test cases with an analysis of the

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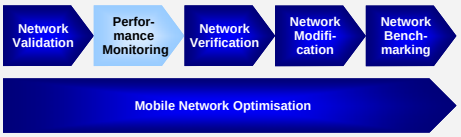
related mobile originated and mobile terminated events.

The deliverables of the Mobile Network Validation service include:

- A network parameters consistency check report,
- A site integration report for each radio site,
- A weekly site integration progress report,
- A service validation report.



Mobile Network Performance Monitoring

The scope of the Mobile Network Performance Monitoring service is the definition, ongoing calculation and reporting of Key Performance Indicators (KPI) using network counter data automatic collection and processing methods and tools. The Mobile Network Performance Monitoring service focuses on the access network because of its complexity, lack of robustness and because it is the mobile network intrinsic capacity bottleneck as a result of scarce spectrum resource. However the scope of the service can be extended to the backhaul, core and backbone networks for which performance is usually carefully monitored by Network Operations.

By using Coleago's Mobile Network Performance Monitoring service a high level analysis of a mobile network can be performed. Areas of improvement that are revenue critical can be identified or the impact of the implementation of a modification or the introduction a new feature can be assessed and quantified from the desktop without the need of extensive, time consuming and costly field testing. Network performance reports can also be used to predict traffic volumes and plan accurately network nodes and links expansion. The methodology developed for the Mobile network Performance Monitoring service includes:

- Analysis of available raw network counter data,
- Definition of KPI formulas such as blocked call rate, dropped call rate, handover success rate, etc.
- Sourcing, procurement and set-up of automatic data collection and processing tools,
- Ongoing monitoring of network performance.

The deliverables of the Mobile Network Performance Monitoring include:

- A KPI definition document,
- A weekly network performance report.

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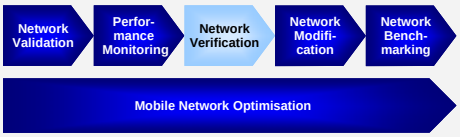

Mobile Network Verification

The scope of the Mobile Network Verification service is to minimise discrepancies in the mobile network and to conduct in-depth investigations when severe problems are detected during the optimisation process especially as a result of network performance monitoring.

By using Coleago's Mobile Network Verification service discrepancies in a mobile network can be minimised and in-depth investigations conducted when severe problems are detected during the optimisation process. Both points are very important since they can become rapidly revenue critical if not taken care of properly.

The methodology developed for the Mobile Network Verification service is similar to the methodology developed for the Mobile Network Validation service and includes:

- Definition of a logging and handling procedure for the detected problems,
- A thorough analysis of the Key Performance Indicators (KPI) as defined in for the Mobile Network Performance Monitoring service and their gradients up to the cell level,
- A preliminary consistency check of the network parameters for switches, controllers, cells, frequency and code allocation, neighbour relations and for algorithm such as cell selection, handover and power control,
- A verification of the antenna type, height, azimuth, tilt, clearance and a verification of the cabling for each cell of the radio sites,
- A verification of the coverage for each cell of each radio site and of its continuity with a test of the selection and handover algorithms using drive test equipment,
- If necessary additional verifications using interface measurement tools,
- A field test of services using test cases with an analysis of the related mobile originated and mobile terminated events.

The deliverables of the Mobile Network Verification service include:

- A network parameters consistency check report,
- A verification report for each radio site,
- A service verification report,
- A weekly problem tracking report.

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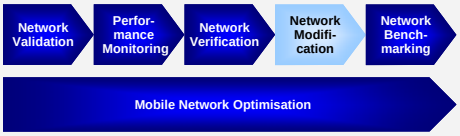

Mobile Network Modification

The scope of the Mobile Network Modification service is to implement mobile network changes smoothly in the most controlled manner using a phased approach to cure detected and analysed problems, to deploy new features or services or to integrate a new node with no significant mobile network performance degradation.

By using Coleago's Mobile Network Modification service smooth implementation of mobile network changes in the most controlled manner can be ensured, gain or degradation can be precisely quantified and revenue can be increased as a result of the modification and not reduced even temporarily.

The methodology developed for the Mobile Network Verification service includes:

- Definition of a logging and handling procedure for modifications,
- For each modification, definition of the type and scope of the modification and definition of a project plan to implement the modification with the identification of tasks , resources, responsibilities and timing as required,
- Verification of network counter data collection and processing before the modification so a "before snapshot" can be taken,
- Backup of all critical parameters so the "before" network configuration can be restored rapidly if the modification results are not satisfactory,
- Initiation of modification orders and follow-up of modification implementation,
- Collection and processing of network counter data after the modification so an after snapshot can be taken,
- Comparison of the "before snapshot" and of the "after snapshot" so gain or degradation can be quantified.
- Phased and gradual controlled implementation of modification at the cell level and at radio network controller level first and at the entire network level, if relevant.

The deliverables of the Mobile Network Modification service include:

- Templated modification orders such as parameter, antenna or configuration change requests,
- A network modification report with a gain or degradation analysis for each level of modification implementation (cell level and radio controller level first and network level then if relevant),

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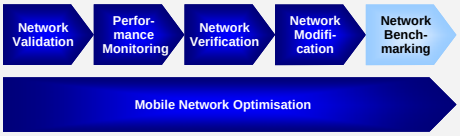

- A network modification project plan if relevant,
- A weekly network modification tracking report.

Mobile Network Benchmarking

The scope of the Mobile Network Benchmarking service is to compare the quality of a mobile network with the competition from the subscriber's point of view. Mobile networks can be benchmarked when major modifications take place but only when the network is sufficiently stable.

By using Coleago's Mobile Network Benchmarking a mobile network can be objectively compared with the competition. A quarterly mobile network benchmark for the most critical market area is recommended to track the evolution of all mobile networks and is especially important if independent agencies conduct this type of benchmark to inform consumers or to assess if license conditions are met.

The methodology developed for the Mobile Network Benchmarking service includes:

- Definition of benchmarking periodicity,
- Definition of reference areas for benchmarking by region,
- Definition of reference drive-test routes for each area,
- Definition of reference drive-test conditions,
- Drive test data collection for all mobile networks,
- Drive test data processing and comparative analysis of all mobile networks and with the data for the previous benchmark.

The deliverables of the Mobile Network Benchmark service consists of a mobile network benchmark report. This includes indicators such as call set-up success rate, call set-up time cumulative distribution, blocked call rate, dropped call rate, overall call success rate, handover success rate (global and intra/inter band or intra/inter layer), signal strength cumulative distribution, bit error rate cumulative distribution and mobile output power cumulative distribution.