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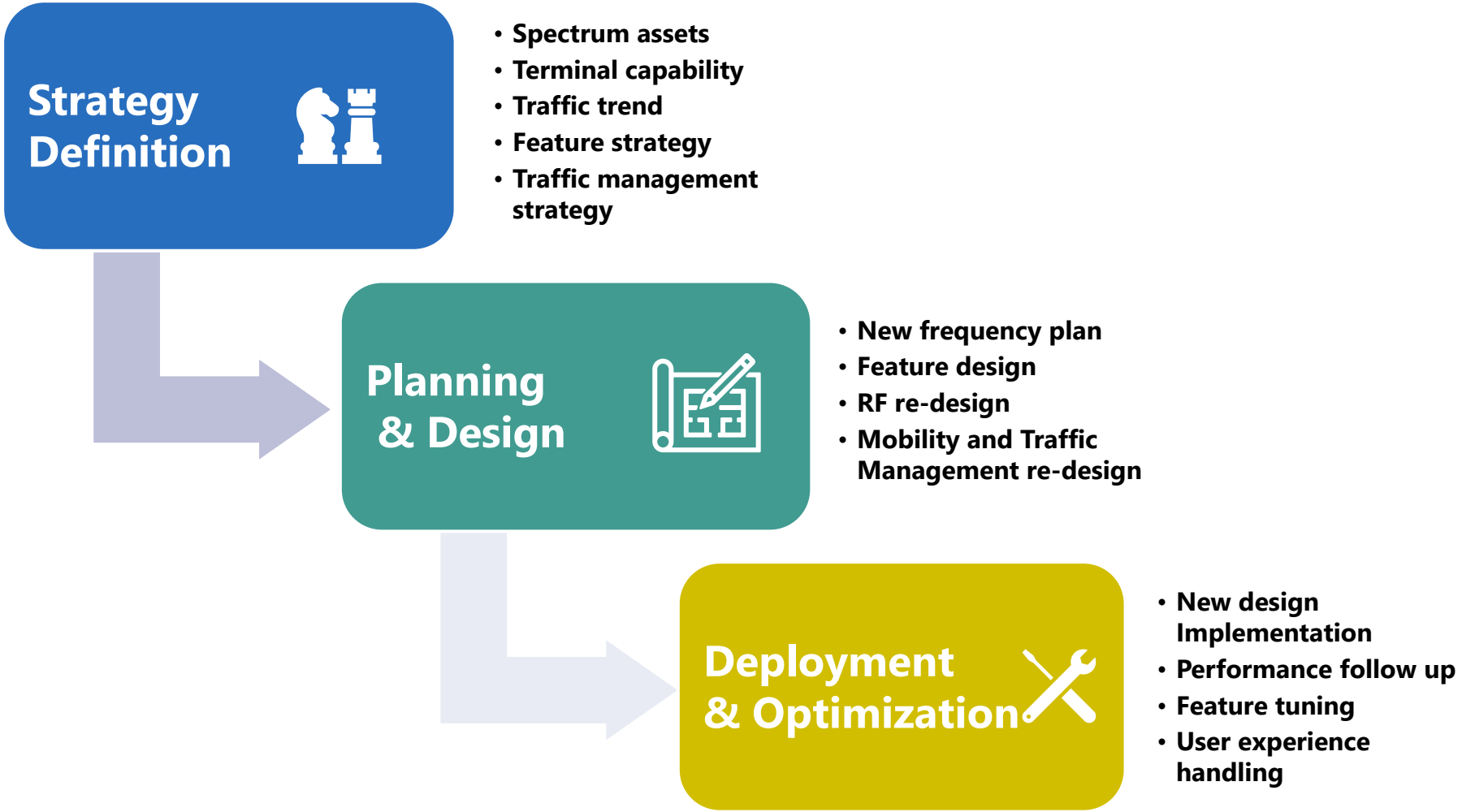
Commercial in confidence

Technology Sunset Services

Technical Soutions Group

April 2023

NEC Aspire view on technology sunset



Technology Sunset Strategy

Problem/ Cause

- Need for spectrum reallocation to technologies with better spectral efficiency, in order to achieve optimal spectrum usage and meet business goals
- Need for older technology shutdown to keep reasonable number of different technologies and achieve OPEX reduction

