

NetScale™ with its UMTS/HSDPA module is the perfect tool for thorough evaluation and optimization of 3G and 3.5G mobile networks. By allowing very realistic simulations of large scale end-to-end networks in your laptop, the tool creates a new paradigm for network engineering.

Scalability:

The simulation time and memory requirements of NetScale™ grow linearly with traffic, whereas they grow exponentially with the other tools – with major impact on engineering efficiency.

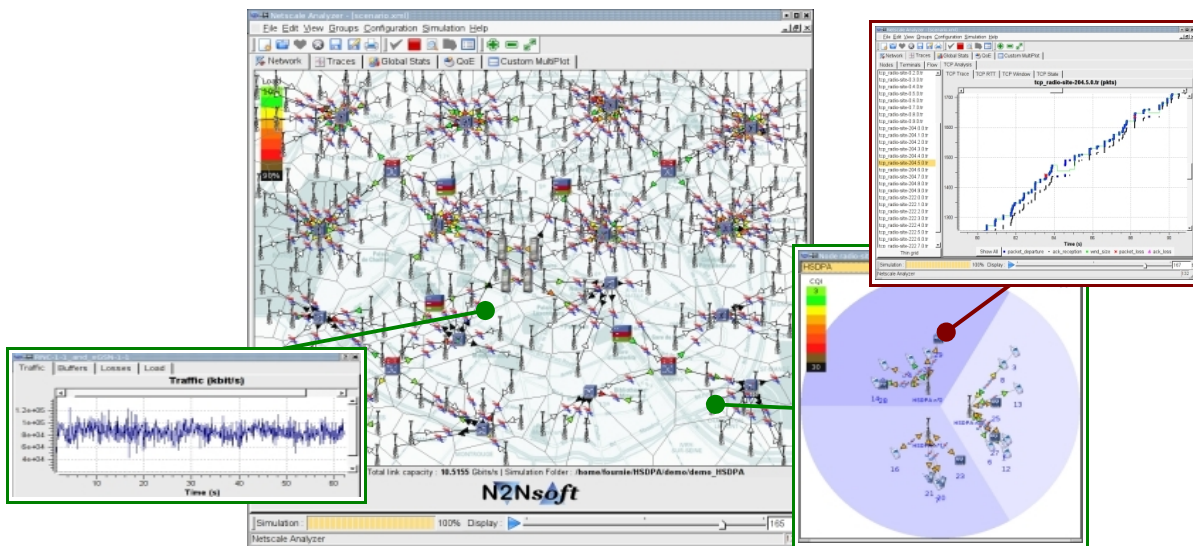
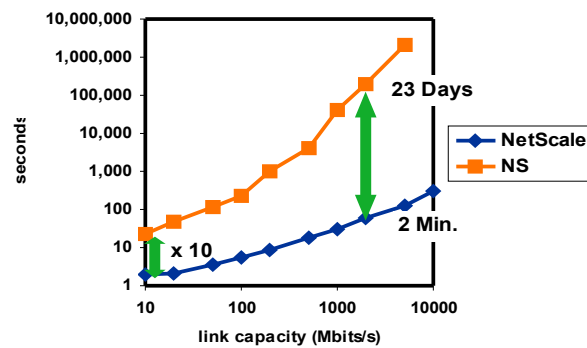
In your laptop, you can simulate:

- 100 000 end-users
- 10 000 mobiles in active download
- 500 base stations (3-sector nodeB)
- 10 Radio Network Controller (RNC)
- SGSN, GGSN, MSC and the core network
- the server farm
- Iub, Iu, IuPS, IuCS interfaces

... and also :

- 500 000 TCP connections
- Tbits of traffic
- radio simulated at 2ms time scale

Run time comparison
(fixed network)



Typical Use Cases:

- backhaul dimensioning and evolution planning
 - TCP, HTTP, streaming proxy engineering
 - UMTS/HSDPA allocation
 - nodeB scheduling evaluation
 - radio resource optimization
 - SLA requirements
 - end-to-end QoS policies
 - new service introduction
 - QoE validation
 - RNC dimensioning
 - server farm optimization
 - robust backbone architecture
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Features**Application layer**

- WAP & web-browsing (HTTP)
- file transfer (FTP), e-mail
- video streaming
- voice (PSTN, VoIP)

Transport layer

- UDP & TCP variants: SACK, Reno, split TCP
- customized API for protocol evaluation

Network Layer

- IP
- Adaptive Mutli Rate for voice coding
- Radio Resource Control (RAB adaptation)
- Admission control

Link layer

- PDCP (header compression)
- RLC (acknowledged and transparent mode)
- MAC-d, MAC-hs
 - channel aware scheduling
 - adaptive modulation and coding
 - chase combining & incremental redundancy

Physical layer

- ATM & ethernet
- Channel Quality Indicators (CQI)
- BLER computation for different transport formats (coding, modulation, nb channels)

QoS settings

QoS classes are mapped into:

- a radio bearer
- an ATM traffic descriptor
- a priority level for the nodeB scheduler

Radio models

All models are driven from standard 3GPP specifications. They include:

- power control
- horizontal & vertical antenna patterns
- customized path loss environment and multipath propagation models
- lognormal shadowing & fast fading
- Rake receiver
- intracell and extracell interferences
- classes of velocity for User Equipment

Proprietary features

- application programming interfaces allows to leverage the simulation environment and integrate specific modules.
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Outputs

On the simulated network, the traffic is captured on all the links and on thousands of terminals – as if engineers were tracing the actual traffic on the network. It can be post-processed to provide extensive statistical data for analysis:

- Network state: link utilization, throughput, buffer sizes, RAB utilization statistics...
- Service Level Agreement: network availability, response time, packet loss probability...
- Application dependent Quality of Experience: blocking rate, latency, goodput, delay, jitters...
- Radio performance: code allocation, CQI vs SINR statistics, interferences...
- Detailed engineer investigation: Ethereal-like TCP traces, nodeB scheduler monitoring...

please contact N2NSoft:

<http://www.n2nsoft.com>

+33.1.40.13.95.53