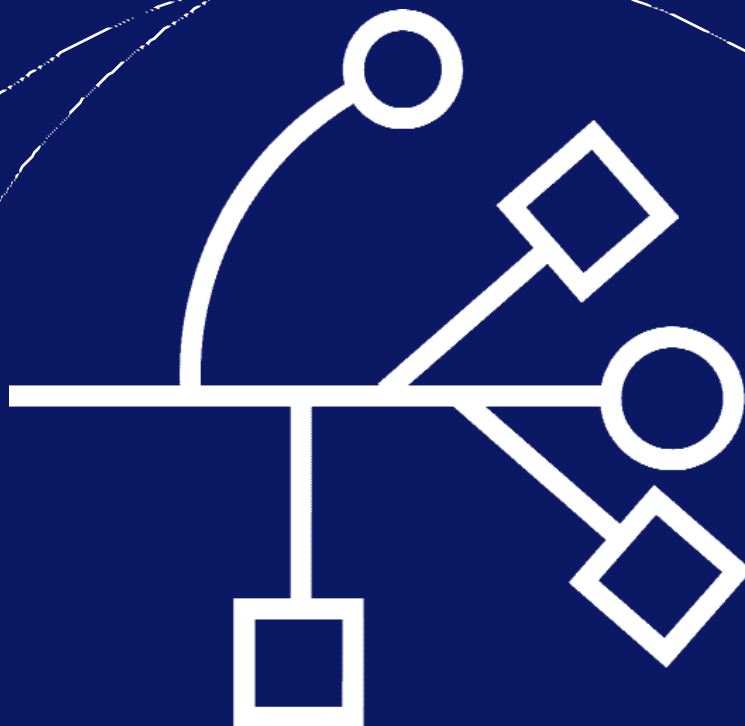


UQoS EDGE

- A telecom network end-to-end QoS test system



- Advanced network and service testing in Telecom networks
- Reporting on user perceived network and service quality
- Reporting at different organisation levels, both for management and technical personnel
- Centralised network wide regression testing and interactive protocol level error tracking

UQoS EDGE builds a roadmap for cross network testing as fixed networks with line switched technologies, IP-networks and 3rd generation mobile networks are brought together to realise service convergence in Next Generation Networks.



Your customers will notice



WHO IS UQoS EDGE FOR?

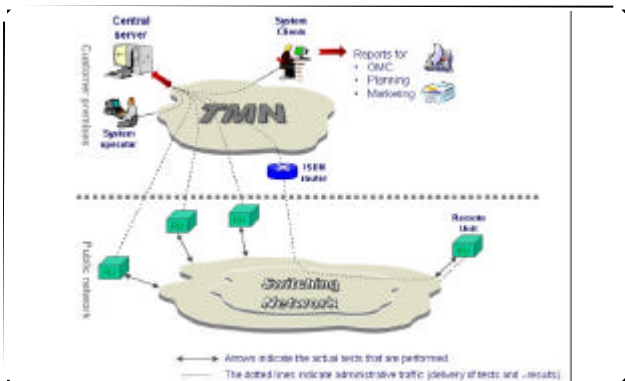
The typical network operator/service provider has different departments such as:

- Operation and Maintenance Centre (OMC)
- Network/service planning department
- Marketing/Public Relation department
- Customer care unit
- Management

These units have unique responsibilities and areas of focus. Common for all is that they require relevant QoS-information from the networks and services within their areas of responsibilities. Due to the versatile reporting module of UQoS EDGE, the reports can be tailored to fulfil the different user requirements with respect to abstraction and level of detail.

SYSTEM DESCRIPTION

The system comprises a number of remote units (RU) and a central site unit (CU) with an SQL-database. The CU is



Operators and clients communicate with the central server over an internal LAN/WAN (i.e. a TMN network). The central server distributes test jobs to all the remote units which, in order, carry out the tests and report the results back to the central server.

