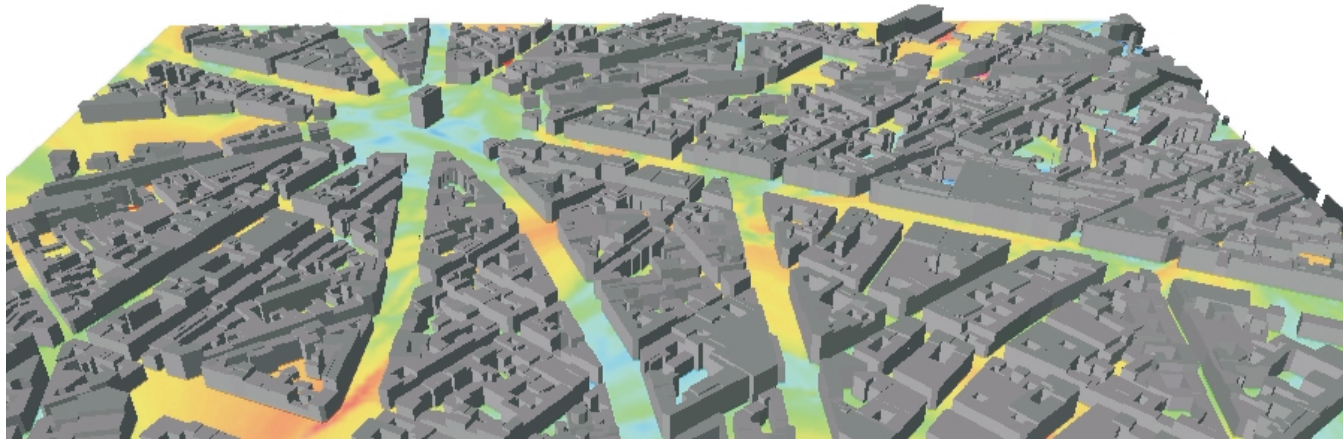


WinProp: 3G UMTS PS



Tx power of mobile station in uplink 3G network (Paris)

The evaluation of system performance and user QoS for PS services requires the simulation of parameters like packet delay, throughput (cell and user based),...

Packet Switched Traffic

WinProp offers modules to evaluate packet switched services in 3G networks. The sporadic activity of the traffic sources and different requirements concerning the QoS (e.g. delay, throughput distribution, ...) are the main differences compared to CS simulations.

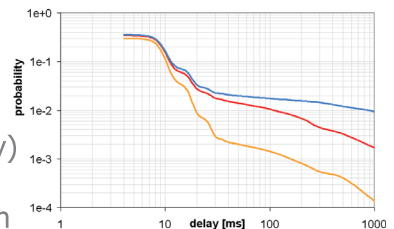
A traffic source generates data units (packets) and the network transmits these data units considering interference levels and available radio resources. Statistics of packet delays, throughput and resource allocation are determined.

UMTS FDD HSDPA

The adaptation of the transport scheme (modulation, coding) and the scheduling of the requesting users within one cell is performed depending on the radio channel conditions. Different services and different types of mobiles (restrictions in modulation or memory) can be defined and simulated in parallel.

The influence of network layout or parameterization on system performance (capacity, coverage) and on user experienced QoS can be studied.

To get realistic estimations (map) for the location depending HSDPA peak data rate an accurate interference determination is used (profile depending orthogonality).



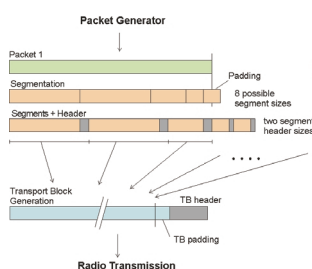
UMTS FDD DCH

In contrast to HSDPA dedicated radio resources have to be considered to serve the mobiles exclusively. The performance on system and user level can be compared for different parameterisations or traffic source properties. Different services (also HSDPA and CS) can be simulated in parallel.

UMTS TDD DCH

Especially for sources with asymmetric uplink/downlink traffic the TDD mode offers a flexible option for efficient bandwidth utilization. Therefore the TDD module includes independent uplink/downlink traffic sources. Additionally it is possible to specify a feedback link generating acknowledgment traffic.

Traffic Model



A three stage traffic model is available using session, page and packet level. Predefined statistical distributions can be used to set up the required parameters (e.g. page size, page reading time, packet size, ...). The applied traffic model can be freely customized by loading any distribution for the statistical parameters. This enables the simulation of many different PS service characteristics (WWW, FTP, ...).