Solution

Customized service, with selection of modules relevant for operator

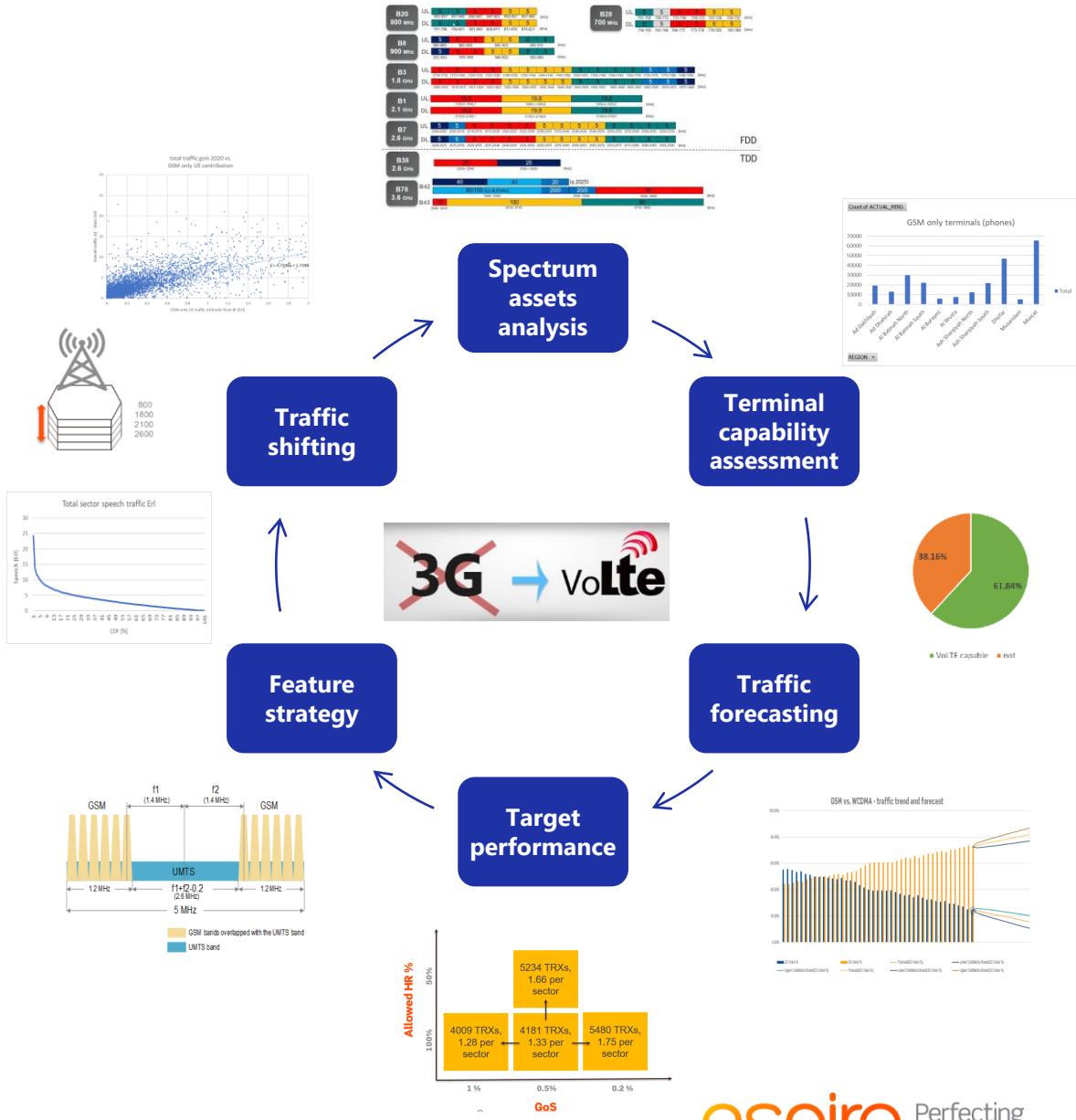
- Spectrum assets analysis, with scenario definition and
- Terminal capability assessment, UE limitations as input for strategy
- Traffic forecasting, understanding trends
- Target performance definition, agreement of minimal service requirements to be met
- Feature strategy, identification and deployment strategy to support operation with less BW
- Traffic shifting, to prepare Network for sunset

Unique Features

- Customized automation use case definition, for maximized spectrum usage

Benefit

- Optimal efficient spectrum usage, leading to cheaper bit per second
- Reduced OPEX due to less technologies to maintain
- Mature methodology and vast experience with technology sunsets on different markets and with different RAN vendors products for reduced risks