UQoS EDGE		Weekly report 1 - Week 32, 2001		UTEL SYSTEMS	
Generated: Wednesday 15.04.01, 15:23					
Network:	ISDN				
Bearer service(s):	Speech, 64 Kbit Unrestricted, 3.1 kHz Audio				
Testtype(s):	charge, loss_of_service, network				
Testlocations:	All traffic under Operator xx				
<hr/>					
Testperiod:	Week 32, 2001				
	Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday				
	Self-defined time: 00:00 - 23:59				
<hr/>					
Summary:					
Tot. number of calls:	1751	Tot. setup delay OSI layer 3 (s)	1.521		
Tot. number of calls with block:	0	Tot. setup delay OSI layer 2 (s)	0.100		
Tot. # of unsuccessful call attempts:	5	Tot. setup delay OSI layer 1 (s)	0.574		
Tot. availability (%):	100.0	Tot. errored second ratio (%)			
Tot. reachability D (%):	99.7	Tot. severely errored second ratio (%)			
Tot. reachability B (%):	99.9	Tot. break ratio (%)			

The Weekly report above shows the highest level of abstraction for reporting on QoS parameters. Statistics are shown for the complete network and includes average "call set-up time" and the "call success ratio".

connected to an administrative LAN/TMN network for management of the RU's. The management of the RU's can optionally be done via ISDN.

SYSTEM OPERATION

The operator connects to the CU using the operator's internal LAN/TMN network. The operator can:

- Define network models for both the line and packet-switched network
- Define scripts
- Define test matrixes
- Define test schedules
- Manually connect to a given RU for remote interactive testing
- Monitor on log-files generated in the RU's and stored in the database
- Start test scripts for mobile units (mobile RU's), which are placed temporary in the network.

Tests defined by the operator are validated by the CU and then put into the database. When the test is due, the CU distributes the test descriptions to the relevant RU's by means of the administrative network. After the test period, the CU will collect the measured data, calculate defined parameters, and update statistical and accumulated parameters and store relevant data in the database.

QoS REPORTING

The different functions/departments within the organisation will typically have different requirements with respect to the detailing and abstraction of the reports generated from UQoS EDGE. The reports forwarded to the market department will for example have less details and higher degree of abstraction than the reports to the OMC/NOC (Network Operation Centre).

UQoS EDGE includes a powerful Excel application for post-processing and presentation of the reports. The (QoS-) parameters reported are displayed numerically and graphically at different levels of abstraction. The system clients/users of UQoS EDGE may also define their own reports by accessing the open SQL-database.

The system client may also extract reports from administrative, commercial regions (for example county or tariff zones).

UQoS EDGE

Report details
Network: Operator X

Main report

From	Data	To	BOTD	BRAB	BRBG	CHTB	O-OK	O-SLO	TB-O	TOTAL	TOTAL
BOTD	Number of calls		415	30	30	30	30	30	30	30	625
	Number of calls with block		0	0	0	0	0	0	0	0	0
	# of unsuccessful call attempts		0	0	0	0	0	0	0	0	0
	Availability (%)		100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
	Reachability B (%)		100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
	Reachability B (%)		100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
	Setup delay OSI layer 3 (s)		1,897	1,892	3,952	1,594	2,112	3,098	1,473	2,238	1,748
BRAB	Number of calls		30	1130	47	65	47	145	73	145	1761
	Number of calls with block		0	0	0	0	0	0	0	0	0
	# of unsuccessful call attempts		0	0	0	0	1	0	0	0	2
	Availability (%)		100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
	Reachability B (%)		100,0	100,0	100,0	100,0	99,3	100,0	100,0	100,0	99,9
	Reachability B (%)		100,0	100,0	100,0	100,0	99,3	100,0	100,0	99,3	99,9
	Setup delay OSI layer 3 (s)		1,850	1,481	1,453	1,906	1,498	2,207	2,214	2,128	1,874
BRBG	Number of calls		30	47	660	47	47	48	47	47	1020
	Number of calls with block		0	0	0	0	0	0	0	0	0
	# of unsuccessful call attempts		0	0	1	0	0	0	0	0	1
	Availability (%)		100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
	Reachability B (%)		100,0	100,0	99,9	100,0	100,0	100,0	100,0	100,0	99,9
	Reachability B (%)		100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
	Setup delay OSI layer 3 (s)		2,072	1,499	1,722	2,089	1,774	2,192	2,383	2,220	1,806

The system client may by himself navigate by means of point and click in the Excel sheets to display the required details of information. A typical scenario would be to click on the highlighted red numbers to find out where the undesired irregularities are found in the network and what caused them.

