

## ESG-NetCOP

Network Configuration,  
Optimisation and  
Planning Tool

CS Core Network  
Planning

### Planning Objectives

The overall aim is to design and dimension a circuit switched (CS) core network for GSM and UMTS. Design rules like network Grade Of Service (GOS) and minimising infrastructure costs of the network are the constraints for ESG-NetCOP.

### CS Applications

Apart from the basic service Voice, ESG-NetCOP allows different CS applications to be modelled like video streaming, music on demand and future CS-based applications. It assists the planner to reveal possible consequences new services will have on the network, determine possible up-coming bottlenecks and suggests additionally required network resources at minimum cost.

### Supported Core Network Modelling and Planning Tasks

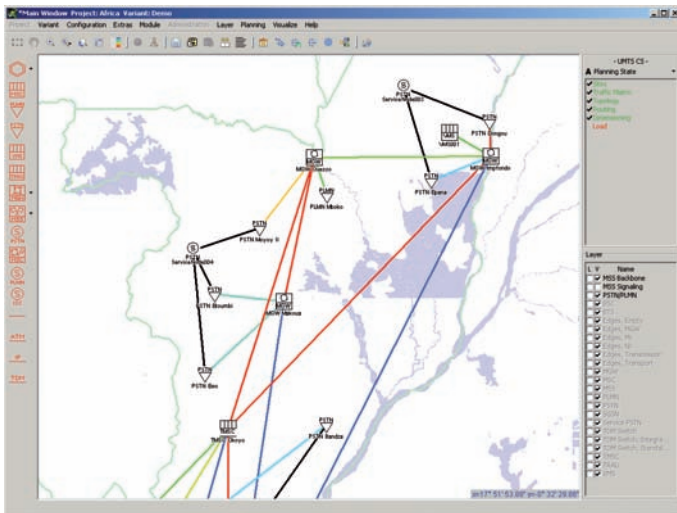
- ▶ Modelling of circuit-switched core network topologies with all relevant nodes like switches (MSCs, TSCs), Point of Interconnections (POI) to PSTN and other PLMN, Application Server, Voice Mail Centre, etc.
- ▶ Definition of subscriber traffic models for the different applications and network areas
- ▶ Modelling of source/sink traffic relations (traffic matrix) for all individual network nodes and supported applications; these traffic relations can be derived from a running network or can be forecasted traffic
- ▶ Calculation of routing plans under different constraints, for example, in order to minimise connection costs for leased lines and minimising transit costs for calls to PSTN
- ▶ Analysis of given routing plans – discovering routing loops and resolving them
- ▶ Dimensioning for changed traffic conditions and changed network topology, for example, introduction/retirement of switches, connections and links

### HIGHLIGHTS

- ▶ Modelling of different CS applications for GSM and UMTS
- ▶ Highly detailed subscriber traffic models
- ▶ Traffic matrix per application
- ▶ Support of hierarchical network designs
- ▶ Definition of high usage groups
- ▶ Routing plans suggestions
- ▶ Analysis of given routing plans for loops
- ▶ Automatic elimination of cycles
- ▶ Network dimensioning
- ▶ Simulation for link and equipment outages

From To	Element 1	Element 2	Element 3	Element 4	Element 5	Element 6	Element 7	Element 8	Element 9	Element 10	Element 11	Element 12	Element 13	Element 14	Total Traffic	Local Traffic
Basin 1	27.00718	4.06231	5.10509	7.08446	4.12217	4.80204	8.12207	5.76117							106.39925	70.01437
Basin 2	4.06214	23.40205	6.72054	3.00419	5.20352	4.6504	12.11105	8.47343							88.99275	46.98725
Donndorf 1	6.15892	6.70708	37.80040	3.71935	20.21265	9.13404	7.38127	7.02865							134.1725	76.00095
Diessen 4	7.07184	3.08454	3.71702	21.02288	2.97761	4.02822	4.57725	3.81782							73.83125	42.04536
Essen 1	4.12500	5.29817	20.21207	2.07874	27.54188	7.16857	5.90413	5.27207							111.26500	95.09277
Frankfurt 1	4.99955	4.65373	6.13620	4.03102	7.17012	39.92989	5.81907	5.35922							114.82760	71.87976
Hammberg 1	8.12725	12.10860	2.37651	4.57584	5.30022	5.91374	48.67865	9.72782							130.91	80.63926
Hannover 1	6.75285	6.40002	7.02377	3.81764	5.20880	5.35878	9.72421	22.98877							91.83	45.97904
Koeln 1	4.31271	4.07507	16.36477	3.20803	15.17070	8.07939	5.88134	5.183							114.8276	63.24807
Leipzig 1	6.79559	2.7724	3.30634	5.48641	2.60091	3.53453	4.0007	3.49885							87.26875	23.48884
Munich 1	5.84781	4.19488	6.12804	5.49713	5.03585	8.02085	5.72735	4.89579							138.08125	125.54082
Nürnberg 1	3.56842	3.20803	3.76284	3.30887	3.034	5.44807	3.41248	2.84436							48.48	28.78816
Regensburg 1	6.35147	3.84887	3.17838	2.84188	2.67764	2.76545	2.27868	3.57753							87.26875	29.18127
Stuttgart 1	3.88829	3.20524	5.29599	3.34700	4.30654	8.55691	4.19889	3.5645							88.99275	56.26888
<b>Total Traffic</b>															<b>106.39925</b>	<b>80.01814</b>

Traffic matrix for MSC to MSC relations



Graphical presentation of a NSS network analysis result. Edges connecting the network elements are colored according to the amount of traffic carried.

## Network Analysis

ESG-NetCOP offers a variety of features that help you to analyse the behaviour of a running network. For example, based on the peak time traffic ESG-NetCOP can simulate GOS for all end-to-end traffic relations in the network. It shows for which source and destination pairs a pure grade of service was achieved or if there is a waste of network resources due to the network design.

## Outage Simulations

ESG-NetCOP allows you to simulate changed loadings on the different nodes and connections for modified routing plans or for outages of a single link, total trunk group or entire node. Additionally it suggests extra capacities in order to minimise the loss of traffic in the case of network failures.

Based on this information the planner can decide whether and if so, at which part of the network to what extent it makes sense to provide extra network capacities to avoid too much loss of traffic and thus revenue. This helps to avoid a bad quality of service for critical parts of the network.

## Benefits

- ▶ Detailed analysis of network loading
- ▶ Quick dimension of a CS core network
- ▶ Easy introduction of new switches, POIs and connections
- ▶ Very flexible basis for network planning
- ▶ Many different network scenarios can be simulated in a short time
- ▶ Cost-savings due to optimised routing for calls to PSTN
- ▶ Supports least-cost routing
- ▶ Detects dangerous routing cycles