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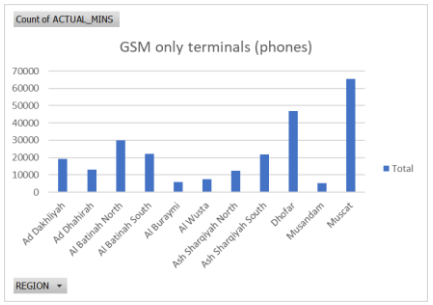
Technology sunset - Strategy definition

methodology

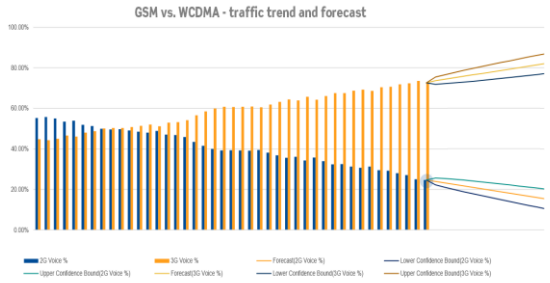


Terminal fleet analysis

- GSM only terminals
- GSM/WCDMA capable terminals
- VoLte capable terminals
- Traffic profiles

- Speech traffic historical data analysis
- ML based traffic forecasting and prediction

Traffic trends and forecasting

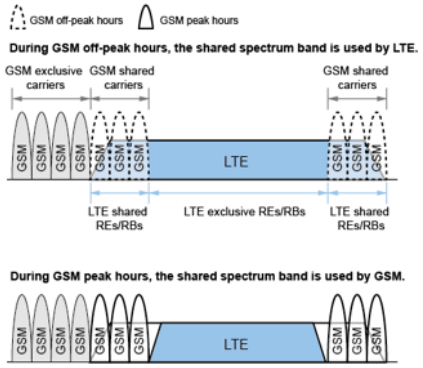


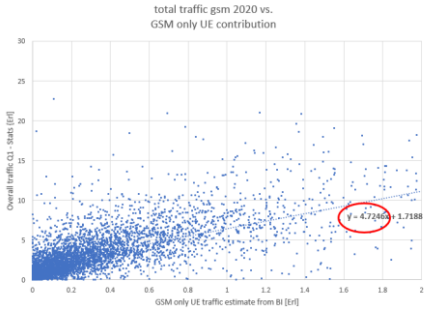
Speech capacity dimensioning

- Speech capacity assessment
- GSM dimensioning (TRX per sector)
- Cluster needs/capacity segmentation

- Beneficial Features considerations (VAMOS, advanced radio resource and spectrum management…)
- Experience from other markets

Feature strategy





Traffic management

- Traffic re-distribution to adjust to new scenario
- Load balancing strategy
- Mobility consideration
- IRAT handover strategy

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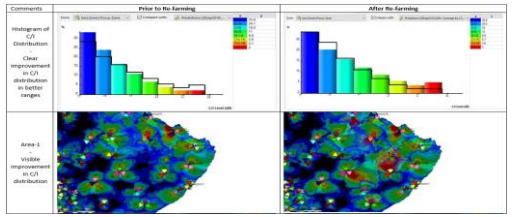
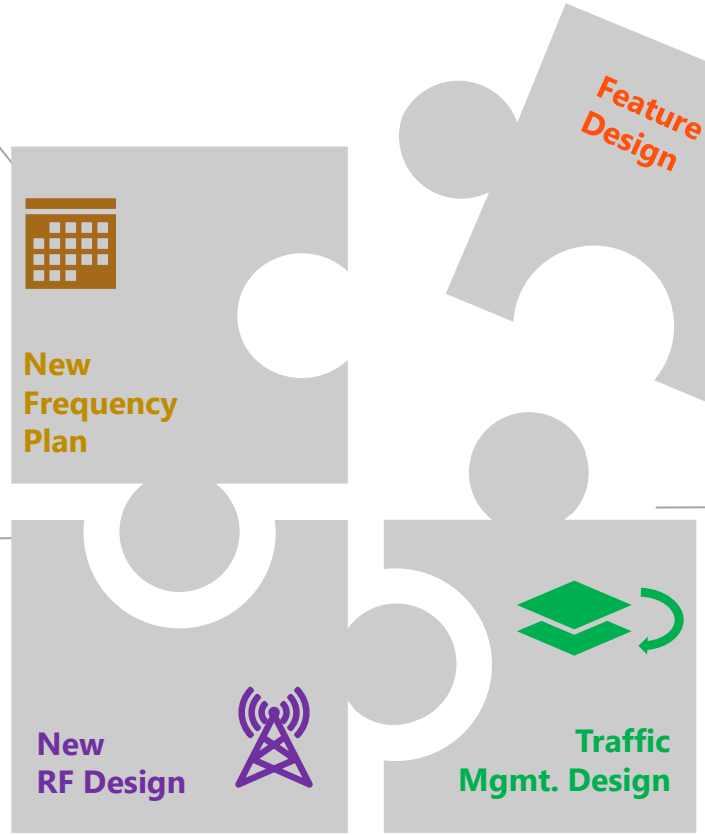
Technology Sunset – Planning & Design
methodology