Reports may be generated on bases of:

- Low traffic/busy hour
- Time; day, week, month, quarter, year, up to now and self defined
- Test type (billing test, service loss testing, network test, manual test)
- Service (line switched, packet switched)
- Bearer service
- Exchange type
- QoS parameters
- Type/nature of fault
- Location/part of network
- Areas (adm. areas, regions, counties, tariff zones etc)

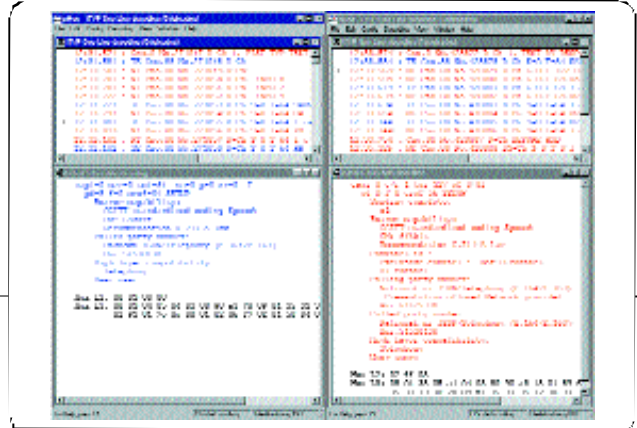
The reports can be distributed via e-mail directly from the system client.

ADVANCED FEATURES

An important feature of the UQoS EDGE system is that it can handle both the line and packet switched services (X.25, B/D-channel) simultaneously.

QoS EDGE does in addition to this automatic traffic route QoS reporting offer the following functionality:

1. Remote interactive control of the call generator/simulator in the RU's.
2. Protocol analysis on log-files generated in the RU's and stored in the database.
3. Active alarms from the RU's towards the CU when certain trigger conditions are fulfilled.
4. Generate output to 3'd party "correlation" systems for parameter verification. Of particular interest is the verification of billing records.
5. Overnight regression testing after software upgrade in the public exchange (before the subscribers wake up).
6. Testing of new network services overnight (before the subscribers wake up).
7. The system can be configured to generate alarms (SNMP-traps) on defined events.

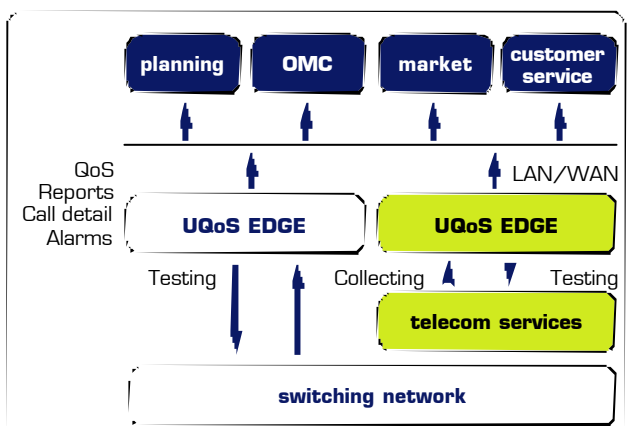


For error tracking purposes the operator can doubleclick a call and study the protocol signalling on the A- and B-side.

Individual calls

test id	call id	from	to	from	to	setup	info	admit	connect	total	cause
id	id	id	id	id	id	trans	trans	trans	trans	trans	value
1000	1	ATHENA	ATHENA	804	FFS	26 12 2000 20 00	0 180	0 021	1 512	0 260	16
1000	1	ATHENA	ATHENA	046	0V0	26 12 2000 20 00	0 191	0 010	1 292	0 280	16
1000	1	ATHENA	ATHENA	030	0304	26 12 2000 20 00	0 180	0 020	1 272	0 260	16
1000	1	KAVALA	KAVALA	VEA2	MJ7	26 12 2000 20 00	0 290	0 020	2 073	0 401	16
1000	1	IRAKLI	IRAKLI	ES	F04V3	26 12 2000 20 00	0 241	0 010	1 662	0 280	16
1000	1	IRAKLI	IRAKLI	H05	H09	26 12 2000 20 00	0 260	0 010	1 412	0 280	16
1000	1	IRAKLI	IRAKLI	044	0E4	26 12 2000 20 00	0 180	0 010	0 862	0 261	16
1000	1	KAVALA	KAVALA	AS	EV5	26 12 2000 20 00	0 190	0 020	1 742	0 330	16
1000	1	KAVALA	KAVALA	FS	NT06	26 12 2000 20 00	0 210	0 010	1 192	0 261	16
1000	1	KAVALA	KAVALA	TUS	05	26 12 2000 20 00	0 170	0 010	0 961	0 260	16
1000	1	LAFISSA	LAFISSA	POKIS	SAC18	26 12 2000 20 00	0 180	0 020	2 420	0 300	16
1000	1	SYROS	SYROS	CST	MD6	26 12 2000 20 00	0 180	0 020	0 801	0 260	16
1000	1	THESSA	THESSA	AHM7	FD6	26 12 2000 20 00	0 180	0 020	2 033	0 321	16
1000	1	THESSA	THESSA	F752	JAN	26 12 2000 20 00	0 210	0 020	2 420	0 480	16
1000	1	THESSA	THESSA	HEN4	KR02	26 12 2000 20 00	0 180	0 021	2 123	0 300	16
1000	2	ATHENA	ATHENA	FFB	046	26 12 2000 20 02	0 211	0 010	0 841	0 260	16
1000	2	ATHENA	ATHENA	M05	030F	26 12 2000 20 02	0 170	0 010	0 822	0 271	16
1000	2	ATHENA	ATHENA	804	0V0	26 12 2000 20 02	0 281	0 020	1 963	0 300	16
1000	2	KAVALI	KAVALA	8478	9412	26 12 2000 20 02	0 191	0 020	1 752	0 381	16
1000	2	KAVALI	KAVALA	VEA2	THD	26 12 2000 20 02	0 180	0 020	1 813	0 401	16
1000	2	IRAKLI	IRAKLI	H05	0E4	26 12 2000 20 02	0 210	0 010	0 831	0 260	16
1000	2	IRAKLI	IRAKLI	H09	044	26 12 2000 20 02	0 280	0 020	1 623	0 441	16
1000	2	IRAKLI	IRAKLI	ES	SAB8	26 12 2000 20 02	0 180	0 020	1 292	0 261	16
1000	2	KAVALA	KAVALA	AS	05	26 12 2000 20 02	0 190	0 020	1 842	0 330	16
1000	2	KAVALA	KAVALA	EV5	T45	26 12 2000 20 02	0 211	0 020	0 971	0 270	16