WinProp: 3G UMTS PS

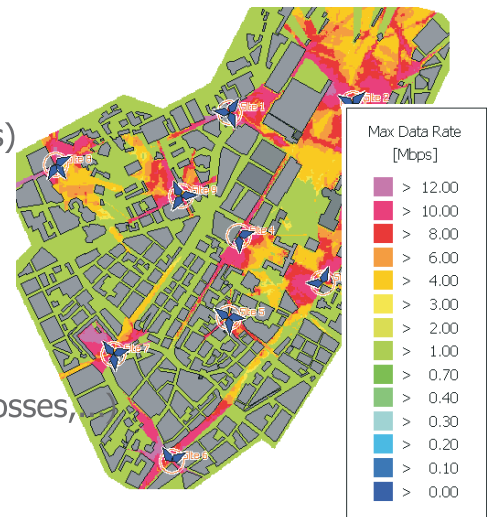
Features:

Propagation & Scenarios

Network simulation based on any scenario supported by WinProp (i.e. rural, urban, indoor, tunnel scenarios)

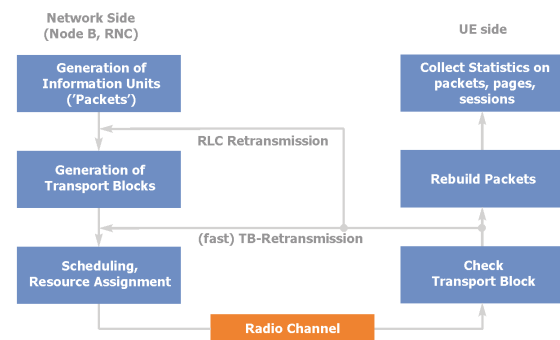
Service Mix

- Definition of arbitrary services
- Spreading factor (processing gain)
- PS traffic definition (sessions, pages and packets)
- Target Eb/N0
- Different types of mobile stations (individual speed, losses, ...)
- Multiple services in one simulation run possible



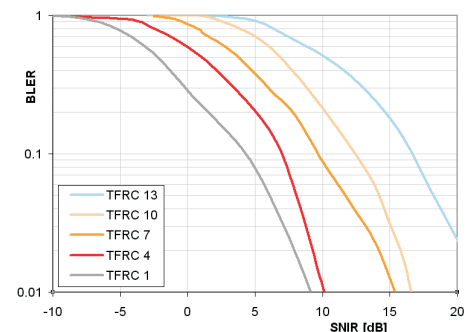
HSDPA (High Speed Downlink Packet Access)

- Definition of different transport formats
- Modulation
- Block size
- Number of codes
- Packet processing (segmentation/concatenation)
- Determination of interference level
- CQI reporting
- Scheduling (Round Robin, Priority, C/I based)
- Assignment of radio resources (codes and TX power)
- Fast retransmission and H-ARQ
- Higher Layer retransmission (RLC)



Link Level Performance

- Import of BLER performance tables
- Open ASCII interface
- Depends on transport format, speed, channel profile

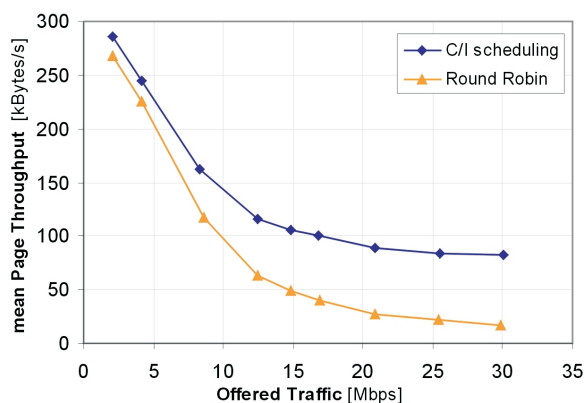


Outputs

- Maps (quasi static)
 - HSDPA peak data rate
 - Reported CQI value (HSDPA)
- Statistical information collected on sector and/or system basis (dynamic)
 - Offered and Carried Traffic
 - Packet transmission
 - Packet delays
 - Different throughput measures
 - Number of retransmissions
 - Resource allocation
 - Power
 - Codes

Circuit switched traffic

fully interworking with 3G CS models



3G Packet Switched Networks