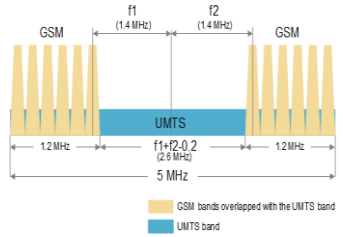
New Frequency Plan
- Allocation of released spectrum
- Distribution per technology
- Assessment of different options
- Fine tuning of frequency plan



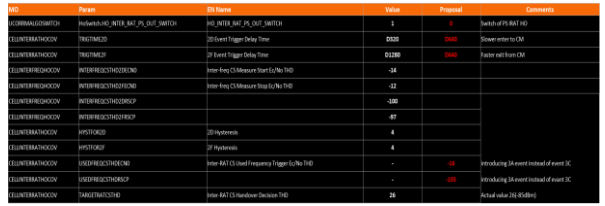
New RF Design
- Proficiency in Atoll
- RF re-design through what-if analysis of different scenarios
- Optimal antenna azimuths/tilts or considerations of new sites



Feature Design
- Advanced features Initial design
- feature parametrization
- Parameter baseline update



Mobility and Traffic management Design
- Fine traffic shifting between layers
- Load balancing parameters re-design
- IRAT handover parametrization



Technology Sunset – Deployment & Optimization

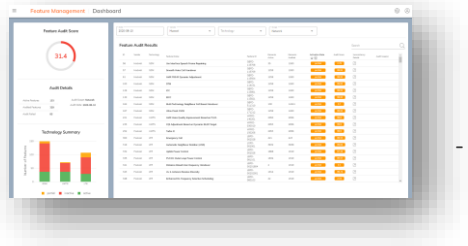
methodology

Data build & Implementation

- Database preparation
- Script generation
- Implementation of scripts in live network

Performance & Strategy Assessment

- Assess impact of technology shutdown in main KPIs and Drive tests
- Define main gaps to tackle
- Identify worst offenders and areas that require adjustments
- Identify if strategy is working as expected and highlight improvement areas

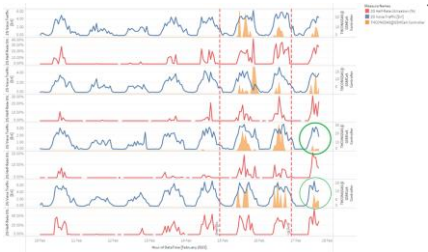


Baseline and NR Audit

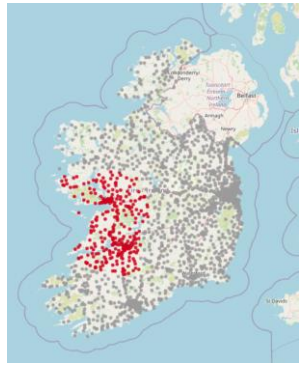
- Ensure baseline was correctly implemented
- Automatic NR audit and implementation of missing NRs

Congestion Mitigation

- Review capacity needs and traffic management strategy for sites that show increase congestion
- Tune capacity and/or traffic management settings to mitigate congestion



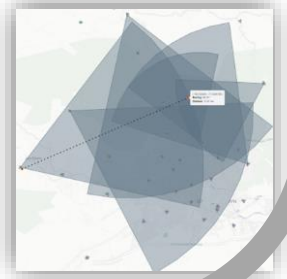
Border Area Optimization



- Analyse user performance impact in border areas with legacy technology still active.
- Fine tune strategy and coverage of legacy technology in border region with shutdown cluster.

Coverage & interference adjustment

- Mitigate coverage holes or interference areas with fine tuning optimization.
- Tilts, power settings or parameter changes can be implemented to improve performance



Repeat until target performance is achieved

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