At the "lowest" level of detail the system client may isolate categories and isolate all irregular calls/tests performed. A number of important Quality parameters and error values such as "cause values" are shown for these individual tests. The operator may further more click/choose on any test to automatically start a comprehensive protocol analyser for complete decoding on both A- and B-side of the given call (see top right).



The above figure illustrates how UQoS EDGE tests the network/ services and subsequently collects the test results. The processed and/or raw data are then offered to the system clients at different levels of abstraction and detail.

FEATURES AND BENEFITS



Feature	Customer benefit
Statistical reporting on network and service quality	<ul style="list-style-type: none"> • Improved planning leading to reduced congestion and increased revenues • Early detection of performance degradation implies reduced number of customer complaints and increased customer loyalty • Objective reporting fulfilling requirements of regulatory authorities • Objective reporting against elements of service level agreements (SLA) • Objective QoS figures for product marketing
User defined tests down to protocol and bit level implies	<ul style="list-style-type: none"> • Cost and time efficient network wide regression testing (after changes in network/service) • Cost and time efficient network wide testing of new services
Protocol level error tracking	<ul style="list-style-type: none"> • Increase revenues by time efficient detection and identification of irregular network call handling • Time and cost efficiency through central site error tracking
Verification of billing records	<ul style="list-style-type: none"> • Increase revenues by early detection of missing billing records • Documentation of statistical accuracy of billing system (customer perspective)
PC-based platform and conventional operating systems	<ul style="list-style-type: none"> • Customer can regulate pricing on hardware units by adjusting the PC-requirements • Customer can use IT-personnel for the maintenance of the system (backup system, database, report clients)
Open database for collected, measured and aggregated information	<ul style="list-style-type: none"> • Customer can build value added reports himself and include/export results to other systems
Open information model	<ul style="list-style-type: none"> • The extracted, aggregated information can seamlessly be included in or requested by other support systems (such as customer relation management systems)

TECHNICAL SPECIFICATIONS

Access types supported

- ISDN Basic Access
- ISDN X.25
- PSTN
- LAN/WAN (IP)

Services supported/tested

- Bearer services
- Tele services
- IN services
- IVR/DTMF telephone services
- Internet/Web-services (downloading and login)
- VoIP services

Typical Call Setup QoS parameters presented

- Network availability
- Unsuccessful call ratio
- Activation time
- Call set-up time
- Call success ratio

Typical Data Transfer QoS parameters presented

- IP delay, IP jitter and IP loss
- End-to-end speech delay
- Speech quality (MOS)
- Download time (web-pages)
- Response time (interactive service)
- B-channel transmission quality: SES (Severely errored seconds), ES (Errored seconds): (G.821)
- Throughput (adjustable packet- and window size)
- Service availability
- Round trip delay

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